I. INTRODUCTION

The National Science Foundation’s Model Institutions for Excellence (MIE) Program is currently in its 7th year of operation at the University of Texas at El Paso (UTEP). The institution’s mission is to provide access to higher education to a historically underserved binational community. In alignment with this mission, the MIE Program supports the academic development of Science, Engineering, and Mathematics (SEM) majors at this urban Hispanic-serving institution.

The program has implemented an academic culture-shifting model based on five major curricular and co-curricular initiatives:

a. **The Academic Centers for Engineers and Scientists (ACES).** UTEP’s premier development centers for a large commuter student population with services including tutoring, leadership skills seminars, and graduate school prep workshops.

b. **The Center for Effective Teaching and Learning (CETaL).** UTEP’s faculty enhancement center with services that include active learning seminars, cooperative learning workshops, course planning and evaluation, and syllabus consultation.

c. **The Circles of Learning for Entering Students Program (CircLES).** UTEP’s SEM entering student academic program providing summer orientation, career path advising, peer mentoring, scheduling services, and administrative course clustering.

d. **The Curriculum Enhancement Program (CEP).** UTEP’s primary curriculum reform effort in undergraduate Science and Engineering, which has led to the improvement of developmental and lower division courses and the institutionalization of the University Seminar and the implementation of an undergraduate degree program in Environmental Science program.

e. **The Research Experiences for Undergraduates Program (REU).** UTEP’s leading undergraduate research effort charged with mentoring and training tomorrow’s SEM scholars.

The overarching goal of these initiatives is to assist the Colleges of Engineering and Science in their effort to increase the number of students who pursue and earn degrees in SEM disciplines by providing a series of sustainable academic, social, and financial support mechanisms. Through these mechanisms, the Colleges have achieved high student retention rates in the first two years of SEM college education (Figure 1), which are viewed as critical for student success. The anticipated outcome will be to increase the number of baccalaureate degree recipients by 50% by Fall 2005 (Figure 2). The effort will thus transform UTEP into the largest producer of Mexican-American SEM graduates in the nation.

The UTEP MIE Program is overseen by an external Advisory Committee with constituents from industry, academia, and government. The Advisory Committee is headed by Edward Ahnert, President of the ExxonMobil Foundation. The Committee functions both as a critical friend and an external resource for the program. The Committee has been instrumental in affecting institutional policies that address the implementation of student-learning centered strategies.
Figure 1. New UTEP SEM Student Retention Rates.

Figure 2. Anticipated UTEP SEM Degree Production.

* Actual degrees produced reflect students beginning at UTEP prior to CircLES implementation
II. MAJOR ACCOMPLISHMENTS

Institutional

In 2001-2002, UTEP focused institutional attention on degree production, student enrollment, and Hispanic faculty recruitment:

- UTEP reported to the Texas Higher Education Coordinating Board the Institution’s intent to double the number of SEM degrees awarded by the year 2010 with respect to 1999-2000 baseline data. These figures were submitted as part of the Closing the Gaps, a statewide initiative to increase the number of BS degrees awarded in technical and scientific fields.
- UTEP has a total of 244 Hispanic faculty members (representing 26% of the total faculty). This is an increase of 50% over the last 10 years. Of these, 90 Hispanic faculty members have tenure (corresponding to 21% of all tenured faculty).
- Fall 2001 engineering major enrollment (1150 students) increased 8.5% with respect to Fall 2000 enrollment. Science major enrollment (555 students) increased 10.6% over the same period. Current enrollment in both colleges, including pre-engineering and pre-science students (CircLES), is 2914.

MIE Advisory Committee

The UTEP MIE Advisory Committee played a major role in the planning of future MIE strategic activities:

- In its Fall 2001 meeting, the Advisory Committee recommended that the MIE leadership develop and implement a strategic plan for SEM student success. The Advisory Committee also recommended the dissemination of MIE accomplishments at institutions that match UTEP’s student demographics.
- Gloria Montano (MIE Advisory Committee) and Patricia Nava (Electrical and Computer Engineering) secured a grant from the Institute for Women and Technology to support the development of a Virtual Development Center at UTEP. The center will be involved in outreach and recruiting activities for women in SEM.

Circles of Learning for Entering Students Program

UTEP continued to employ successful strategies that improve the performance of entering SEM students. Since the scale up of the program, students who have participated in CircLES interventions are more likely to stay in college and are earning better grades:

- 78% of the CircLES students entering in the Fall of 2000 returned in the Fall of 2001 (compared to 68% retention baseline). During their first two semesters at UTEP these students maintained an average cumulative GPA of 2.83 (compared to 2.02 GPA baseline).
- Institutional Fall 2001 census data show that the two-year retention rate for the 1999 CircLES cohort was 68%. The two-year average cumulative GPA for this cohort was 2.76. Similarly, the three-year retention rate for the 1998 cohort was 57%, while the four-year retention rate for the 1997 cluster pilot group was 47%. Among the pilot group 3% of the students have graduated within four years.
- The CircLES mathematics refresher continued to be an effective activity during summer orientation. Nearly 60% of the 2001 Circles cohort students enrolled in college-level mathematics courses in their first semester, thus reducing the time they
spend on developmental course work. Prior to the CircLES mathematics review, only 37% of the students placed into Mathematics courses at the college level.

Curricular Enhancement

UTEP continued to implement strategies for effective teaching, aiming at an 80% success rate in gateway courses:

- In the Fall of 2001, 74% of the SEM students enrolled in Pre-Calculus successfully completed the course on their first attempt.
- In the Fall of 2001, the first-attempt passing rate was 85% in Physics I, 82% in Physics II, 75% in General Chemistry I, and 80% in Introduction to Engineering.

Academic Centers for Engineers and Scientists

ACES continued to provide an environment for the UTEP commuter student body to work on science and engineering academic and professional development activities:

- ACES now has three main facilities and serves 1680 active users. On average, 540 students per day utilize the center. The facilities have a total capacity of 320 seats.
- The newest of these facilities, located in the Classroom Building, was made available for SEM tutoring in Spring 2002. The facility has a seating capacity of 115 and serves an average of 130 students per day.
- Plans for the construction of an ACES facility located in the Mathematics Department were completed. Construction began in the summer of 2002.

Research Experiences for Undergraduates

The REU (Research Experience for Undergraduates) program continued to provide support for on- and off-campus SEM research experiences:

- To date, 260 students have received REU research stipends. 60% of them (n=156) have graduated, 33% of them (n=86) are still in school, and 7% of them (n=18) have stopped out. Of the 156 REU participants who have graduated, 22 students have received masters’ degrees, 28 are in masters’ programs, 4 are working on another undergraduate degree, and 3 are in doctoral programs.
- 27 REU students participated in off-campus research and internship experiences in the summer of 2002.
- Kristina Garza (Biology) and Kate Miller (Geology) secured grants from the National Science Foundation to further support SEM undergraduate research opportunities for UTEP students.

Center for Effective Teaching and Learning

CETaL continued to support faculty and staff seeking to improve teaching effectiveness:

- CETaL hosted 44 professional development seminars for faculty and staff in the Fall of 2001 and Spring of 2002, with 521 individuals in attendance. 57% of the College of Science faculty and 38% of the College of Engineering faculty attended at least one faculty development workshop.
- CETaL also hosted the first SUN Conference on Teaching and Learning. A total of 44 presentations were offered with 18 presentations dedicated to SEM. Total attendance was 249.
- CETaL instituted a campus-wide instructional development program for teaching assistants and a mentoring program for women faculty.
Student Financial Support

The MIE Program continued its financial support for and development of qualified SEM students:

• In the 2001-2002 academic year, the MIE program directed 63% of its budget to support 290 students or approximately 10% of the SEM student population.

SEM Infrastructure

UTEP continues to create the infrastructure required for new education, research, and student services:

• Construction of a new $25 million Biosciences complex is scheduled to begin in late Spring 2003 and be completed by 2005.
• Construction of a $7 million Engineering Annex Building is scheduled to begin in late Spring 2003 and be completed by Fall 2004.
• Construction of a $10 million Academic Services Building is scheduled to begin in Spring 2003 and be completed by Fall 2004.

III. FUTURE DIRECTIONS

In the second year of Phase II, the emphasis was on continuous quality improvement driven by assessment. The process of institutionalization began by focusing on the cost analysis of ACES, CircLES, CETaL, and REU.

Institutional

UTEP will continue to institutionalize activities initially funded by the MIE Program:

• The Institution will integrate CircLES into the University College by the end of the 2002-2003 academic year, will increase funding for CETaL, and fully fund the BS in Environmental Science program by Fall 2003.

MIE Advisory Committee

The Advisory Committee will continue to provide constructive critiques on the status of the MIE program to ensure its success:

• The Advisory Committee will meet in October 2002 to discuss UTEP’s strategic plan for the next three years.

Circles of Learning for Entering Students

A top priority of this program will be to integrate with the University College to assure a seamless transition toward its institutionalization:

• SEM faculty and staff teaching a University Seminar section in the fall will continue to receive training in active learning strategies.
• SEM faculty and staff teaching a University Seminar section in the fall will receive compensation for their efforts.
• SEM peer leaders will continue to receive formalized training in leadership skills and cooperative learning strategies.
Curriculum Enhancement

The Colleges of Science and Engineering will place emphasis on the continuous improvement of SEM curricula:

- The College of Science will invest resources to improve student performance in freshman Biology and Mathematics courses.
- The College of Engineering will invest resources to improve student performance in Basic Engineering courses.
- Faculty from the Colleges of Science and Engineering will be encouraged to submit proposals for curriculum, course, and laboratory improvements to NSF.

Academic Centers for Engineers and Scientists

The Centers will maintain a resource system that reaches all SEM students and provides quality service:

- ACES will continue to offer tutoring for freshman and sophomore SEM courses with assistance from REU students.
- The ACES Assistant Director will continue to mentor SEM female students involved in the WISE (Women in Science and Engineering) support program.
- ACES will continue to offer GRE and other examination preparation workshops for interested students.
- An ACES facility to serve the Department of Mathematics will be completed. A similar facility to serve Computer Science majors will be refurbished.

Research Experiences for Undergraduates

External research and internships will be an integral component of the undergraduate research experience:

- REU students will continue to apply to external summer research experience programs.
- 5 SEM faculty teams intend to submit REU proposals to strengthen graduate school pathways for their respective departments.

Center for Effective Teaching and Learning

The Center will continue to offer faculty development opportunities to ensure that the student-centered learning paradigm replaces the faculty-centered teaching paradigm:

- CETaL will increase participation of junior SEM faculty at workshops and seminar.
- CETaL will expand the SUN Conference to include the participation of educators in the Southwest region.
- CETaL will continue to offer a diverse set of workshops on teaching effectiveness.
- The Office of Academic Affairs will develop a plan to ensure the complete institutionalization of the Center.