

**Practices Worthy of Attention**  
**K–16 Mathematics Alignment**  
**El Paso Collaborative for Academic Excellence**  
**El Paso, Texas**

**Summary of the Practice.** The El Paso Collaborative for Academic Excellence (EPCAE) has built and implemented a cohesive K–16 mathematics program for all 12 school districts EPCAE serves in the greater El Paso area. The 12 districts require all students to complete Algebra II in high school. To prepare students to successfully meet this requirement, EPCAE has backward mapped the mathematics curriculum down through the elementary grades so that students have the foundations they need.

**Need.** El Paso is one of the nation’s poorest cities, and students who graduate high school there tend to stay in the area. In 1998, the El Paso Collaborative for Academic Excellence found that 80% of students entering the local community college and university had to take remedial college mathematics courses.

**Goal.** The goal of EPCAE’s K–16 mathematics alignment project was to backward map the mathematics curriculum to ensure that students had the knowledge and skills they need to be successful in mathematics in their K–16 educational experience.

**Demographics**

The El Paso Collaborative for Academic Excellence consists of 12 school districts, three of which are considered large urban school districts: El Paso Independent School District, Ysleta Independent School District, and Socorro Independent School District, which serve grades K–12.<sup>1</sup> In these three districts alone, enrollment—at just over 146,400 students—increased over by about 7,000 students from 2002–2003 to 2005–2006 (see Table 1).

**Table 1. Enrollment Data for El Paso ISD, Ysleta ISD, and Socorro ISD**

Academic Year	Enrollment
2002–2003	139,635
2003–2004	141,824
2004–2005	143,662
2005–2006	146,447

Table 2 shows the percentage of students enrolled by race/ethnicity, limited English proficiency, and economic disadvantage for the three urban districts in EPCAE. Most students in those districts in 2005–2006 were Hispanic (87%) and economically disadvantaged (about 74%). In fact, El Paso’s median household income is among the lowest in the U.S. (U.S.

<sup>1</sup> The other nine districts are Anthony, Canutillo, Clint, Dell City, Fabens, Ft. Hancock, San Elizario, Sierra Blanca, and Tornillo ISDs (El Paso MSP, n.d.).

Census Bureau, 2003). Dropout rates were similar across most groups, except for students with limited English proficiency, who have a higher dropout rate. The highest percentages of students graduating were in the Asian American and white student populations, while populations with the lowest percentages of students graduating were students with limited English proficiency and students with economic disadvantage.

**Table 2. Enrollment, Graduation, and Dropout Rates  
for El Paso ISD, Ysleta ISD, and Socorro ISD**

<b>Demographics</b>	<b>Academic Year</b>	<b>Percentage Enrolled</b>	<b>Percentage Graduating</b>	<b>Percentage Dropping Out</b>
<b>All Students</b>	2002–2003	100	80.9	4.7
	2003–2004	100	81.6	4.5
	2004–2005	100	79.9	4.3
	2005–2006	100	*	*
<b>Asian American</b>	2002–2003	0.8	88.9	6.6
	2003–2004	0.8	82.5	3.6
	2004–2005	0.8	89.1	3.9
	2005–2006	0.8	*	*
<b>Black</b>	2002–2003	3.0	82.9	4.4
	2003–2004	3.0	78.3	6.8
	2004–2005	3.0	84.7	3.2
	2005–2006	3.2	*	*
<b>Hispanic</b>	2002–2003	85.8	79.5	4.8
	2003–2004	86.5	80.6	4.6
	2004–2005	86.8	78.7	4.5
	2005–2006	87.0	*	*
<b>White</b>	2002–2003	10.0	89.0	3.7
	2003–2004	9.4	88.5	3.2
	2004–2005	8.9	87.4	2.7
	2005–2006	8.6	*	*
<b>Limited English Proficient</b>	2002–2003	28.2	51.6	15.9
	2003–2004	28.5	62.4	8.5
	2004–2005	28.4	56.6	9.5
	2005–2006	27.7	*	*
<b>Economically Disadvantaged</b>	2002–2003	72.3	79.4	4.9
	2003–2004	72.5	80.1	4.4
	2004–2005	74.3	77.2	4.4
	2005–2006	73.9	*	*

Note: The asterisk (\*) notes that data were not available.

## Description of the Practice

In 1991, the El Paso Collaborative for Academic Excellence was founded, bringing together 12 school districts and the local community college and four-year university to establish a common vision for a K–16 effort. EPCAE includes elementary, middle, and high schools, postsecondary institutions, and the entire El Paso community in an effort to achieve coherence in their curriculum and promote success for students past high school graduation. EPCAE's work is guided by three key goals:

- To ensure academic success for all students, K–16.
- To ensure that all students graduate from high school prepared to succeed in a four-year college or university.
- To close achievement gaps among different groups of students. (EPCAE, n.d.)

After EPCAE began their work, their systemic reform efforts appeared to promote gains in high school mathematics performance data. However, beginning in 1998, when EPCAE focused more closely on mathematics, they realized that 80% of students entering El Paso Community College and 80% of students entering the University of Texas at El Paso were placed in remedial mathematics courses; these numbers were even on the rise (EPCAE, 1998). It was obvious that high school mathematics courses were not preparing the majority of students well enough for college-level mathematics.

EPCAE realized that if students could successfully complete Algebra II in high school, they could usually avoid remedial mathematics courses in college and enter College Algebra fully prepared. Since remedial mathematics courses in college do not count toward the degree, this would help students save both time and money in college, as well as ensuring that they had a good mathematics background.

A K–16 mathematics alignment initiative was formed, made up of mathematics educators—elementary, middle, and high school teachers and college and university faculty—who spent the next two-and-a-half years producing a curricular framework that aligned high school and first-year college mathematics. The goals of the initiative were to reach a shared vision for K–16 mathematics teaching and learning, illuminate issues on mathematics alignment and student achievement, and develop a reliable and valid system for math college placement.

The alignment group produced an Algebra II Curriculum Framework (EPCAE, 2001). The framework is a matrix that maps mathematics topics to (1) cognitive demands, guided by the work of Porter and Smithson (2001) and Webb (1999); (2) locally used texts and materials; and (3) Texas and national mathematics standards (Porter & Smithson, 2001; Webb, 1999). The districts' teachers were using three different Algebra II textbooks, and the new framework took this into account so that teachers could continue to use the materials they already owned and were familiar with as they implemented the framework's recommended changes to their practice.

After the curriculum frameworks were developed, EPCAE provided teachers with professional development to use the frameworks as the foundation for Algebra II in high schools. The professional development takes place during summer trainings and at EPCAE's annual mathematics summit, where teachers, teacher leaders, and college faculty come together to see the progress they have made and to plan for next steps. The Algebra II frameworks are currently being used in EPCAE schools.

A part of this work resulted in a standards-based assessment matrix, which the alignment group has used to develop an end-of-course test for Algebra II. The exam was piloted in spring 2006. In fall 2006, the test was administered to a subset of El Paso Community College and University of Texas at El Paso freshmen, in both remedial and non-remedial mathematics courses, to assess their understanding of Algebra II. Analyses on the results of this exam are underway, with other data like the correlation of performance with college placement exam scores in mathematics (measured by ACCUPLACER, an online computer-adaptive placement testing program offered by the College Board), mathematics course placement in college, and course grades, to see how well students are prepared for college mathematics.

## Results

Correlational analyses of Algebra II end-of-course exam scores, ACCUPLACER scores, and course grades were not available when this report was written. Test scores have mixed results in indicating that a minimum requirement of Algebra II for high school graduation is showing promise in improving all students' mathematical learning. For instance, analyses of Texas Assessment of Academic Skills (TAAS) scores show that, from 1994 to 2002, the achievement gap was shrinking, and there was consistent improvement in mathematics scores across all demographic groups. TAAS was the criterion-referenced test measuring state standards before the Texas Assessment of Knowledge and Skills (TAKS) was introduced in 2003. From 1994 to 2002, performance on TAAS improved for all subgroups within EPCAE schools: for Hispanic students, performance went from 50% passing to 90% passing; for black students, it went from 48% to 88%; and for white students, it went from 73% to 95%.

TAKS was initially administered in the 2002–2003 school year and is purported to be a more comprehensive and challenging assessment of student learning than TAAS, as defined by Texas's academic standards. As such, performances from TAAS to TAKS are not comparable, and in general, students tended to perform worse on TAKS than on TAAS.

Table 3 shows the mathematics results since 2002–2003 for grades 6–11 in the 12 districts in EPCAE. There appears to be variable performance across the years, with poorer performance in the second year of TAKS administration (except for grade 9, which remained steady, and grade 11, which showed increased performance) and a slight improvement for all grades in the third year (except for grade 11, which had slightly lower scores); in 2005–2006—the fourth year of TAKS administration—students in all grades achieved at their highest levels to date. The largest gains from the 2003 testing to the 2006 testing results are for grades 6 and 11, from 62% to 71% passing in grade 6, and from 56% to 70% passing in grade 11. Grade 9 students appear to have the most consistent performance across the years (not as much variability as the other grades).

**Table 3. EPCAE Districts' Mathematics TAKS Results**

Academic Year	TAKS Performance (Percentage Meeting Standard) by Grade Level					
	6	7	8	9	10	11
2002–2003	62	55	53	40	49	56
2003–2004	58	51	47	40	41	68
2004–2005	62	53	48	45	47	63
2005–2006	71	61	58	45	52	70

Tables 4–6 list TAKS mathematics results for the three urban school districts in EPCAE for grades 6–11, by race/ethnicity, limited English proficiency, and economic disadvantage. Unfortunately, we could not compile the data for all 12 EPCAE districts by subgroups because the data we had access to did not provide the number of students taking the test by subgroup for each grade.

Table 4 shows the percentage of students meeting the TAKS mathematics standard for El Paso ISD across all subgroups. In general, as of 2005–2006, El Paso ISD students were performing below all students in EPCAE across all grades, except in grade 11, where El Paso ISD students were slightly ahead of all students in EPCAE. Students in all subgroups in El Paso ISD had variable performance across the years, with most groups performing lower in 2003–2004 and 2004–2005 than in the other two years.

In El Paso ISD, Asian American and white students outperformed all other subgroups. This difference was most obvious for black and Hispanic students in grades 8 and 9. Students with limited proficiency in English had the lowest performance overall, with fewer than 20% passing the mathematics TAKS for most years in grades 7–10. Fewer economically disadvantaged students were passing the mathematics TAKS than all students in El Paso ISD. Given the fact that the data across years did not show consistent growth in student achievement for any group, it is difficult to tell if the achievement gap is closing for any subgroup.

**Table 4. El Paso Independent School District Mathematics TAKS Results**

Demographics	Academic Year	TAKS (Percentage Meeting Standard)					
		6	7	8	9	10	11
All Students	2002–2003	56	51	50	42	52	60
	2003–2004	49	45	42	40	46	71
	2004–2005	52	45	44	42	47	64
	2005–2006	63	55	52	43	53	73
Asian American	2002–2003	78	74	75	68	68	86
	2003–2004	76	72	79	60	69	84
	2004–2005	68	67	76	76	72	80
	2005–2006	86	79	71	78	79	84

Table 4, continued

Demographics	Academic Year	TAKS (Percentage Meeting Standard)					
		6	7	8	9	10	11
<b>Black</b>	2002–2003	51	47	40	37	54	54
	2003–2004	41	43	32	33	37	63
	2004–2005	45	40	39	34	33	53
	2005–2006	49	52	44	36	39	59
<b>Hispanic</b>	2002–2003	52	47	45	37	47	56
	2003–2004	46	42	38	35	41	68
	2004–2005	49	42	39	38	42	61
	2005–2006	60	52	49	39	49	70
<b>White</b>	2002–2003	74	71	72	64	69	73
	2003–2004	67	64	68	68	67	84
	2004–2005	72	65	65	67	73	81
	2005–2006	79	78	70	63	74	87
<b>Limited English Proficient</b>	2002–2003	32	22	15	14	21	33
	2003–2004	24	21	15	11	19	45
	2004–2005	21	15	14	14	13	31
	2005–2006	35	20	20	13	19	38
<b>Economically Disadvantaged</b>	2002–2003	48	42	41	32	42	51
	2003–2004	41	37	33	30	35	63
	2004–2005	45	38	35	32	37	55
	2005–2006	56	48	44	35	45	65

Table 5 lists the students in Socorro ISD meeting the mathematics standard for TAKS across the same four years and subgroups as listed in Table 4. In the first two years of TAKS testing (2002–2003 and 2003–2004), Socorro ISD had slightly fewer students passing the mathematics TAKS compared to all students in EPCAE. This changed in 2004–2005, when Socorro ISD students were either on par with all students in EPCAE or had slightly higher percentages meeting the mathematics TAKS standard. As in El Paso ISD and EPCAE, the performance of Socorro ISD students fluctuates from year to year.

In Socorro ISD, as of 2005–2006, Asian American students were far outperforming other subgroups, with over 99% passing in some years and grades. White students had the second highest set of results, followed by Hispanic and black students. Economically disadvantaged students performed below all racial/ethnic subgroups, but were still performing higher than students with limited proficiency in English. In grades 7–10 across the four years, there were many cases in which 20% or fewer students with limited English proficiency were passing the mathematics TAKS. This was not the case for any other subgroup in Socorro.

**Table 5. Socorro Independent School District Mathematics TAKS Results**

Demographics	Academic Year	TAKS (Percentage Meeting Standard)					
		6	7	8	9	10	11
<b>All Students</b>	2002–2003	59	56	53	42	55	60
	2003–2004	57	49	45	42	37	65
	2004–2005	64	56	47	46	50	61
	2005–2006	75	67	60	47	53	71
<b>Asian</b>	2002–2003	83	*	*	>99	80	89
	2003–2004	75	78	78	82	*	79
	2004–2005	85	73	80	73	>99	>99
	2005–2006	88	77	64	91	87	63
<b>Black</b>	2002–2003	77	64	50	33	64	57
	2003–2004	52	59	45	49	32	47
	2004–2005	68	41	55	28	66	58
	2005–2006	67	60	57	54	42	75
<b>Hispanic</b>	2002–2003	58	54	52	40	54	58
	2003–2004	57	47	44	41	36	64
	2004–2005	63	55	46	45	48	60
	2005–2006	75	66	59	46	52	70
<b>White</b>	2002–2003	71	72	72	59	77	77
	2003–2004	65	62	59	64	42	91
	2004–2005	72	67	60	65	69	70
	2005–2006	72	78	70	62	64	90
<b>Limited English Proficient</b>	2002–2003	33	20	18	14	29	33
	2003–2004	31	20	13	13	14	46
	2004–2005	44	30	19	16	22	29
	2005–2006	63	35	33	18	27	41
<b>Economically Disadvantaged</b>	2002–2003	55	50	48	36	50	56
	2003–2004	55	44	41	37	33	63
	2004–2005	62	52	44	41	45	57
	2005–2006	73	63	57	42	48	68

Note: The asterisk (\*) notes that data were not available.

Table 6 lists the performance on the mathematics TAKS for Ysleta ISD across the same subgroups and years as Tables 4 and 5. Ysleta ISD students outperformed all students in EPCAE and the other two districts in almost all grades across all four years. The greatest difference was in grade 6, where there were always at least 13% and as many as 25% more students meeting the TAKS mathematics standard in all four years of testing. As in EPCAE

and the other two urban districts, performance of Ysleta students was inconsistent over time, with no steady growth or decline across the years.

**Table 6. Ysleta Independent School District Mathematics TAKS Results**

Demographics	Academic Year	TAKS (Percentage Meeting Standard)					
		6	7	8	9	10	11
<b>All Students</b>	2002–2003	72	64	62	44	52	58
	2003–2004	74	62	59	46	43	72
	2004–2005	78	67	59	54	50	65
	2005–2006	83	71	67	52	56	72
<b>Asian American</b>	2002–2003	92	92	91	80	79	82
	2003–2004	62	90	86	50	73	83
	2004–2005	92	82	89	67	80	88
	2005–2006	89	93	80	90	62	81
<b>Black</b>	2002–2003	67	71	70	38	54	45
	2003–2004	66	60	52	50	39	70
	2004–2005	82	76	67	48	44	63
	2005–2006	83	65	80	56	65	60
<b>Hispanic</b>	2002–2003	72	62	60	42	50	57
	2003–2004	73	61	58	44	41	71
	2004–2005	77	66	57	53	49	63
	2005–2006	82	70	66	51	55	71
<b>White</b>	2002–2003	82	79	79	62	69	71
	2003–2004	86	77	73	65	63	83
	2004–2005	89	81	76	68	69	80
	2005–2006	92	86	80	69	67	84
<b>Limited English Proficient</b>	2002–2003	57	31	27	12	22	31
	2003–2004	64	28	38	15	11	42
	2004–2005	63	37	24	29	23	40
	2005–2006	71	37	34	23	25	47
<b>Economically Disadvantaged</b>	2002–2003	70	61	59	40	48	55
	2003–2004	72	59	56	43	38	68
	2004–2005	75	64	56	51	46	61
	2005–2006	81	68	64	48	53	69

In Ysleta ISD, Asian American and white students were passing the mathematics TAKS more often than any other subgroup. Black and Hispanic students in grades 9 and 10 had the lowest performance compared to the other grades. Economically disadvantaged students were

performing just below black and Hispanic students, while students with limited English proficiency had the lowest performance across all grades and years. Unlike in El Paso ISD and Socorro ISD, however, there were only three incidents in which fewer than 20% of students with limited English proficiency passed the mathematics TAKS.

Within EPCAE, enrollment in college preparatory mathematics courses has increased. In 2005, 100% of students were enrolled and completing Algebra II by eleventh grade, with pass rates of 85% for Hispanic students, 90% for black students, and 92% for white students. These enrollment numbers show the impact of setting high standards and building ways for students usually unsuccessful in mathematics not only to be successful but to be successful at a level that ensures better college preparedness. Graduation rates have also increased, from 68% in 1996, to 73% in 2001, to 78% in 2006.

## Conclusions

The combined effort of several educational systems and the community shows consistent improvement for students in EPCAE, as seen by the increased number of students enrolling and passing Algebra II as well as increased graduation rates. EPCAE's success has also been supported by several large grants awarded to fund their systemic initiatives.<sup>2</sup> The coherent K–16 system in mathematics with minimum mathematics requirements appears to help better prepare students to succeed in high school and college.

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<sup>2</sup> This funding includes “the El Paso Urban Systemic Initiative, a five-year \$15 million grant from the National Science Foundation completed in 1999; an \$8 million U.S. Department of Education Technology Innovation Challenge Grant, currently in the final year of a five-year funding period; and the Pew Charitable Trust's Community Compacts for Student Success, a \$1 million grant from 1992 through 1998. The Collaborative is in the fourth year of a five year NSF Urban Systemic Program Grant” (El Paso MSP, n.d.).

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#### **About *Practices Worthy of Attention: Local Innovations in Strengthening Secondary Mathematics***

*Practices Worthy of Attention* is a joint initiative of Achieve, Inc. ([www.achieve.org](http://www.achieve.org)), and the Charles A. Dana Center at The University of Texas at Austin ([www.utdanacenter.org](http://www.utdanacenter.org)). The initiative is led by Pamela L. Paek, a research associate at the Dana Center, who, in 2006, examined 22 program, school, and district practices that showed promise—based on early evidence and observation—of strengthening secondary mathematics teaching and learning.

Our goal was to document practitioners' descriptions of *what is really happening* in the field to strengthen secondary mathematics education around the country. Thus, while the practice highlighted may be common, the specific structures and strategies used to implement the practice are worthy of attention. These initial investigations set out to mark these practices for future rigorous scientific inquiry by Dana Center and other researchers.

Ultimately, we hope to create a community of inquiry made up of university researchers working with administrators and teachers from featured schools and districts to more rigorously research how effectively these practices improve secondary mathematics learning for all students.

**Reports and practice profiles.** An executive summary details the methods for this initiative and analyzes themes. Two cross-case analyses discuss specific strategies for raising student achievement and building teacher capacity. Brief profiles describe each practice. All of these publications are available on our website at [www.utdanacenter.org](http://www.utdanacenter.org).

**Data.** In all cases, data about the practice were provided by the program, school, or district studied as part of a description of their practice. We did not independently analyze data gathered through a consistent assessment tool, and we did not evaluate their uses of data for measuring effectiveness. Thus, the data in the practice profiles are intended not to prove the practice's effectiveness from a research perspective, but to paint a detailed picture of the practice and what data were used by the program, school, or district to gauge how well it was working.

**Theoretical frameworks.** In some cases, district staff mentioned specific literature on theory or practice that they used when they developed the practice we highlight. In those cases, we cite that literature in our discussion of the practice.

#### **How to cite this profile**

Paek, P. L. (2008, January). K–16 mathematics alignment: El Paso Collaborative for Academic Excellence. Case study from *Practices worthy of attention: Local innovations in strengthening secondary mathematics*. Austin, TX: Charles A. Dana Center at The University of Texas at Austin.