

**The El Paso Mathematics and Science Program
Annual Report
October 2003 - May 2004**

I. INTRODUCTION

In Year Two, the multiple, yet closely related, activities of the El Paso Mathematics and Science Partnership (MSP) are fully underway throughout K-12 classrooms and postsecondary institutions in the El Paso region. Indeed, MSP's focus on the achievement of all students in mathematics and science, at high levels of proficiency, and its work across K-12, college, university and community organizations is embodied in the five MSP key features. First, is a strong partnership among the twelve school districts, the University of Texas at El Paso (UTEP), the El Paso Community College (EPCC), and other partners throughout the El Paso area, strengthened even further over the past year. Second, is attention to teacher quality, quantity, and diversity reflected in the work of staff developers in K-12 classrooms, building the skills of math/science teachers through the Masters of Arts in Teaching Mathematics and Science program, and, support for new teachers through traditional and alternative induction and recruitment efforts. Third, is the development and implementation of challenging courses and curricula, implementation of the El Paso MSP mathematics and science curriculum frameworks which focus on both state and national standards, and requirements for higher education. Fourth, is the use of evidenced-based design and outcomes reflected in the implementation of research-based teaching and learning approaches, such as inquiry-based learning, the utilization of the most recent knowledge about effective professional development practices, and the dissemination of research findings and successful strategies. And, finally, is a purposeful focus on institutional change and sustainability evidenced by increased engagement among UTEP and EPCC math, science and engineering faculty, as well as K-12 and community leaders who are invested and committed partners in improving mathematics and science achievement K-12.

Return on Investment

In looking at what has been accomplished as a result of the National Science Foundation (NSF) grant, it is clear that we have made significant progress toward meeting the goals of MSP. In our second year, El Paso MSP has built the infrastructure needed to ensure full implementation of El Paso MSP, including the following:

- Enrolled a cadre of teachers in the Master of Arts in Teaching Mathematics and the Master of Arts in Teaching Science to improve the quantity, quality and diversity of the teacher work force;
- Implemented the El Paso MSP Professional Development Plan that resulted in greater understanding and buy-in by El Paso math/science teachers of El Paso MSP's goals, and improved math/science teaching and learning in classrooms across the region.
- Improved the capacity of mathematics and science staff developers and high school teachers to implement the new mathematics curriculum frameworks and Algebra I and Biology TEXTEAMS modules thus deepening student conceptual understanding by addressing higher levels of cognitive demands.
- Developed mathematics and science content leadership among principals, assistant principals, and district office leaders through the implementation of a newly created mathematics and science classroom observation protocol and through building their capacity to utilize student achievement data to monitor progress and ensure the highest level of achievement in mathematics and science among all students.
- Utilized the expertise of local STEM faculty in providing professional development to staff developers, and in developing mathematics and science curriculum frameworks, thus strengthening the partnership between PreK-12 teachers and

- postsecondary faculty.
- Strengthened capacity for STEM faculty and K-12 teachers to conduct research in a variety of educationally-related areas of mathematics and science.

Among, the clearest evidence that El Paso MSP is significantly impacting student achievement are the following:

- Over three-fourths of all students in MSP districts are now enrolled in college preparatory math/science courses including Algebra I, Geometry, Algebra II, Biology and Chemistry.
- Pass rates in key secondary courses are at an all-time high with significant increases occurring in Algebra I and II, Biology and Physics. Of particular note is the 10 percentage point increase, to 84.3, in the passing rate for Algebra I.
- High School graduation rates have increased among all students with almost 78% of students graduating from MSP districts. Of these, over 80% are graduating having completed the college preparatory Texas Recommended High School Program.
- During MSP Year Two, math and science teacher production has increased significantly.

II. OVERVIEW OF YEAR TWO IMPLEMENTATION

During Year Two of El Paso MSP, all key elements of our Strategic Plan were fully operationalized. The following section of the report delineates El Paso MSP's progress in addressing MSP goals and objectives via implementation of the key elements and related activities.

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

Progress in carrying out strategies outlined in the first key element—to increase and improve the quantity and quality of certified math and science teachers—has been significant in Year Two. During this period, the El Paso MSP increased the participation of UTEP STEM faculty toward improving preK-12 teacher preparation, while further building the knowledge and instructional capacity of teachers and instructional leaders in the field.

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

Objective 1.2: Create the MSP Scholars to support twenty students each year to work toward middle school or high school mathematics or science certification.

The UTEP College of Science has made significant progress toward full implementation of the Master of Arts in Teaching Mathematics and Science (MATM/S) programs. In both degree programs areas, faculty positions are fully in place, and classes are underway.

For the MATM program, fourteen members of the first student cohort continue to be enrolled in the 2003/2004 academic year. Courses offered included: MATH 3300 *History of Mathematics* and MATH 5360 *Introduction to Research in Mathematics Education*. In the Spring 2004 semester, Cohort I members enrolled in MATH 5365 *Technology in the Mathematics Classroom* and MATH 5370d. Summer courses for Cohort I, MATH 5370c *Number Theory and Algebra* and STAT 3330 *Probability*, are underway. The following courses for the MATM Cohort I members are projected for the Fall 2004 semester: MATH 3319 *Number Theory* and MATH 5385

Statistics in Research. Whenever possible, MATM courses were held at EPCC's Valle Verde campus to increase accessibility for teachers and accommodate their schedules.

It is projected that at least 20 applicants will be accepted into Cohort II, which is scheduled to begin during Summer, 2004 with MATH 5370a *Logic and Proof* and MATH 5360 *Introduction to Research in Mathematics Education*. In Fall 2004, MATM Cohort II members will enroll in MATH 3300 *History of Mathematics* and MATH 5370 *Calculus and Analysis*. In order to ensure greater success in the MATM program, pre-MAT Calculus I and II courses were offered for those interested in joining Cohort II or III. This also allowed middle school teachers to take the necessary prerequisites for the MAT program. The students who were enrolled in the pre-MATM Calculus I and II courses in the Fall 2003 and Spring 2004 are prepared to become members of Cohort II.

The Substantive Degree Program Request for the MATS is currently being reviewed by the Graduate School. The Program Request includes tracks for four possible emphases under the MAT in Science degree. Those include: physical science, life/earth science, life science, earth science. All emphases require 36 credit hours for completion. Thirty of those credit hours are content courses that include pedagogy. The remaining six credit hours are in *Classroom Research Methodology*, which is designed to enable students to conduct research and prepare an original project in the area of science education. These courses will introduce the basic principles for techniques of a research problem, research library, problem statement, analysis assessment, and statistical analysis.

Although the MAT in Science degree is currently in review at the Graduate school, twenty-one applicants were recruited and admitted to the program through the Master of Science in Interdisciplinary Science (MSIS) degree and began their studies in Fall 2003. Once approval has been granted, students' records will indicate the MAT in Science degree. All MATS students successfully completed the Fall 2003 semester. They were enrolled in CHEM 5301 *Modern General Chemistry* and PHYS 5321. Students continued in the Spring 2004 semester by enrolling in CHEM 5359 *Contemporary Topics in Physical Chemistry* and PHYS 5393 *Electricity and Magnetism*.

To facilitate the recruitment of out-of-field teachers into both the math and science programs, pre-MAT courses in Calculus I and II were especially adapted to assist teachers in meeting MAT course requirements.

Objective 1.3: Create the NSF Scholars Program for Alternative Certification (ACP) Professionals.

Objective 1.5: Create an induction program to keep new math and science teachers in the profession.

Objectives 1.3 and 1.5 are the responsibility of the Center for Research on Educational Reform, and the overall goals of both objectives are to improve the quality and number of math and science teachers, especially those in their first three years of teaching, where there is often high attrition from the field. Since they are closely connected, we are reporting them together. The teachers in Objective 1.3 were graduates of the Alternative Certification Program and those in Objective 1.5 were graduates of a more typical undergraduate teacher preparation program. The double goal, improving the knowledge and teaching skills of novice teachers and keeping them in the field of teaching, is accomplished through participation in a series of Saturday seminars throughout the year (two semesters), with a focus on building a professional community of new teachers and providing them professional development and workshops on

applied classroom research aimed at making novice teachers “reflective practitioners” of their craft.

The Saturday seminars were supported by seven professors (Professors Blake in science education, Tchoshanov in math education, Pacheco and Descamps in teacher education, and Hagedorn, Hamed, and Suskavcevic in physics), and two MSP professional staff, (Dr. Penelope Espinoza and Lori Rosales) most of whom participated in all of the Saturday seminars.

Preliminary evaluation data from all 23 of the teacher participants in both Objective 1.3 and 1.5 indicate a high degree of satisfaction with the Saturday seminars program, albeit with constructive advice about improving the seminars in the coming year. Generally, the teachers asked for more structure in the Saturday seminars and more research training. Accordingly, we are revising the seminars for the coming year. In Year Three, participating teachers will have a graduate seminar on “research for educators,” and will complete an applied classroom research project (in math and science teaching). In Year Four, participating teachers will have a graduate seminar focused on issues in gender equity in math and science teaching and learning, followed by a classroom research project.

Year Two was the first full cycle of the NSF Scholars Program for the Alternative Certification Professionals, with 9 middle and high school math/science teachers completing the first year of a 2-year program. The group of nine included 6 high school teachers and 3 middle school teachers; five men and four women, seven in science and two in math, and seven Latinos, one African-American, and one Eastern European. All are recent graduates of the UTEP Alternative Certification Program, and all are in their first three years of teaching. All nine have enrolled in master’s degree programs, either in education, or in the College of Science, and all nine will continue in teaching and into year two of the program.

Year Two was also the first full cycle of the MSP Induction Program, with 14 teachers selected to participate. There were 11 middle school teachers, 2 high school teachers, and one elementary school teacher; nine women and five men; eleven math teachers and 3 science teachers. The group included 11 Latinos, one Asian, one African-American, and one Anglo. They completed the same Saturday seminars—with the same workshops and projects—as did the ACP teachers described above, and all 14 are enrolled in or have just graduated from a master’s degree program. One teacher was dropped from the program at the end of the first semester, due to lack of participation.

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

Through the UTEP College of Engineering’s Teacher Recruitment Program (TRP), brochures and posters addressing opportunities through the Alternative Teacher Certification Program (ACP) were developed and distributed throughout the College. This outreach effort complements more focused activities undertaken by MSP-funded students who staff Teacher Recruitment Program booths at University Engineering and Science job fairs and provide information and address questions regarding the program raised by prospective applicants. The Teacher Recruitment Program coordinates with the UTEP Alternative Certification Program staff to focus on shared approaches toward the effective recruitment of engineering students into teaching.

In Year Two of the MSP, five Engineering students declared plans to enter teaching. They include two 2004 graduates of the Master of Science in Industrial Engineering program; one 2004 Master of Science in Electrical and Computer Engineering graduate, and two Bachelor of

Science in Electrical and Computer Engineering graduates.

To inform future efforts, the TRP project team is currently interviewing students to identify those factors contributing to engineering students' decision to enter teaching. The lessons learned from these interviews are intended to support the program's institutionalization. The College of Engineering is seeking to identify all graduates who were either (1) engineering or computer science graduates who entered public school teaching or (2) teachers with an understanding of engineering that would teach high school courses in the areas of engineering and computer science. These graduates will form a pool that we will survey annually. The survey will be developed to define: how the engineering program prepared them for the teaching profession; the effect of the MSP supports on their decision and performance; recommendations for future student recruitment and/or training; and, testimonials that illustrate the impact of the MSP program.

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

All action steps from Year Two have been completed, including the hiring of a coordinator and the identification and initial contact of six high school magnet programs across El Paso County. Three of the programs are designated as teacher magnet programs (located at Riverside High School, Socorro High School, and Americas High School), two are health sciences programs (at Silva High School and Bel Air High School), and one is a science and engineering program (at Chapin High School). The coordinator has corresponded with the directors of all programs, and has met personally with five of them. She has begun the initial data collection process, including gathering information on size/makeup of the programs, field experiences of students, and curriculum. The coordinator has also discussed the potential relevance of the programs to future math and science teaching careers with the directors and faculty. In addition, she met with the faculty members of the two most established teacher magnet programs (Riverside and Socorro) to establish a data base regarding their content knowledge, expertise, areas of certification, and to identify professional development needs. The Center for Research on Educational reform, which operates this effort of MSP, also arranged, coordinated, and hosted a visit to the UTEP campus for a group of 100 future teachers from Americas High School during Year Two. Students learned about careers in math and science teaching, viewed a physics presentation given by graduate students, and received information on admission to UTEP.

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

Fundamental to increasing the quantity and quality of teachers in MSP is the work of school-based mathematics and science staff developers. In the spring of 2003, a cadre of twenty-five mathematics and science staff developers was hired as school-based coaches and work began in laying the foundation for meeting the goals of MSP. By August of 2003, staff developers began their work at school sites focusing a major portion of time in high schools. To fully prepare staff developers for the challenges they would face, they were provided with over one hundred hours of professional development to strengthen their knowledge, skills, and abilities around three major areas: 1) training support for the implementation of the K-16 math curriculum frameworks, Algebra I and II, and math/science TEXTEAMS (Algebra I, Biology, and Science for grades 6-8); 2) cognitive/content coaching to facilitate entree into schools in ways that impact the culture of mathematics and science departments for sustained change, and to provide a structure for coaches and teachers to plan and work collaboratively on school improvement efforts; and, 3) analysis and utilization of student achievement data. In addition, staff developers

were provided tools to help them gain successful entree to schools, and facilitate their becoming an integral part of the schools' organizational culture.

Staff developers created an urgency for change and a rationale for their role in schools by focusing on student achievement data. They brought teams of teachers together to uncover and reflect on gaps in student achievement, ask critical questions, and identify root causes of their findings. In doing this, schools were able to assess their progress in improving student achievement and determine areas of need that the staff developers addressed while working with teachers. These analyses and questions became a roadmap for crafting plans of action, drawing on research on teaching and learning to increase students' conceptual knowledge of math/science content, and assist teachers in understanding and working towards meeting district, state and national standards.

The embedded use of the curriculum frameworks and TEXTTEAMS training supported the staff developers in raising the bar for teachers to provide instruction at more rigorous levels. The curriculum frameworks map math and science content to levels of cognitive demand as well as to state and national standards. They also clarify for teachers what should be taught and how to teach it so that students acquire "knowledge packages" that connect and synthesize various topics and concepts. Liping Ma, a widely recognized mathematics educator, notes that this type of grouping or connecting of concepts helps students to learn mathematics at more complex and deeper levels. She states that "a teacher's ability to 'pack' knowledge--to see mathematical topics group-by-group, rather than piece-by-piece is a way of thinking...The purpose of a teacher in organizing knowledge in such a package is to promote a solid learning of a certain topic" (Ma, L. 1999). The frameworks also provide clarity to the vertical alignment of topics, and build shared understanding by teachers on how to make curriculum leaner so that learning occurs at deep conceptual levels.

Entree into high schools was supported through the use of the Professional Teaching Model (PTM), a five step coaching process which helped staff developers become both critical friends and teaching colleagues within schools. Teacher and staff developer teams co-designed a series of lessons addressing needs of students identified by the teacher and/or department. Included in the six week process is the *study* of the TEKS and curriculum frameworks, a *determination* of instructional practices and materials to be used in the lesson, *planning* of a lesson and an assessment, *implementation* of the lesson and assessment, and collaborative *analysis* of results and student work before reviewing and beginning the process again. As a coaching tool, PTM engaged and built a shared vocabulary between staff developers and teachers while developing lessons rich in content that meet students' needs and ensure maximum impact and understanding for all. Each six week cycle of the PTM provided a structure for staff developers to work one-on-one as well as with small groups and departments to build on-site capacity for lasting change and to demonstrate best practices. This supported an environment where teachers were continuous learners committed to building their knowledge and skills, and nurtured leadership for and ownership of MSP's school improvement efforts. Using the PTM was a step toward transferring responsibility for professional development from a staff developer/coach to teachers, embedding opportunities for them to assume leadership roles and take ownership for their own learning.

A range of training and support mechanisms have also been provided to elementary and middle school teachers through MSP. In concert with district content specialists, professional development in the K-8 mathematics frameworks has focused teachers on the most important content taught at higher levels of intellectual demand. Training in TEXTTEAMS and standards based curricula has provided them clear direction and assistance in day-to-day teaching. Support through the Urban Systemic Program has provided classroom-based, on-site professional

development and has further built the capacity of a set of over 125 lead teachers across area elementary and middle schools.

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

All of the Action steps in the Year Two Implementation Plan have been met. The coordinator for National Board (NB) Certification in El Paso completed a series of recruitment activities designed to foster interest among experienced teachers in applying for the year-long assessment process associated with National Board Certification. The coordinator, an outstanding high school mathematics teacher, is one of only three National Board certified teachers in the El Paso region. She presented workshops and made presentations on NB certification throughout Year Two to scores of school principals, and teacher groups, and she met with school district officials to discuss salary incentives for NB certified teachers in their districts. In addition, in the Spring of 2004, she designed and taught a graduate course for 27 experienced teachers interested in preparing themselves for National Board Certification. This graduate class will now be taught every year, and will replace the pre-candidacy workshops taught the previous Spring. This class provides the most effective recruitment vehicle and school districts have agreed to pay tuition for teachers taking the course. We anticipate 10 teachers will apply for NB certification by the completion of Year Two, ahead of the 15 teachers called for in the Strategic Plan for Year Three.

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

The second key element focuses on issues central to supporting the improvement of math and science instruction in PreK-12 classrooms via leadership at the school and district level. Activities also include increased parent and community engagement. Building school and district capacity is critical to ensuring institutionalization and sustainability of MSP goals and objectives, and promotes inclusive and coordinated change at both the college/university and local school district level.

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

In Year Two of El Paso MSP, principals participated in MSP Principals' Academy seminars focused on three key areas; development of content leadership; applying data analysis for increased monitoring and accountability of student achievement; and, strengthening collaborative cultures at the school site to build school partnerships for learning. Each session was designed to intensify ownership of the goals of MSP and support an infrastructure for lasting change. Over 170 principals, assistant principals and deans of instruction attended over 40 hours of Collaborative-based seminars.

To ensure that principals and assistant principals supported the highest level of teaching and learning, seminar content was designed to assist school leaders in becoming more comfortable with math/science content and pedagogy. Focused dialogue, based on learning theory and evidence from classroom observations, provided principals with a real-time check of the critical attributes of exemplary math/science learning. The use of the MSP classroom observation protocol shifted the principal's role from one of manager and evaluator to that of instructional leader.

Principals learned to examine data in order to identify the academic needs of all students, and to ensure that mathematics and science teaching and learning programs were supporting students

in achieving at optimal levels. Principals were asked to take an interactive role with the data through facilitated conversation that was grounded in practice. The data were viewed as a tool for raising questions about practice that allowed principals to probe and clarify instructional decisions and their potential impact on student achievement levels.

Academy seminars also provided time for principals to engage in strategizing and problem solving about ways to transform their schools into more collaborative and collegial professional learning communities. Networking with colleagues gave principals an opportunity to articulate the challenges faced in fostering an organizational culture for reform, based on current research and practice.

In addition, MSP district directors met monthly with principals, both on site and district-wide, to build shared understanding and commitment to the goals of MSP. School-based meetings afforded an opportunity for one-on-one monitoring, support, and assistance in this endeavor.

Objective 2.2: Build District Level Capacity for School Sites

Bi-monthly meetings between Superintendents and Collaborative executive leadership set the expectation and vision for building capacity at the district level from the onset of MSP. These regular meetings prioritized the alignment of instruction, policies, and resources, as well as providing opportunities to discuss and monitor the progress of MSP goals. In addition, over 200 district leaders participated in 30 hours of Collaborative Leaders' seminars focused on three key areas; analysis of school achievement data to improve student learning; coaching and group facilitation for district leaders; and, building content leadership aimed at increasing capacity to sustain the efforts of MSP. Each seminar emphasized the goals of MSP, the alignment of those goals with other district priorities, and the institutionalization of the work.

Central to the success, sustainability, and institutionalization of MSP at the district level was the alignment of professional development with mathematics and science student achievement priorities, PreK-12. Great emphasis was placed by district MSP directors on conducting monthly meetings with key district associate superintendents, content specialists, and MSP staff developers to align goals and professional development resources across the district and within feeder patterns. Vertical, feeder pattern professional development helped teachers learn how to utilize data in making instructional decisions, and strengthened content knowledge through the utilization of the curriculum frameworks and TEXTEAMS content-based modules. As a result of the close, district-wide partnerships, the curriculum frameworks became a tool that unified districts and influenced their regular monitoring of student achievement, as well as the development of district scope and sequence documents for mathematics and science teachers.

MSP Directors' monthly meetings with Collaborative leaders prioritized proactive fiscal and instructional management of MSP at the district site. All MSP District Directors serve on the Superintendent's cabinet, which is instrumental in policy development, and fiscal and instructional support for MSP at the district level. Ultimately, the MSP District Directors play a vital role in ensuring program sustainability, effective use of resources, and the development and implementation of new policies and practices that support MSP goals and activities.

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

Parent engagement efforts commenced in Year Two with presentations on MSP goals and objectives to parent educators and liaisons at beginning-of-school-year sessions at district offices.

This served to reinforce and recognize parents as major stakeholders and supporting partners in El Paso MSP. It also strengthened the link between district-wide parent efforts and El Paso MSP parent initiatives. Throughout the year, parent presentations were carried out in conjunction with Think College Now presentations to 8th and 9th grade students. Parent training sessions for Year Two were a two-strand effort: 1) the 9th Grade Parent Prep had two beginning and one follow-up seminars at UTEP that brought together parent teams from over three quarters of the urban high schools and over half of the rural high schools, with follow-up sessions projected for the summer; 2) Parent PLUS are seminars held at high schools for parent teams from each of their feeder schools. Eight urban high schools and one rural have hosted their feeder patterns, representing 61 schools. The feeder patterns seminars at the high schools have created stronger links among feeder schools and increased support from principals for parent initiatives. Throughout meetings, presentations, and seminars, the consistent messages to parents are the importance of high-level preparation for college for all students, the critical importance of making sure that students are taking challenging and rigorous mathematics and science courses throughout the pre-college years, and the essential role of parents in supporting their students' education, K-12.

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

The primary focus of this portion of the MSP agenda is the alignment of curriculum, instruction, and assessment in mathematics and science by developing curriculum frameworks, as well as supportive policies, that ensure that every student has access to challenging and rigorous mathematics and science curricula that will prepare them to successfully enroll and complete freshmen college mathematics and science courses. Through the alignment process, K16 partnerships were strengthened as leaders, teachers, and postsecondary faculty played significant, supportive roles in developing and implementing the frameworks.

Objective 3.1: Fully align high school college-preparatory math 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 math and science curricula with newly redesigned high school courses to develop a seamlessly aligned math/science teaching and learning program, PreK-16.

During Year Two of MSP, we moved solidly toward full alignment of K-12 math/science courses with college expectations and acted on priorities that emerged from focused dialogue of the K-16 Leaders Institute convened in Year One. These included the continued development of the mathematics and science curriculum frameworks, and the implementation of the Algebra I, II and K-8 mathematics curriculum frameworks. The Leaders group also discussed and identified strategies for supporting teachers in implementing the frameworks.

The K-16 Mathematics Working Group and the K-16 Science Working Group, composed of mathematics and science teachers and faculty from elementary, middle and high schools, as well as El Paso Community College and UTEP were vital to the alignment work. Having already written Algebra I and II, and mathematics K-8 curriculum frameworks, the math group is currently developing a curriculum framework for high school geometry. The science group was convened at the beginning of Year Two and is currently writing a high school chemistry curriculum framework, and the strand for science K-8 frameworks that develops concepts

leading to high school chemistry.

Because challenging content alone does not lead to high levels of student learning and achievement, frameworks are written in ways that assist teachers in knowing how math and science content needs to be taught in order for students to understand at deep conceptual levels. To accomplish this, we use a matrix structure that maps content to cognitive demands, and to state and national standards. The cognitive demands are: memorize; perform procedures; understand concepts; make connections; and generalize. They assist teachers in distinguishing what a student is expected to know and be able to do with mathematics/science content and what level of thinking students must be engaged in while learning that content. This mapping of topics to cognitive demands describes content knowledge that will not merely be stored but understood, represented, organized, connected and structured in ways that facilitate retrieval and application of knowledge. With cognitive demands, teachers know how to get students to use, represent and connect pieces of content knowledge in coherent ways that will determine whether students understand knowledge deeply and can use it to solve new problems. The K-16 frameworks also map content in mathematics and science to textbooks and materials that have been adopted by districts. The development of the mathematics and science curriculum frameworks and the integration of cognitive demands have been guided by the work of Andrew Porter (now at Vanderbilt) and John Smithson at the Wisconsin Center for Education Research.

The high school geometry and chemistry frameworks will be completed in Year Two of MSP for use in the 2004–2005 academic year. Both course frameworks will be embedded in the TEXTEAMS training in geometry and chemistry that the MSP math and science staff developers will provide for teachers next year.

The curriculum frameworks have been an extremely useful tool for both staff developers and teachers in understanding alignment of curriculum, instruction and assessment. Staff developers co-designed and developed lessons that engaged students with mathematics and science content. As partners in MSP, UTEP faculty members helped the staff developers design a series of lessons that moved students from procedural-level knowledge to more conceptual knowledge. Because the frameworks were written by K-16 teachers and faculty, implementation of the frameworks, especially in high school courses, ensured that students were provided challenging curricula in mathematics and science, and that high school expectations are aligned with postsecondary expectations. Also, by developing the frameworks together, teachers and faculty of mathematics and science, K-16, formed strong partnerships and networks that played significant roles in the preparation of K-12 teachers.

Objective 3.3: Make recommendations to local school districts, community college, and university regarding policies affecting mathematics and science curriculum and instruction.

A key policy issue in Year Two—across the K-16 Partnership—focused on concerns regarding the high percentage of first-time freshmen placed in developmental mathematics courses at UTEP and EPCC. First, in response to requests from the El Paso Collaborative for Academic Excellence and local districts, the UTEP Center for Institutional Evaluation, Research, and Planning prepared “report cards” outlining postsecondary enrollment, course taking and completion, and graduation trends for graduates from all area high schools. In addition, the report cards outlined trends in course placement. These reports were shared broadly across districts and provided powerful evidence to district leaders of the continuing need to carefully monitor course content and instruction. These data were also summarized and presented to MSP leaders, including the UTEP and EPCC Presidents, the UTEP Provost and EPCC Vice President for

Instruction, district superintendents, the Executive Director of the Region 19 Education Service Center, and community leaders. Increased awareness of and focused attention to the data and their implications were evidenced by district leaders' presentations to principals and teachers regarding the critical need for improvement.

At the K-12 level, attention to the data has also resulted in increased attention to mathematics course-taking requirements for graduation. Most notably, the Socorro Independent School District Board of Trustees passed a policy that mandated mathematics course requirements for graduation be extended to four years—exceeding the Recommended High School program mandated by the State. Ysleta ISD also has adopted this policy. El Paso ISD Board of Trustees is now considering a policy drafted by central office leaders, not only mandating a fourth year of mathematics but requiring that every high school senior take a rigorous math course in their final year. Attention in subsequent years will be given to ensuring that students' fourth year of mathematics remains rigorous and further supports students in preparing for higher education. Attention will also be given, in the coming year, to the enactment of policies requiring that the mathematics and science frameworks, developed through the MSP, are fully integrated into the curriculum at all grade levels.

Instructors at EPCC, led by a working group of mathematics and science faculty, have been focusing on the alignment of the frameworks, as well as the Texas state standards, in their curriculum and are re-drafting their own curriculum guides. UTEP faculty, most notably those participating in the K-16 mathematics and science efforts, are also incorporating the frameworks in their instruction to ensure alignment with the topics and levels of understanding that students are expected to bring to postsecondary education,

Finally, attention to K-16 collaboration in supporting high course placement at UTEP and EPCC is underway by testing and admissions staff at both institutions, who along with area high schools, are collaborating in a pilot effort to offer higher education course placement testing to high school seniors. Further efforts will track the results of the pilot effort, and address policies and strategies regarding the institutionalization of the curriculum frameworks and cross-institutional programs to support all students in placing into college-level mathematics.

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

Throughout fall 2003 and spring 2004, EPCC faculty representing biology, chemistry, engineering, geology, mathematics and physics met weekly to align their courses in mathematics and science with area K-12 institutions and with UTEP. To better understand the structure for writing new aligned courses, the faculty reviewed the Algebra I and Algebra II Curriculum Frameworks produced by the K-16 Mathematics Alignment Working Group, and identified entry level courses for pre-service teachers in math and science where alignment work would begin. Work has commenced in at least three of these courses to align them with high school courses and the state standards, the Texas Essential Knowledge and Skills (TEKS). The TEKS outline the expectations of courses students take in high school to prepare them for college level math and science courses. Along with reviewing the TEKS, they also reviewed some high school textbooks adopted for these courses. As a result of this year's work, draft frameworks for three critical freshman science courses--chemistry, physics, and biology--have been developed. To parallel the frameworks being produced by the K-16 Mathematics and Science Working Groups, the EPCC frameworks will also be written using the same matrix structure mapping topics to cognitive demands, and referencing K-12 state and national standards. A description of the cognitive demands is provided in Objective 3.1 above.

Along with writing course frameworks, EPCC faculty engaged in dialogue and discussion on educational reform issues. They read key texts including, *Making America Smarter*, by Lauren Resnick, *The Teaching Gap* by James Stigler and James Hiebert, as well as the state and national standards for mathematics and science including Principles and Standards for School Mathematics.

The EPCC faculty group co-designed and provided two workshops during January, 2004. Attended by approximately 60 faculty members from various content areas, the Faculty Development Program workshops provided faculty with a clearer, shared understanding of the vision of providing courses where learning for understanding is the norm. EPCC's Vice President of Instruction asked the faculty group to co-design and present a retreat for all full-time mathematics and science faculty during April, 2004 to promote awareness and buy-in for the MSP goals and vision. The retreat engaged seventy-five percent of the full-time faculty in focused dialogue around why and what change is needed in teaching and learning in their classrooms, and allowed them to reflect both individually and as a group on what is needed to support that change. Another retreat is planned for September 2004. To respond to the large number of interested faculty, EPCC's MSP work will include more faculty participants next year. During summer's wrap-up of Year Two, EPCC/MSP faculty will co-design two workshops to present at Fall Faculty Development Program sessions.

As an institution, EPCC has been most supportive and responsible in fully engaging and promoting participation of postsecondary faculty in the alignment work. As individuals, faculty work directly on developing newly aligned freshman courses in mathematics and science. In addition, four full-time mathematics and science faculty are participating in the K-16 Working Groups in mathematics and science, linking and working alongside K-12 teachers in developing K-12 curriculum frameworks. These features have involved EPCC at both the institutional and individual levels, and have given EPCC a vital partnership role in working toward the goals of MSP.

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

A focus on the integration of K-16 mathematics/science alignment efforts in math and science teacher education programs at UTEP has been a key priority for the College of Science in Year Two. Much of this work focused on three activities.

First, the Educational Compliance Committee, comprised of faculty in the College of Science continued regular meetings, which commenced in Year One and were focused on the alignment of math and science pre-service teacher preparation course content with state standards and competencies expected of math and science teachers. The work of this Committee also resulted in the development of ten (10) secondary education degree plans in mathematics and science disciplines. Given that over 75% of College of Science Chemistry, Biology, Physics and Mathematics faculty taught courses required for preservice teachers, the vast majority of college faculty were part of this important work.

College of Science faculty also worked with pre-service teachers in K-12 classrooms where, for example, they focused on teaching hands-on, inquiry based science. This classroom-based effort allowed pre-service teachers to be taught within the very context in which they would be working. The classroom/school-based effort also provided pre-service teachers opportunities to participate in science fairs, classroom observations, and discussions regarding inquiry-based,

hands-on approaches and materials.

Finally, discipline-based workshops for College of Science faculty, to be held later in Year Two, will refine and reinforce the knowledge and competencies required for pre-service teachers based on the frameworks developed through the MSP curriculum alignment process.

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

The improvement of science, technology, engineering, and mathematics education (STEM), PreK-12, will support the development of a diverse and well-prepared set of students completing secondary school. If these students are to have an opportunity to join the ranks of scientists, technicians, engineers, mathematicians, and educators, all key stakeholders in the community must recognize the importance of postsecondary education and be supported in preparing all students for college. This key element focuses the work of MSP directly on students through three major initiatives: THINK COLLEGE NOW, Counselors Creating College-Going Pathways, and the Infinity Project from the College of Engineering.

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 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 of 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. 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 the first eight months of MSP Year Two, 134 business and community volunteers, and 95 college students were trained in Texas Scholars presentations. They conducted 348 8th grade and 223 9th grade class presentations reaching a total of 14,225 8th and 9th grade students throughout the El Paso MSP area.

To facilitate scheduling of Texas Scholars presentations, numerous training sessions with district counselors were held in Year Two. Meetings with district counselors, as well as with business representatives, are already scheduled for the 2004-2005 school year.

During Year Two, the Texas Scholars program made an impact on students' view on the importance of receiving a college education. Students reported, in a set of unsolicited letters, that the Texas Scholars presentation opened their eyes to the realities of living on their own and how their education directly affected their ability to live a good life. Among the student comments received are the following:

- “[B]efore the presentation, I thought I could live with just a high school degree, but I was wrong.”

- “Thank you for coming to our school. I thought college was nothing, but now I know what it is. I think I’m going to college, because I really want to have my own house.”
- “Thank you for giving us more information about college, it was really good the way you told us about it.”
- “I am very grateful that people like you make me think ahead...Just keep doing what you do.”

The second element of THINK COLLEGE NOW involves the development of a ToolKit for middle and high school administrators, counselors, and teachers aimed at preparing them to engage all students and their parents in preparing for college. Information in the ToolKit is supported by research which shows the important role played by the entire school community in a student’s decision to enroll in a postsecondary institution. Schools not only need to provide adequate information to students and their parents but also provide opportunities for them to learn and apply the skills they need to successfully apply, enroll, and obtain a degree at a postsecondary institution. The ToolKit is now being finalized with the collaboration of district guidance counselors and district research staff. The ToolKit will be piloted at the middle school level during Year Three of MSP. This ToolKit provides schools with research-based information and user-friendly program implementation and evaluation tools, such as templates, talking points, PowerPoint presentations, and CD-ROMs, that emphasize the importance of earning a post-secondary degree. All materials are designed to assist school faculty and staff in developing their own customized program and activities to create or maintain a college-going culture at their schools.

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

The MSP counselors’ initiative, “Creating College-Going Pathways,” in Year Two expanded opportunities and support for middle and high schools in building efforts to ensure that students are prepared for college. MSP staff met regularly and collaborated with a region-wide group of district counseling directors to support efforts to create a college-going culture.

MSP staff also engaged with counseling directors in how to address gaps in counselors’ learning and expertise. In response to a concern that counselors need to better understand ways in which to use achievement results in making appropriate decisions regarding students, a session focused on data analysis was provided to middle and high school counselors. Among the most significant issues addressed at the session was the importance of looking beyond the minimum expectations established by the state in order to ensure that students are better prepared for higher education. Planning during the summer will focus on an MSP-wide conference for counselors, which will build on the data session, address implementation of the THINK COLLEGE NOW toolkit, and showcase best practices in creating college-going cultures across the El Paso MSP region.

Objective 4.3: Implement and Support the Infinity Project

In Year Two, College of Engineering staff continued to recruit schools into the Infinity Program. Teachers attending the Infinity Summer Institute in 2003 are now actively recruiting their schools into the program.

The College of Engineering’s Department of Electrical and Computer Engineering worked closely with Southern Methodist University (SMU) and Texas Instruments to promote and support El Paso area high schools in the implementation of the Infinity Project curriculum. Two

faculty members are leading this effort. The Infinity curriculum is aligned with the Texas Essential, Knowledge, and Skills (TEKS) and offers hands-on classroom and laboratory work that is cognitively demanding due to the analytical nature of the material that requires synthesis and evaluation of the course content. The Infinity Project was implemented in two area high schools, with several others seriously considering starting in Year Three. Key science administrators in one urban district have expressed the goal of adopting the Infinity Program district-wide. Additionally, one high school's U.S. Department of Education-funded, Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) program will adopt the Infinity curriculum for all of its program participants who will be high school juniors in the upcoming academic year.

On-going professional development continues throughout the 2003-04 academic year and summer, with training focused on mapping targeted laboratory lessons to the TEKS. Students hired under the MSP Infinity Program assist teachers with Infinity-based exercises both at the school site and on the UTEP campus. UTEP Infinity students recently presented the engineering perspective to producing digital music to approximately 1,500 students at an area high school. This presentation was developed by the students for the annual Engineering and Science Expo held on the UTEP campus in February 2004.

During summer, 2004, UTEP faculty members will work on a number of tasks that will enable expansion of activities beginning in fall, 2004. These include the following efforts:

- Adaptation of World Materials modules for implementation in high schools;
- Development of engineering applications for mathematics modules, currently used in pre calculus modules at UTEP, for use in high schools;
- Development of a minor in engineering that can be taken by education majors; Identification of modules available from other organizations; and Identification of faculty contacts within each program who will talk to interested students.

II.5. KEY ELEMENT/GOAL V: Implementing a research agenda that advances knowledge and understanding about the systemic improvement of mathematics and science education.

The final key element in MSP recognizes that research about the impact of systemic education reform is central to continued efforts and informs critically important decisions about what works, where, and under what conditions.

Objective 5.1. Develop math/science field based research pedagogical Laboratories (RPL)

Building on the designs and models developed in Year One for the Research Pedagogical Laboratories (RPLs), faculty from the UTEP Colleges of Science and Education are providing training and support to teams of math and science teachers in conducting research to inform their instructional practice, and that of their colleagues. Indeed, the value of teachers conducting research to further develop their own reflective practices, by basing decisions on empirical evidence, is a critical aspect of the RPLs.

In Year Two, the establishment of RPLs in four high schools and two middle schools in El Paso MSP districts is completed. In addition, teams of pre-service and in-service teachers are participating in classes on-site as well as working in faculty teams to discuss issues related to math/science teaching and learning in their schools, identifying research questions related to

those issues, then designing and implementing research studies aimed at informing and improving practice.

In addition, the RPL Libraries of Resources were established to support teachers in identifying exemplary, standards-based math and science curricula (e.g., CMP, SIMMS, Cambridge Physics, ChemCom, and FOSS) to incorporate in their classrooms. The Libraries provide access to relevant curricular material for teachers, who are also supported by RPL faculty in determining how to coordinate components of different curricula to best meet the needs of students, and are facilitating research efforts to tests these combined approaches. Also available are materials developed from observations of high performing schools.

Finally, the partnership between the MSP-supported RPL initiative and additional externally-funded projects supported by NSF, NASA and other organizations is facilitated both within schools and through bi-monthly meetings of faculty from across the UTEP Colleges of Science, Engineering and Education and the Center for Research on Educational Reform to discuss their school- and classroom-based research projects.

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

An Assistant Director of Research, Dr. Penelope Espinoza, a social psychologist and a recent Ph.D. from the University of Michigan, was hired in January, 2004. Two research workshops were presented to the MSP staff developers in the Winter term of 2003 (one by Dr. Arturo Pacheco and one by Dr. Connie Della-Piana). These sessions provided staff developers a deeper understanding of the principles of solid scientific research, information on how to pose questions that can be investigated empirically and how to link research to relevant theory. In addition, the sessions provided staff developers guidance on the use of action research to improve teaching practice, the variety of methodologies for designing research studies, and information aimed at ensuring rigor and avoiding “fatal” flaws in research. Another workshop is planned for Summer, 2004 and will be presented by Professors Sally Blake and Mourat Tchoshanov. They will present evidence from their applied research in teaching calculus concepts to middle school students, work based on Vygotsky’s notion that conceptual learning leads to development of cognitive acquisition of formal procedural operations. Year Three activities will include workshops presenting the research findings and evidence for the teaching and learning practices adopted by staff developers in their work with math and science teachers in the schools.

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

As projected in the Year Two Implementation Plan, the Center for Research on Educational Reform (CRER) awarded the first round of MSP Action Research Grants for Teachers. CRER developed a Request for Proposals that highlighted MSP goals and solicited research proposals from middle and high school math and science teachers in the El Paso area. A selection committee of CRER staff and teacher education faculty selected proposals for funding that clearly responded to the MSP goals and outlined a plan for researching the improvement of math or science education. Eight awards totaling \$29,000 were presented to three solo-investigator projects (\$3000 each) and five multiple-investigator projects (\$4000 per project). The seventeen teacher-researchers include 13 math and 4 science teachers, and 9 middle school and 8 high school teachers. A university faculty mentor with expertise in math or science supervises each project. CRER hosted an orientation session for the awardees where they received materials including a schedule of workshops and progress report due dates, and contact information for

professional staff (i.e., Dr. Penelope Espinoza, CRER Assistant Director for Research; Ms. Zulma Méndez, *Challenge* Grant Evaluation Coordinator) available for guidance in conducting research. Dr. Espinoza and Ms. Méndez hold meetings with the awardees to discuss the progress of their research, and also held a workshop in April for the awardees on data management and analysis. In late August, awardees will submit a final report of their research to CRER and present their findings at a colloquium. Presentations to math and science departments at their schools will commence in Fall, 2004.

The action research projects concentrate on a variety of issues related to improving math/science teaching and learning, K-12. Presently, most of the teacher-researchers have implemented an intervention and collected preliminary data. A description of their projects follows. The awardees are featured on the CRER website:

<http://www.crer.utep.edu/awardeestopics.htm>. Also, the awardees were featured in local newspapers and news broadcasts.

Awardee(s): Stella Woo, Miles Kettel

Mentor: Dr. Hamide Dogan (Mathematics)

School: Silva Magnet High School

Topic: Changing Teaching Technique Changing Student's Math Attitude

Synopsis: Their project will introduce high school freshman and sophomores to logic and proof theory by using software called Geometer's Sketchpad. Their idea is that implementing technology into geometry lesson planning will enhance traditional teaching methods and will help students to create visual images of abstract mathematical concepts. Once students begin to understand geometry concepts better and experience success in the course, their attitudes towards mathematics may change.

Awardee(s): Yogesh Velankar

Mentor: Dr. Matthew Winsor (Mathematics)

School: Americas High School

Topic: Connected Mathematics

Synopsis: This project investigates whether the Connected Mathematics curriculum—as opposed to the traditional mathematics curriculum—will improve students' conceptual understanding of math and thus improve their performance on the TAKS test. The aim of his study is to make students become better thinkers, doers, and communicators.

Awardee(s): Ernie Herrera, Rosa Harding

Mentor: Dr. Milijana Suskavcevic (Physics)

School: El Dorado High School

Topic: The influence of integration of physics concepts into a biology course

Synopsis: Their project will introduce physics concepts to biology students, in order to create an interest in physics that will potentially lead to enrollment in a physics course. Their goal is to not only present physics concepts in a way that will promote interest, but also to defeat the misconception that physics is incomprehensible.

Awardee(s): Michael Garcia

Mentor: Dr. Sally Blake, Dr. Mourat Tchoshanov (Math Education)

School: Wiggs Middle School

Topic: Investigation of conceptual and procedural-based curricula among 7th-graders at a predominantly Hispanic middle school

Synopsis: The purpose of this project is to compare the outcomes of three different teaching

styles: a procedural method, a conceptual method, and a combination of procedural and conceptual methods. He will use the concept of integers to compare the teaching styles. His hypothesis is that the combination of conceptual and procedural methods—that is, the balanced approach—will lead to the highest achievement on the end-of-course Algebra exam.

Awardee(s): Alex Bustillos, Sue Spotts

Mentor: Dr. Sally Blake, Dr. Mourat Tchoshanov (Math Education)

School: Wiggs Middle School

Topic: The influence of developmental levels of thinking on understanding of advanced mathematical concepts

Synopsis: Their project will investigate the outcomes of introducing calculus concepts to middle school students. By introducing calculus concepts to students at an early age, they hope to increase the number of minority and lower socioeconomic-status students taking calculus courses in high school.

Awardee(s): Luisa Bonilla, Leslie Gardner

Mentor: Dr. Eric Hagedorn (Physics)

School: El Dorado High School

Topic: Creating a scientific community using local ecological awareness

Synopsis: Their project is concerned with the growing El Paso population—particularly in the El Dorado community—and the increasing water demands that are expected to exceed the water supply. Their aim is to educate members of the community on these ecological issues by engaging students in the design of a xeriscaped area within school grounds. The area is designed to be representative of the local ecosystem and will serve as outdoor classroom where students will develop critical thinking skills.

Awardee(s): Antonio Borunda

Mentor: Dr. Kastro Hamed (Physics)

School: Bowie High School

Topic: Development & implementation of a balanced conceptual & procedural curriculum in algebra classes at a predominantly Hispanic high school

Synopsis: This project investigates whether ninth-graders' achievement on the end-of-course algebra exam can be increased as a result of using a balanced approach to teaching, which integrates both conceptual and procedural curricula. He will use the balanced curricula to introduce concepts including the Pythagorean Theorem and algebraic reasoning to both traditional and bilingual classes.

Awardees: Donna Alford, Patty Benitez, Julio Escajeda, Martha Costanzo, Rosa Loya, Richard O'Malley

Mentor: Dr. Art Duval (Mathematics)

Schools: Wiggs Middle School, Henderson Middle School, Richardson Middle School, Magoffin Middle School, Canyon Hills Middle School

Topic: Investigation of collegial in-school-based professional development vs. teacher isolation in conceptual mathematics classes at predominantly Latino middle schools **Synopsis:** Their project investigates whether students perform better in math classes when their teacher is involved with collegial groups that develop lesson plans together—as opposed to when their teacher develops lesson plans in isolation. Their hypothesis is that “lesson-study groups” assist teachers in improving the quality of their instruction, since they have the opportunity to receive feedback from their colleagues and develop a shared body of knowledge.

As the Year 3 Implementation Plan indicates, CRER will solicit proposals for the second round of action research grants in summer 2004. The award competition will be publicized by distributing RFPs to middle and high school campuses, school district offices, UTEP departments associated with teacher education, and by word of mouth via current awardees. Special efforts will be made to obtain proposals from science teachers, since less science than math teachers entered the first competition. Ten proposals will be selected for funding in August 2004.

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

Improving K-12 student academic achievement, reducing the achievement gap among ethnic/racial groups, and increasing the quantity and quality of mathematics and science teachers are among the critical outcomes for El Paso MSP. In Year Two of MSP, the partnership is focused on, and presents in this report, data relative to the following:

- course enrollment and completion in secondary, college preparatory mathematics and science courses;
- high school graduation and college preparation rates;
- SAT/ACT participation and performance;
- college enrollment; and
- production of secondary mathematics and science teachers.

In addition, the primary indicator of student performance and gap reduction K-12 is the Texas Assessment of Knowledge and Skills (TAKS). Data for 2003/2004 TAKS will not be available until early June, 2004 and will be sent as an addendum to this report by mid-June, 2004.

Course Enrollment

A critical priority of the El Paso MSP has been an increase in enrollments in higher-level mathematics and science courses at the high school level. These courses not only provide students access to college admission, but also make possible majors and careers in mathematics, science, engineering and technology. As Table 1 indicates, enrollment in college preparatory math and science courses continues to increase with over three-fourths of all students in the MSP districts now taking Algebra I, Geometry, Algebra II, Biology and Chemistry. Particularly noteworthy is the increase in pass rates in Algebra I, which rose by 10.1 points to 84.3%. This is especially significant, as failure to pass Algebra I is often associated with holding 9th graders back from promotion to the sophomore year, which is in turn related to increased drop-out rates. Also noteworthy is the fact that the Year Two benchmark goal, that 75 percent of students enrolled in Chemistry and Algebra I will pass the course, was reached.

Table 1

Math/Science Course Enrollment and Pass Rates El Paso MSP Districts 2002-03 Academic Year					
		Hispanic	White	African American	Total
Algebra I*	Enrolled	96.1	97.8	95.2	96.0
	Passed	83.4	91.1	87.1	84.3
Geometry **	Enrolled	83.6	88.3	82.4	84.0
	Passed	82.3	90.9	90.2	83.6
Algebra II***	Enrolled	79.6	83.8	69.5	79.6
	Passed	75.7	81.7	77.5	76.5
Biology **	Enrolled	84.0	88.4	86.0	84.5
	Passed	81.0	87.4	85.8	81.9
Chemistry***	Enrolled	74.6	76.9	77.3	74.7
	Passed	77.8	83.8	82.3	78.7
Physics	Enrolled	23.0	34.0	25.3	24.4
	Passed	92.3	97.4	98.6	93.3

* 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.

High School Completion

Related to increases in mathematics and science course enrollment and success is success in completing high school and a college-preparatory high school program. On both of these critical indicators, El Paso MSP performance has never looked better. High school completion rates increased from 72% in the baseline data to 77.6% for the most recent year, with increases occurring for the three largest groups of students, including Hispanics, Whites and African Americans. Because graduation rates increased for White students by 11 percentage points, and for Hispanics by 5 points, the gap between the groups grew. Still, the gap between these two largest groups is only 5 percentage points. As is apparent in Table Two, a continuing area of need is the gap between urban and rural district students, which suggests the need to encourage rural districts to set policies monitoring high school completion data and holding schools accountable for this important element of school performance.

Table 2

High School Completion Rates Class of 2003			
Ethnicity	Urban Districts	Rural Districts	All MSP Districts
	% Graduating	% Graduating	% Graduating
Hispanic	78.5%	68.2%	76.9%
White	82.7%	73.8%	82.3%
African American	75.1%	51.2%	74.7%
Native American	73.7%	59.0%	73.0%
Asian	95.9%	76.4%	95.6%
Total	79.0%	68.4%	77.6%

Source: Graduation derived from 1998-1999 Region 19 district enrollment data provided by TEA, and Class of 2003 graduation data taken from TEA adhoc report generator. High school completion rates are based on number of graduates divided by the number of eighth graders 5 years prior.

Increases also occurred in the percentage of El Paso MSP students completing the Texas Recommended High School Program (RHSP), the college-preparatory program. The number and percent of graduates across El Paso MSP districts who complete the Recommended Program now exceeds 80%, with the state reporting that 82.7% of El Paso area graduates completed the program in 2002. Locally collected data indicate that 83.1 completed the program in 2003. These rates far exceed all other urban areas in Texas, as well as the state as a whole, which reported that 58.2% of students completed the program in 2002. As MSP Year Two comes to a close, the Year Three benchmark calling for 75% of students in area districts to complete the RHSP, has been met, and surpassed, ahead of schedule.

SAT/ACT Participation and Scores

In 2003, the numbers of students taking college entrance exams, across the El Paso MSP was 5,951, an increase over the 5,378 in 2002. With the increased test taking, came a drop in scores of 20 points on the SAT and 1.3 points on the ACT. These lower scores are of concern to the districts across the El Paso MSP, which are working toward increased college-going rates and promoting universal participation in the tests.

College Enrollment

A very significant increase in the number of high school graduates going on to college occurred among El Paso MSP students, another indicator that the focus on college preparation is making a real impact on the career decisions of area young people. In the period from Fall 2002 to Fall 2003, the percent of El Paso MSP students enrolling at UTEP or EPCC increased from 40.7% to 52.6%. (See Table Three) This increase was due largely to increases in enrollments at the Community College, which in turn has seen dramatic increases in the numbers of students enrolled in academic programs and planning to transfer to UTEP, and a concomitant decline in the number of students enrolled in vocational degree programs.

Table 3

Postsecondary Enrollments as a Percent of High School Graduates			
	El Paso Community College	U.T. El Paso	Total
Number Enrolled	3128	1630	4758
Area Districts 2003 Graduates	9044	9044	9044
% Enrolled	34.6	18.0	52.6

Source: El Paso Community College Office of Institutional Research UTEP Center for Institutional Evaluation, Research and Planning

Mathematics and Science Teacher Production Since the inception of El Paso MSP, significant progress has been made in enrolling more students in math/science teacher preparation programs as well as in the production of newly certified math and science teachers. First, in 2003/2004, there were over 125 students majoring in math or science at UTEP with a minor in education. (See Table Four) This represents a very large increase over the 94 students enrolled in 2002/2003. The 36% increase far exceeds the Year Two MSP benchmark setting a 5% increase in the number of students enrolled in math/science teacher preparation programs. Because a large

number of these are seniors, the ranks of practicing, newly certified math science teachers are expected to increase rapidly in the coming months.

Table 4

Mathematics and Science Majors with Education Minors Enrolled at The University of Texas at El Paso—2003/2004*					
	N	Freshmen	Sophomores	Juniors	Seniors
Science Majors with Minors in Education	50	2	9	19	20
Mathematics Majors with Minors in Education	78	6	16	18	38
Total	128	8	25	37	58

Source: Center for Institutional Evaluation, Research and Planning, The University of Texas at El Paso. *Spring Data

Progress has occurred not only in the number of students in math and science teacher preparation programs, but also in the number of teachers completing certification programs. Just since the beginning of MSP, the percentage of students completing such secondary certification programs increased from a total of 46, in 2002, to 61 in 2003, an increase of over 30%. While the majority of these are coming from Alternative Certification Programs, districts report that these teachers are quickly integrated into the life of the school and experiencing much success with students and in classrooms.

Table 5

Math and Science Secondary Certified Teachers By Completion Year and Certification Route					
	Math (Reg. Cert.)	Math (Alt. Cert.)	Science (Reg. Cert.)	Science (Alt. Cert.)	Total
2000	5	10	5	17	37
2001	3	12	3	22	40
2002	7	18	0	21	46
2003	11	24	1	25	61
Total	26	64	9	85	184

Also of note are the very significant increases of students completing elementary certification in mathematics and science. New certifications at that level, all from the traditional route, swelled from 47 in 2002 to 72 in 2003, an increase of over 50%.

IV. MSP MANAGEMENT PLAN

El Paso's MSP management structure remains intact. Key personnel including Susana Navarro, PI; Co-PIs Arturo Pacheco, Steve Riter and Jimmy Vasquez; and Project Director Alicia Parra continue to be fully focused on El Paso's MSP. Key leadership in all partner entities remains unchanged from last year's report with the exception of UTEP's Dean of the College of Engineering. Since assuming his new position, early in MSP Year Two, Dean Barry Benedict has been intensely involved in MSP and has moved to fully integrate MSP goals into the College's new priorities.