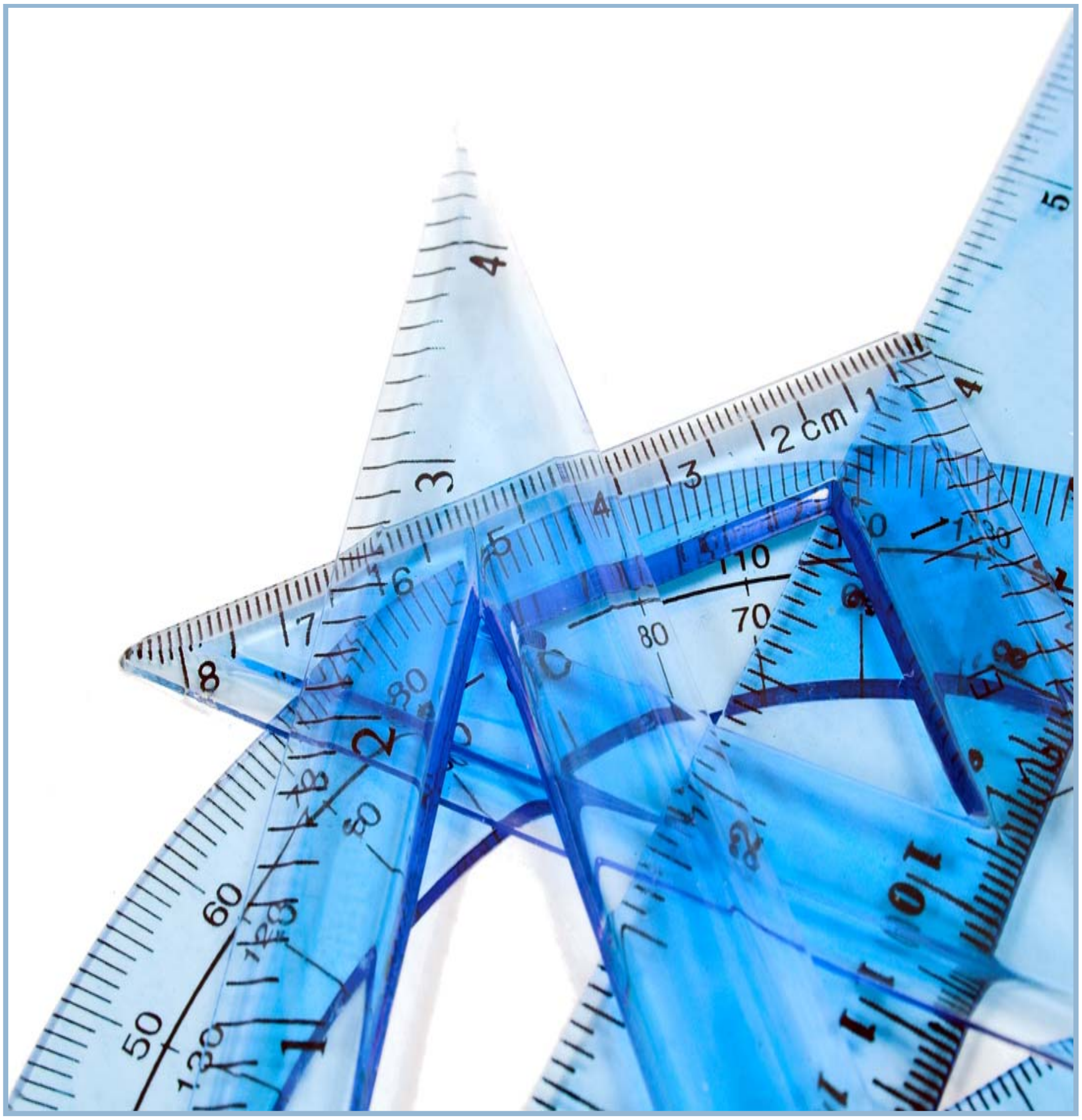
MATH IMPROVEMENT INITIATIVE, YEAR 2 IMPLEMENTATION: 2008–2009



Austin Independent School District
Department of Program Evaluation

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About the Department of Program Evaluation

The Department of Program Evaluation (DPE), a department within Austin Independent School District's (AISD) Office of Accountability, is charged with evaluating federal, state, and locally funded programs in AISD. DPE works with program staff throughout the district to design and conduct formative and summative program evaluations. DPE's methods for evaluating programs vary depending on the research question, program design, and reporting requirements. The evaluations report objectively about program implementation and outcomes, and serve to inform program staff, decision makers, and planners in the district. DPE also responds to information needs at all levels. DPE reports may be accessed online at http://www.austinisd.org/inside/accountability/evaluation/reports.phtml.

ABOUT THE AUTHORS

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After earning degrees in elementary education, curriculum and instruction, and educational administration at Texas A&M University and obtaining certifications for school principalship and superintendency, Dr. Karen Looby began to specialize in program evaluation. Currently, she supervises multiple projects in DPE, and her team focuses on programs being implemented in middle and high school.

EXECUTIVE SUMMARY

Over a 4-year period (2006–2010), the Austin Independent School District (AISD) is partnering with the Charles A. Dana Center at the University of Texas (UT) at Austin to improve the teaching and learning of mathematics (math). This partnership aims to improve math instruction in all high schools, with expectations of increasing student math achievement across the district, especially for students who have limited English proficiency (LEP) and are in high need of specialized support in math. Specifically, the Math Improvement Initiative provides:

- Professional development opportunities to support improved math instruction for each year of the high school math curriculum
- Support for the design of a new 4th-year math course
- Leadership development opportunities to support existing and emerging school and district math leaders
- Recommendations for improving the math performance of students with LEP
- Development and support for the Academic Youth Development Program (AYD)

For the 2008–2009 school year, the program evaluation examined the following: (a) Geometry teacher participation in professional development sessions provided through the partnership, (b) teacher perceptions of and self-report about their instructional practices, (c) observed instructional practices used in Geometry, (d) student outcomes in their Geometry course and on state assessments, and (e) outcomes for student participants in the Academic Youth Development (AYD) program. Several key findings emerged from this evaluation. They are summarized below, and categorized according to the structure of the report.

PROFESSIONAL DEVELOPMENT SESSIONS AND SURVEY RESULTS

- Teacher participation in professional development sessions varied across schools and throughout the school year. In many cases, participation levels did not meet the expectation of the program. More inquiry into factors influencing participation is needed to ensure all teachers receive professional development support.
- Teacher professional development attendance appeared to be based on teacher perception of need. Those who attended the sessions believed the support was

helpful, and many reported their instruction to required high cognitive demand from students.

- Overall, classroom observations revealed variation in classroom practices within and across campuses. Contrary to teacher report on the survey, their instruction was characterized by tasks requiring low cognitive demand (knowledge and comprehension tasks), rather than higher order skills. This finding indicates many teachers need more, ongoing support to employ instructional practices presented in professional development sessions and encouraged by professional developers.

GEOMETRY COURSE PERFORMANCE

- Student demographics varied across regular and Pre-AP Geometry courses. More Asian and White students enrolled in Pre-AP classes, and more Hispanic and African American students enrolled in regular classes of Geometry. Significantly fewer economically disadvantaged and LEP students enrolled in Pre-AP Geometry classes. It would be desirable to observe an equitable distribution of student groups in regular and pre-AP Geometry classes.
- Geometry course passing rates varied considerably by ethnicity. African American students' Geometry course passing rates were lower than were rates for students from other ethnic groups. Course passing rates were not stable across semesters, particularly for African American students.
- Lower percentages of students who were categorized as economically disadvantaged or LEP passed their regular Geometry course, compared with students in the pre-advanced placement (pre-AP) Geometry course.
- Higher percentages of pre-AP Geometry students earned course credit. Lower percentages of African American and Hispanic students earned credit for both semesters of regular and pre-AP Geometry, compared with their White and Asian peers. The lack of credit earning may out the student at-risk of not completing high school or graduating on time.

TENTH-GRADE MATH TEXAS ASSESSMENT OF KNOWLEDGE AND SKILLS (TAKS) PERFORMANCE

- In 2008–2009, the passing percentages for 10th grade on the TAKS Math test improved or remained stable for nine high schools, compared with student performance from the previous year. The largest single-year increase in the percentage of students meeting standard occurred at Travis (18 percentage points).

- TAKS Math passing rates varied among ethnic groups within schools. Lower percentages of African American and Hispanic students passed the test, compared with White and Asian students.
- TAKS Math passing rates of LEP and economically disadvantaged students varied across schools, and in many cases, the passing rates were considered abysmally low.
- Overall, student performance on each TAKS objective addressing Geometry concepts improved from 2007–2008 to 2008–2009. However, gaps in achievement were found among student groups. This may indicate teachers were addressing the concepts more effectively overall, however more work needs to be done to address the gaps in student achievement.

ACADEMIC YOUTH DEVELOPMENT

- With the exception of students at Anderson, students who participated in the AYD program at pilot campuses (Travis, Akins, and Anderson) outscored their peers in the first semester of their Algebra I course during the 2008–2009 school year. These advantages persisted even after controlling for confounding student characteristics.
- Campuses varied in their ability to assign AYD students to their AYD instructor in the fall semester. However, this match was not found to be essential to program effectiveness.
- During focus group sessions with AYD participants, students praised the program and recounted their efforts to recruit friends to participate during the summer sessions. Many students cited parental encouragement as the primary reason for their participation.

CONCLUSION

The partnership between AISD and the Charles A. Dana Center, designed to improve the teaching and learning of math, showed promise in its second year of implementation. Ongoing support should be sustained to realize instructional improvement and student achievement goals. The initiative will continue in the 2009-2010 school year with a focus on support of Algebra II teachers and AYD, however it is unclear at this time what plans are being made to sustain the program after grant funding ends in September 2010

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PROGRAM OVERVIEW

Over a 4-year period (2006–2010), the Austin Independent School District (AISD) is partnering with the Charles A. Dana Center at the University of Texas (UT) at Austin to improve the teaching and learning of mathematics. This partnership aims to improve math instruction in all high schools with expectations of increasing student math achievement across the district, especially for students who have limited English proficiency (LEP) and are in high need of specialized support in math. The 2008-2009 operating budget provided through a Gates Foundation grant for the Math Improvement Initiative was $376,448. Major program expenses included consulting services from the Charles A. Dana Center ($238,680), professional development costs ($12,400), and youth program costs (15,232), and technology software for three schools ($27,000). Over the four years, the Math Improvement Initiative provided:

- Professional development opportunities to support improved math instruction for each year of the high school math curriculum;
- Support for the design of a new 4th-year math course;
- Leadership development opportunities to support school and district math leaders;
- Recommendations for improving the math performance of students with LEP; and
- Development and support for the Academic Youth Development Program (AYD).

Continuing the partnership's focus on providing teachers with the support needed to improve their instruction and student learning, a series of professional development sessions focused on Geometry at all high schools throughout the 2008–2009 school year. Follow-up sessions to support work from the previous school year also were provided for Algebra I teachers. These sessions were developed and facilitated by district curriculum staff and staff from the Charles A. Dana Center at UT. The training addressed Texas Essential Knowledge and Skills (TEKS), development of rigor in the classroom, student engagement practices, and assessment for student learning.

In Summer 2008, program staff and teachers also implemented an Academic Youth Development (AYD) program to support the successful transition of students from middle school to high school math courses. AYD provided selected teachers with an opportunity to use best practices in the teaching of algebra skills, along with strategies to develop student engagement and commitment to success in rigorous academic courses. Students were invited to participate based on their leadership skills, regular school attendance, and plans to take Algebra I in the fall.

METHODOLOGY

EVALUATION OBJECTIVE

The Department of Program Evaluation (DPE) staff provided information for decision makers about program participation and outcomes to facilitate decisions about program implementation and improvement. Thus, the evaluation was designed to determine program merit and answer explicit questions posed by program stakeholders.

SCOPE AND METHOD

The program evaluation examined the following: (a) Geometry teacher participation in professional development sessions provided through the partnership, (b) teacher perceptions of and self-report about their instructional practices, (c) observed instructional practices used in Geometry, (d) student outcomes in their Geometry course and on state assessments, and (e) outcomes for student participants in the AYD program. For each component, the following questions were used to guide the evaluation of the program in the 2008–2009 school year:

Teacher Professional Development

- To what extent did the Geometry teachers from all high schools participate in professional development opportunities designed to improve math instruction?
- What were teacher perceptions of their professional development and resulting instructional practices?
- Did teachers practice what they learned in professional development?

Student Outcomes in Geometry

- What types of students enroll in regular and Pre-AP sections of Geometry?
- What were the average semester grades for students enrolled in Geometry?
- What were the course credit earning outcomes for students enrolled in Geometry?
- What were the overall TAKS Math test passing outcomes for 10th grade students enrolled in Geometry?
- Did students master Geometry objectives from the 10th-grade TAKS Math test?

Student Outcomes in AYD

- How did students who participated in the AYD program fare in their subsequent Fall 2008 Algebra I course?
- How did students who participated in the AYD program perform on their 9th Grade TAKS Math test?
- What did student participants think about AYD?
- Did AYD have an influence on participant academic achievement?

DATA COLLECTION

Both qualitative and quantitative data were collected to measure the initiative's progress toward its articulated goals. Project management timelines were used to describe program implementation and the availability of resources. District professional development records, professional development activity evaluation forms, teacher surveys, and classroom observations were used to describe outcomes for teachers. Teacher focus groups were conducted to elicit detailed information pertaining to math professional development sessions and professional learning communities. District information systems provided demographic, course grade, and Texas Assessment of Knowledge and Skills (TAKS) testing information for students enrolled in a Geometry course.

DATA ANALYSES

Diverse methodological strategies were employed to assess the effectiveness of the Math Improvement Initiative. For teacher-specific outcomes, simple static descriptive statistics were used to summarize survey results, professional development activity participation, and classroom walk-through outcomes for which comparable longitudinal data were unavailable. More complex data analyses were used to determine changes in student outcomes between and within school years. A more technically detailed description of the statistical techniques adopted is provided in the Appendix.

STRUCTURE OF THE REPORT

The report is organized into three major sections summarizing results pertaining to articulated evaluation questions, followed by discussion and recommendations. The first section describes the professional development support provided to Geometry teachers. In this section, teacher professional development attendance, teacher assessment of the professional development sessions and their instructional practice, and outcomes of classroom observations are summarized. In the second section, student outcomes are investigated, with particular focus on 10th-grade students' Geometry course performance and their 10th-grade TAKS Math scores. In the third section, the Fall 2009Algebra I course outcomes of AYD participants during Summer 2008 are examined. The following discussion section highlights the evaluation findings, implications for the district, and fiscal considerations Conclusions and recommendations identified throughout the report are presented and briefly summarized in the last section.

SUMMARY OF RESULTS

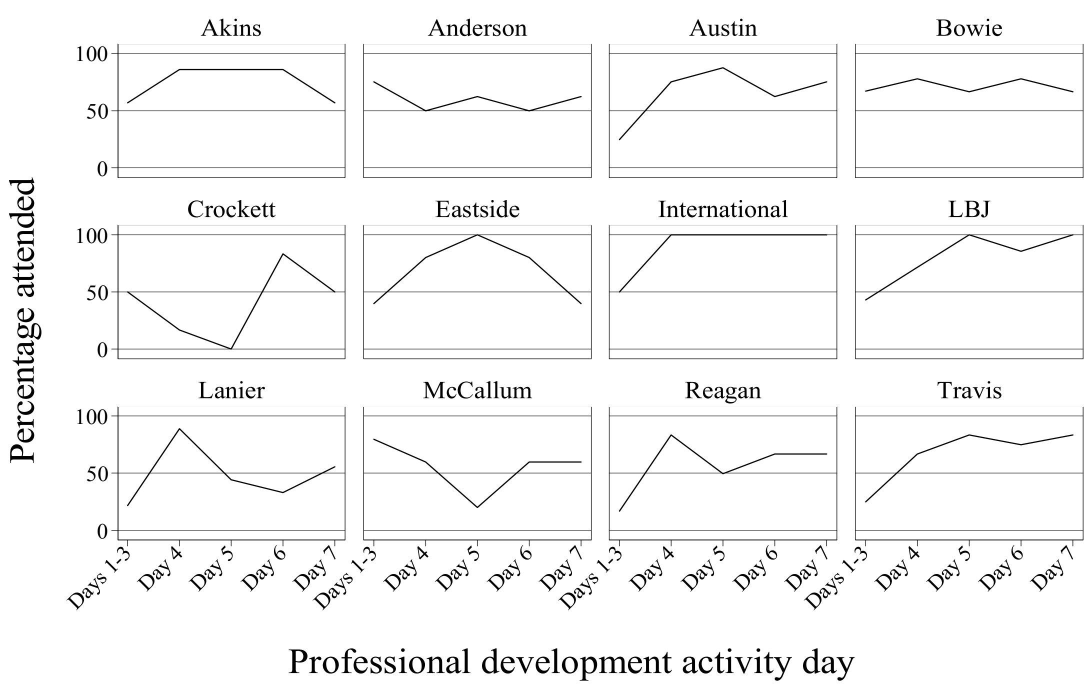
SECTION 1: TEACHER PROFESSIONAL DEVELOPMENT

This section of the report describes the Geometry teacher attendance at professional development activities and teacher responses to a survey instrument intended to gauge their assessment of their instructional practice. Classroom observations also are summarized.

What Was the Extent of Teacher Participation?

It was expected that all geometry teachers attend all professional development opportunities offered by the math initiative, and teacher participation in professional development opportunities was monitored during the 2008–2009 school year. Nineteen percent of Geometry teachers participated in all seven sessions of the professional development offered during the school year, and 55% of Geometry teachers attended 4 or more sessions. Teachers' attendance at these professional development activities varied widely, by training session and by campus (Figure 1). At Akins, Anderson, Bowie, and International, at least 50% of Geometry teachers attended each professional development session offered. At both Travis and LBJ, teachers' attendance rates rose steadily as the school year unfolded. At Crockett, no Geometry teachers attended day 5 of the Geometry professional development session.

Figure 1. Geometry Teachers Attending Professional Development Sessions, by Campus and Day of Training, 2008–2009



Source. District professional development session records, 2008–2009, Department of Program Evaluation (DPE)

In addition to the professional development activity days provided through the AISD/Dana Center partnership, Geometry teachers also were a part of professional learning communities (PLCs) on their respective campuses. The PLCs often focused on improving instructional practices and using student data to guide instruction. During focus groups conducted in Spring 2009, teachers were asked an array of questions concerning how PLCs functioned on their respective campuses. Teachers were particularly complimentary about PLCs when their work was focused around activities closely related to their subject areas. Cross-disciplinary PLCs, however, functioned less smoothly than homogeneous PLCs because the diversity of subject areas represented disrupted collaboration.

Teacher participation in professional development sessions varied across schools and throughout the school year. In many cases, participation levels did not meet the expectation of the program. More inquiry into factors influencing participation is needed to ensure all teachers receive professional development support.

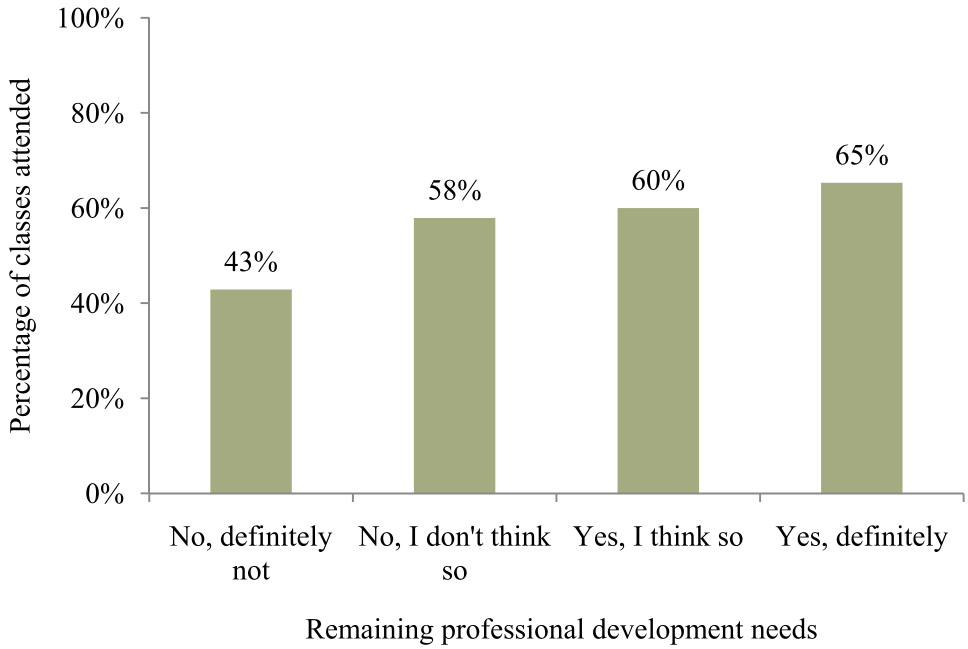
What Were Teacher Perceptions of Their Professional Development and Resulting Instructional Practices?

The DPE, in conjunction with the district's Secondary Mathematics Department, developed a survey instrument designed to evaluate the quality of professional development support and to investigate the use of the instructional practices promoted by the professional development sessions given throughout the school year. The survey explored a range of questions pertaining to the pedagogy of district Geometry and Algebra I faculty, including how student work is assessed and how the results of these assessments are communicated to students. Moreover, teachers were asked to evaluate the usefulness of the training sessions in improving their instructional practice. One hundred seventy-nine Geometry and Algebra I teachers were invited to take the online survey. Of these, 115 responded, yielding a response rate of 64%. Because of the initiative's focus on student performance in Geometry courses and on the 10^{th}-grade TAKS Math exam administered during Spring 2009, this section will be restricted to Geometry teachers' responses to the survey items.

The results of the survey were considered largely positive. Geometry teachers expressed a strong belief in both the district and their respective schools' commitment to improving math instruction in the district. Approximately 90% of respondents thought the district or their campus was committed to this goal. Nearly 98% of respondents stated they were individually committed to this objective. Overall, approximately 80% of Geometry respondents believed the math professional development sessions strengthened their instructional practice. Perhaps as a result of this perceived efficacy, 59% of Geometry teachers who responded to the survey expressed a need for more professional development support from the district's math curriculum office.

The fact that 59% of Geometry respondents indicated they needed additional professional development support may have had an impact on attendance rates for professional development offerings. Geometry teachers' rates of attendance at professional development activities were positively related to the teachers' self-reported need for ongoing instructional support (Figure 2). Thus, attendance rates among teachers who reported they *definitely* needed additional professional development support were nearly 20 percentage points higher than the rates of those who responded they *definitely* did not need additional professional development assistance from the math curriculum office.

Figure 2. Geometry Teacher's Professional Development Activity Attendance Rates, by Self-Reported Perceived Need, 2008–2009



Source. District professional development activity records, 2008–2009; Math Improvement Survey, 2009, DPE
Note. The survey item asked respondents: "Do you need more professional development support from the district's math curriculum office?"

Teacher professional development attendance appeared to be based on teacher perception of need. Those who attended the sessions believed the support was helpful, and many reported their instruction to required high cognitive demand from students.

The district's survey of teachers' professional development activities also focused on how students were engaged in their classrooms. Seventy-one percent of survey respondents claimed their assignments for students *always* or *very often* required "high cognitive demand." Conversely, approximately 10% of respondents indicated they *very often* or *always* gave assignments that required "low cognitive demand."

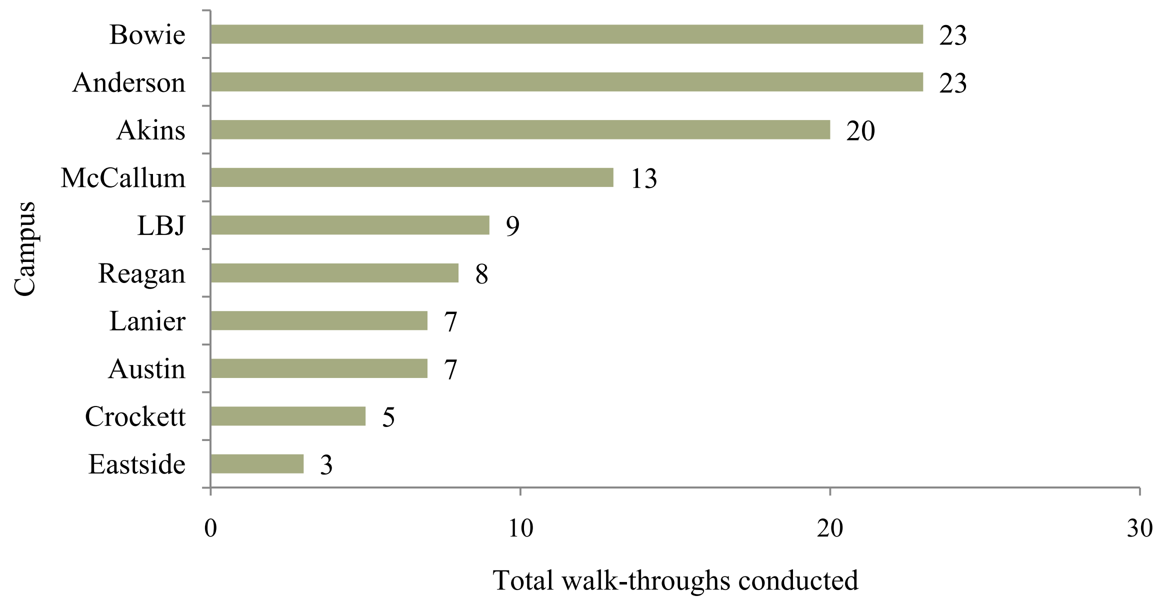
In addition, the survey offered respondents an opportunity to provide an unstructured response to a question asking about any additional training topics that might improve their math instruction. A common request by respondents was for district staff to facilitate the integration of technology into lessons and the classroom. One teacher suggested "technology workshops, just for math teachers." In addition, specialized technology training for particular programs, including Geometer Sketchpad and Fathom, was recommended. In close alignment with these goals, several teachers asked for more incorporation of manipulatives and hands-on activities to help students "connect with the math" taught in the classroom.

To increase professional devlopment attrendance and to improve teacher instructionla prractices, these findings may indicate professional development activity providers should gauge teacher need or interest prior to developing new professional development opportunities. Additionally, they should ensure teachers have a firm understanding of their ongoing need for the continued training prescribed.

Did Teachers Practice What They Learned in Professional Development?

Across all areas (Algebra I, Algebra II, and Geometry), staff conducted 365 observation walk-throughs across all AISD high schools. Walk-throughs were, as prescribed, divided nearly evenly across content areas. In alignment with the research questions guiding this report, the scope of the summary of walk-through results was limited to Geometry classrooms. Each campus experienced multiple walk-throughs, ranging from 3 at Eastside Memorial to 23 at Bowie (Figure 3). Figure 3 presents the distribution of Geometry classroom walk-throughs conducted across campuses.

Figure 3. Walk-throughs Conducted in Geometry Classes Performed by District Walk-through Teams, Spring 2009



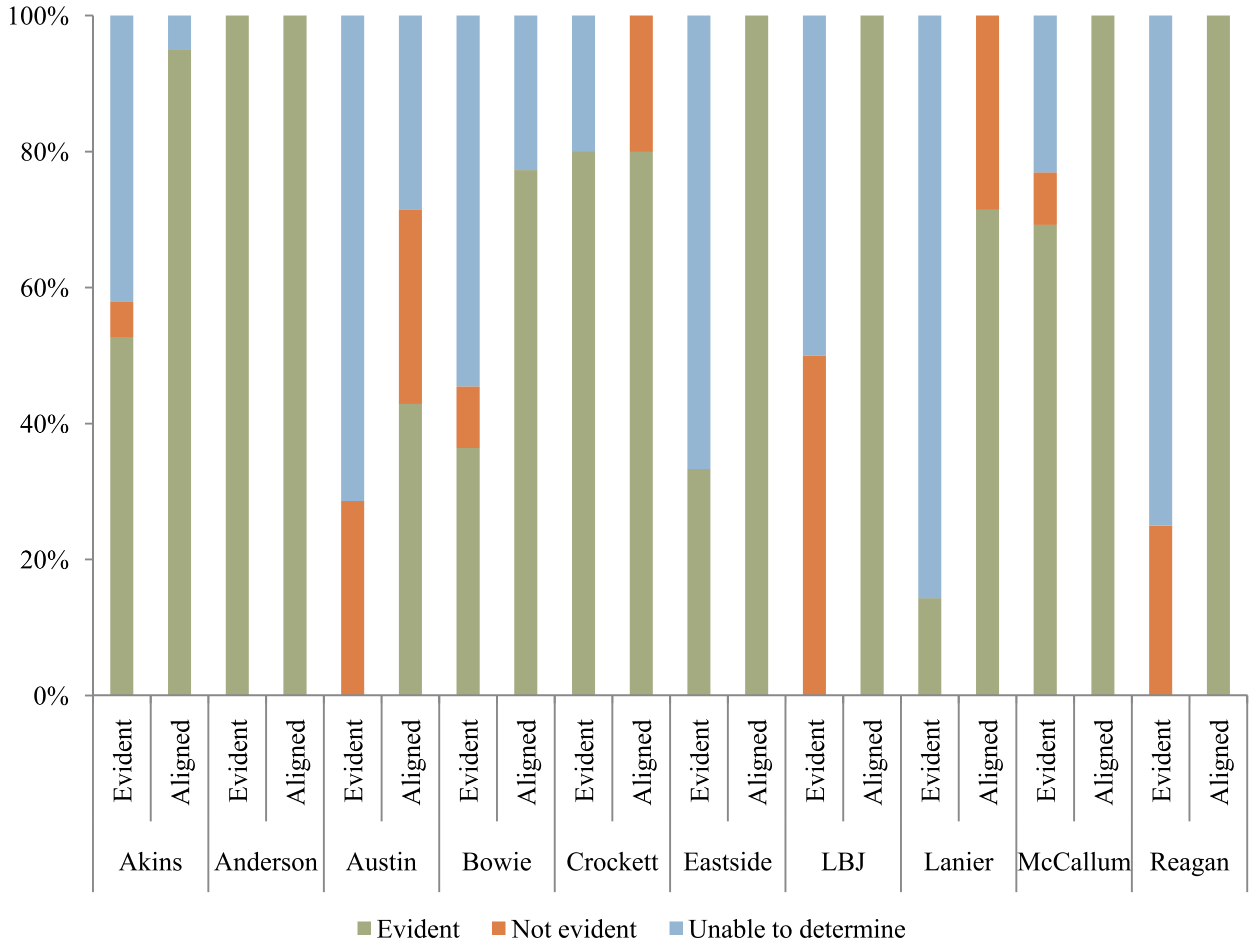
Source. AISD records, DPE

The observation instrument asked questions pertaining to the curricular environment within each classroom selected for a walk-through. One item asked, "Is the learning objective evident to the students?" The second question centered on the alignment of the content with the grade level or course: "Is the learning objective on target for grade-level standards?" Across all AISD high schools, 53% of the walk-throughs indicated the learning objective was evident, while 89% showed the teaching target was appropriately matched to the grade level or course (Figure 4). These are large improvements from the previous year (28% and 44%, respectively), when Dana Center staff only conducted walk-throughs in Algebra I classes.

Differences between Dana Center and AISD observer ratings might be partly explained. A survey instrument designed and administered by DPE asked each walk-through team member how confidently he or she could correctly identify whether particular look-for items were evident in each classroom. According to respondents, AISD observers were noticeably less confident in their ability to declare these objectives as *not evident* or *unable to determine* than they were to indicate the objectives were *evident*. Taken to together, this finding suggests that district-staffed walk-through teams may need additional support from the Dana Center to ensure observation teams faithfully and consistently use the look-for tools to assess classroom instructional practice. Survey evidence tentatively supports this interpretation.

Furthermore, evidence of learning objectives and appropriate curricular alignment varied dramatically across campuses. For instance, at Austin, none of the seven walk-throughs concluded the learning objective was evident. Conversely, learning objectives were identifiable in 100% of the walk-throughs performed at Anderson, although this rate was 20 percentage points more than the rate for the next highest campus (Crockett). Further, the content was aligned with the grade level or course in only 43% of the observations at Austin, while 100% of the walk-throughs at Anderson, Eastside, LBJ, McCallum, and Reagan indicated the content was considered aligned.

Figure 4. Dana Center Observation Walk Evaluations, Focus on Curriculum, Spring 2009



Source. AISD records, DPE

Observers also were asked to categorize students' work and learning activities according to Bloom's Taxonomy of Learning. The cognitive domain of Bloom's Taxonomy describes six levels of knowledge and intellectual development, ordered from the lowest to highest cognitive ability: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Most of the learning activities within the Geometry classrooms across district high schools were classified at the two lowest levels (i.e., the (1) knowledge and (2) comprehension domain; 82%); however, some variation was noted across campuses (Table 1). For instance, all of the observations at Reagan indicated students' activities fit into the (1) knowledge or (2) comprehension domain, whereas 89% of observations at LBJ fell into the (2) comprehension domain. Eastside had the highest percentage of classroom observations classified as fitting in the (3) application domain (67%). This finding should be interpreted with care because only three observation walk-throughs were conducted in Eastside Geometry classes.

Overall, classroom observations revealed variation in classroom practices within and across campuses. Contrary to teacher report on the survey, their instruction was characterized by tasks requiring low cognitive demand (knowledge and comprehension tasks), rather than higher order skills. This finding indicates many teachers need more, ongoing support to improve their instruction.

Table 1. Dana Center Observation Walk-throughs in Geometry Classrooms, by Level of Student Work, Based on Bloom's Taxonomy

	Low cognitive demand ←					→ High cognitive demand	
Campus	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**	**None**
Akins	68%	11%	16%	0%	0%	0%	5%
Anderson	48%	9%	43%	0%	0%	0%	0%
Austin	71%	0%	14%	0%	0%	0%	14%
Bowie	59%	27%	5%	5%	0%	5%	0%
Crockett	60%	20%	20%	0%	0%	0%	0%
Eastside	0%	33%	67%	0%	0%	0%	0%
LBJ	0%	89%	0%	11%	0%	0%	0%
Lanier	14%	43%	43%	0%	0%	0%	0%
McCallum	0%	67%	33%	0%	0%	0%	0%

Source. AISD records, DPE

Note. Where the level of student work was ambiguous, observers were allowed to select more than one level of Bloom's Taxonomy on the look-for tool. For summarization and presentation purposes, the highest selected level is reported for each classroom. Thus, if an observer selected both knowledge and comprehension to describe the level of student work, comprehension superseded the knowledge selection. No Geometry classroom observations were conducted at Travis.

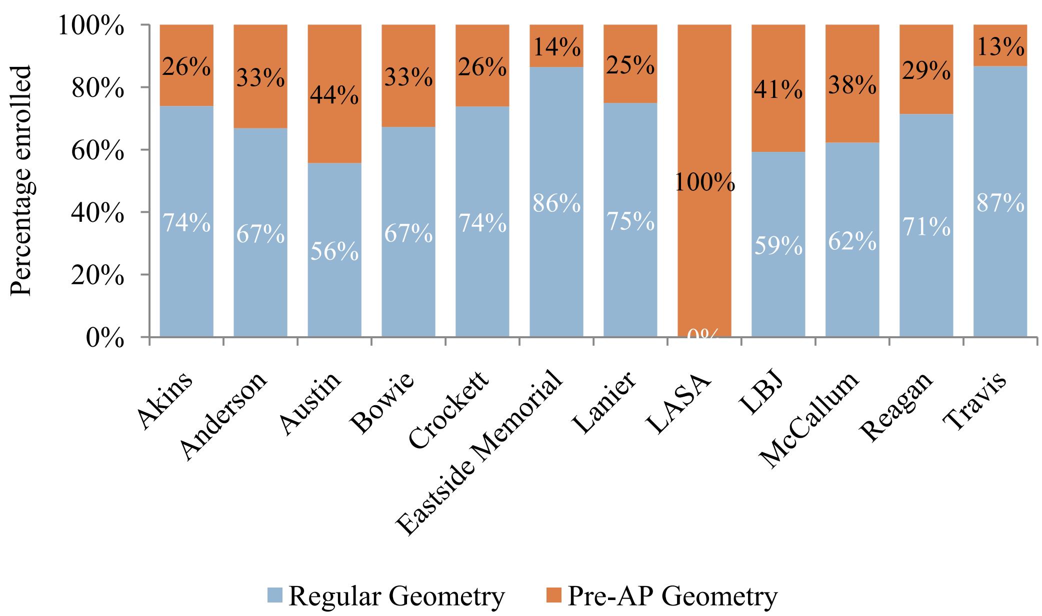
SECTION 2: STUDENT GEOMETRY COURSE ENROLLMENT AND PERFORMANCE

The district's Math Improvement Initiative is based on the idea that quality classroom instruction is integral to the improvement of student academic outcomes. To describe student characteristics and their academic outcomes, student enrollment in regular and pre-advanced placement (pre-AP) sections of Geometry was described. Student performance in their respective Geometry courses and on the TAKS Math test was summarized, and the relationship between student performance in Geometry classes and on the TAKS Math test was explored.

Who are the Students Enrolled in Geometry in 2008-2009?

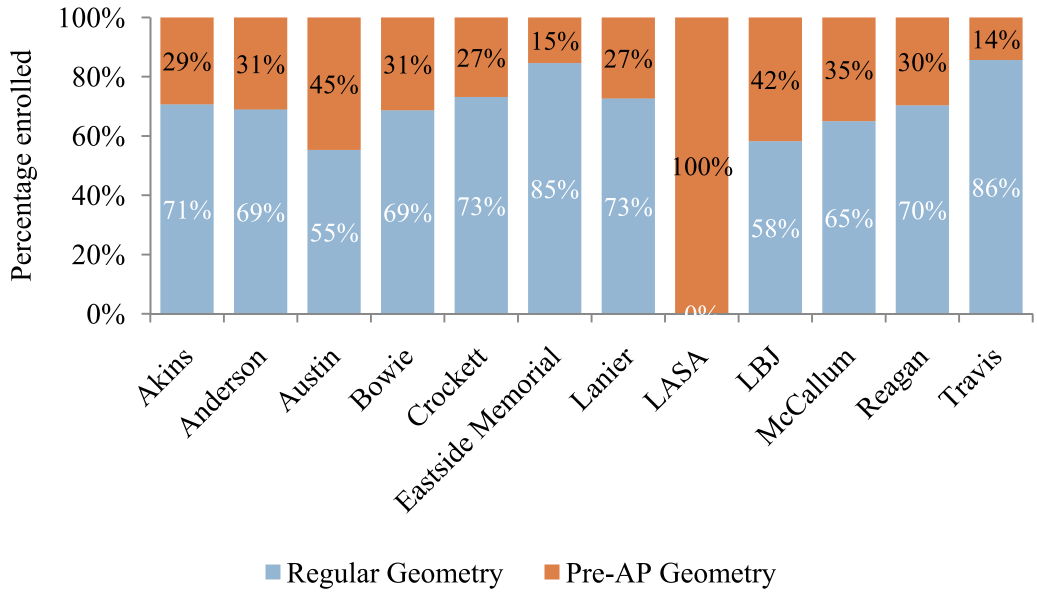
The enrollment of students in regular and pre-AP Geometry classes was consistent across semesters (Figures 6 and 7). Because LASA is a magnet school, all students there were enrolled in pre-AP or magnet Geometry classes. Travis and Eastside Memorial had the lowest rates of pre-AP Geometry enrollment among high schools. Austin, McCallum, and LBJ had the highest percentages of pre-AP Geometry students.

Figure 5. Students Enrolled in Geometry, by School, Fall 2008



Source. AISD course records, DPE

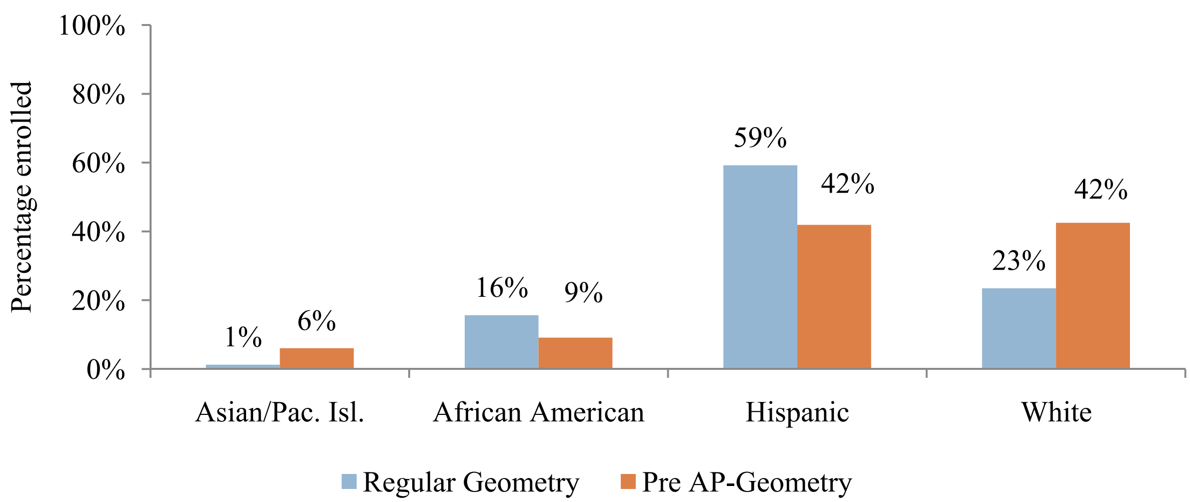
Figure 6. Students Enrolled in Geometry, by School, Spring 2009



Source. AISD course records, DPE

The demographic profiles of students enrolled in pre-AP and regular Geometry differed. Pre-AP Geometry courses had higher percentages of Asian and White students than did regular Geometry courses. On the other hand, regular Geometry courses had higher percentages of African American and Hispanic students than did pre-AP Geometry courses (Figure 7).

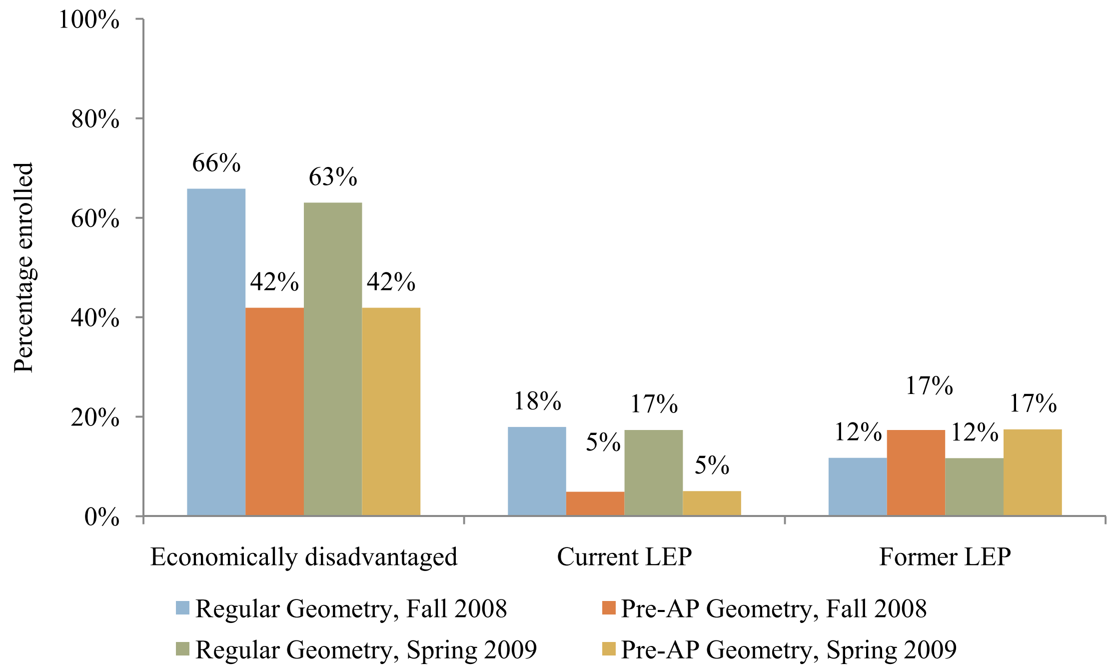
Figure 7. Students in Pre-AP Placement and Regular Geometry, by Ethnicity



Source. AISD course records, DPE

Differences also were found in the enrollment for pre-AP and regular Geometry for students who were categorized as economically disadvantaged or LEP. Significantly higher percentages of students categorized as economically disadvantaged or LEP were enrolled in regular Geometry courses than in pre-AP Geometry classes (Figure 8). This relationship was reversed, however, among students who had exited LEP status.

Figure 8. Students Enrolled in Geometry at All Schools, by Economic Disadvantage and LEP Status, 2008–2009



Source. AISD course records, DPE

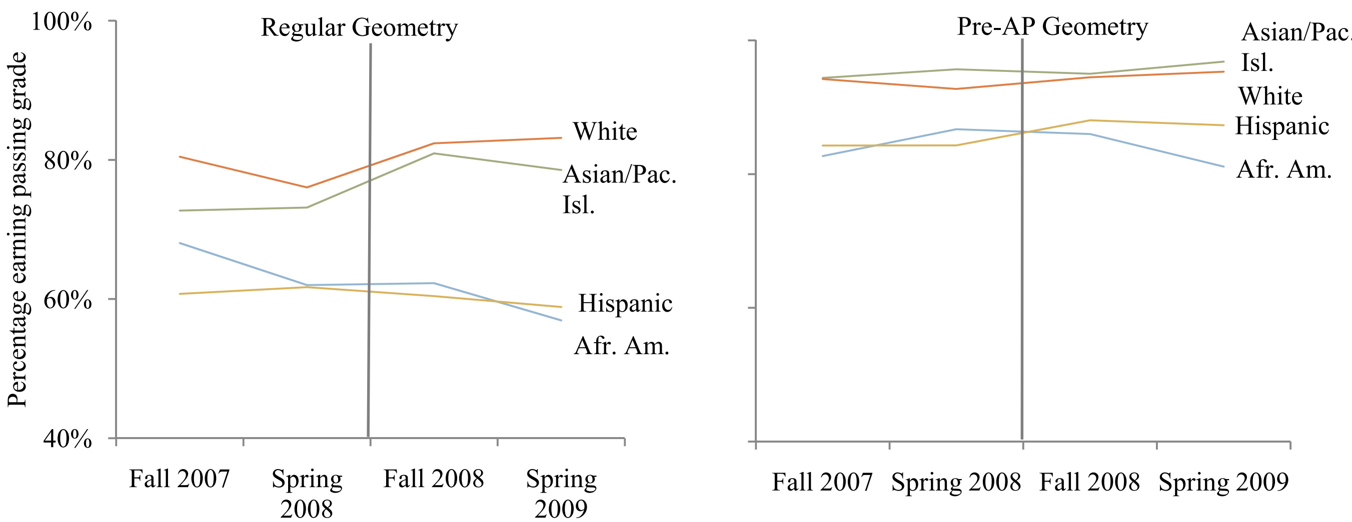
Student demographics varied across regular and Pre-AP Geometry courses. More Asian and White students enrolled in Pre-AP classes, and more Hispanic and African American students enrolled in regular classes of Geometry. Significantly fewer economically disadvantaged and LEP students enrolled in Pre-AP Geometry classes. It would be desirable to observe an equitable distribution of student groups in regular and pre-AP Geometry classes.

Who Passed Their Geometry Course?

Enrollment in Geometry courses varied markedly across ethnic groups, and these differences appeared in students' course grades, as well (Figure 9). First, among students enrolled in a regular Geometry course, passing rates among White and Asian students improved between school years in both the fall and spring semesters. The passing rates of Hispanic students enrolled in a regular Geometry course were modestly lower across school years (less than 1 percentage point between the Fall 2007 and Fall 2008 semesters and less than 3 percentage points between the Spring 2008 and Spring 2009 semesters). A similar pattern was visible among African American students and is evidenced by the regular Geometry passing rate among African American students decreasing from 68% in the Fall 2007 semester to below 60% (57%) in the Spring 2009 semester.

Second, differences in pre-AP Geometry course passing rates between ethnic groups were found within semesters and school years. Although the passing rates of students enrolled in pre-AP Geometry were higher than rates for their peers enrolled in regular Geometry courses, the gaps in course performance between ethnic groups remained. These gaps in course passing rates were attenuated among students enrolled in a pre-AP Geometry course, compared with rates for students enrolled in a regular Geometry course. Despite the narrowing of these gaps the course passing rates of African American and Hispanic students enrolled in a pre-AP Geometry lagged behind the rates for their peers from other ethnic groups in both school years.

Figure 9. Geometry Course Passing Rates, by Course Type, Ethnicity, Semester, and School Year, 2007–2008 to 2008–2009



Source. AISD course records, DPE
Note. A vertical line divides the 2007–2008 and 2008–2009 school years.

Further analyses were conducted to tease out the patterns of course failure by ethnic group and by campus and to assess whether the decline in course performance by African American Geometry students was influenced by student characteristics (e.g., economic disadvantage status or gender), and the analyses are provided in Appendix C. Controlling for student characterisitcs, the Geometry semester average of African American students declined across semesters. This downward trend appeared only among African American students.The Geometry semester average of Hispanic students marginally declined; however, this change was not statistically meaningful. Also, the range of estimated course grades was less variable among African American and Hispanic students across campuses, than was the range of grades among Hispanic and White students. Geometry semester averages differed across schools even after accounting for student attributes; these effects were smaller among African American and Hispanic students than between Hispanic and White students.

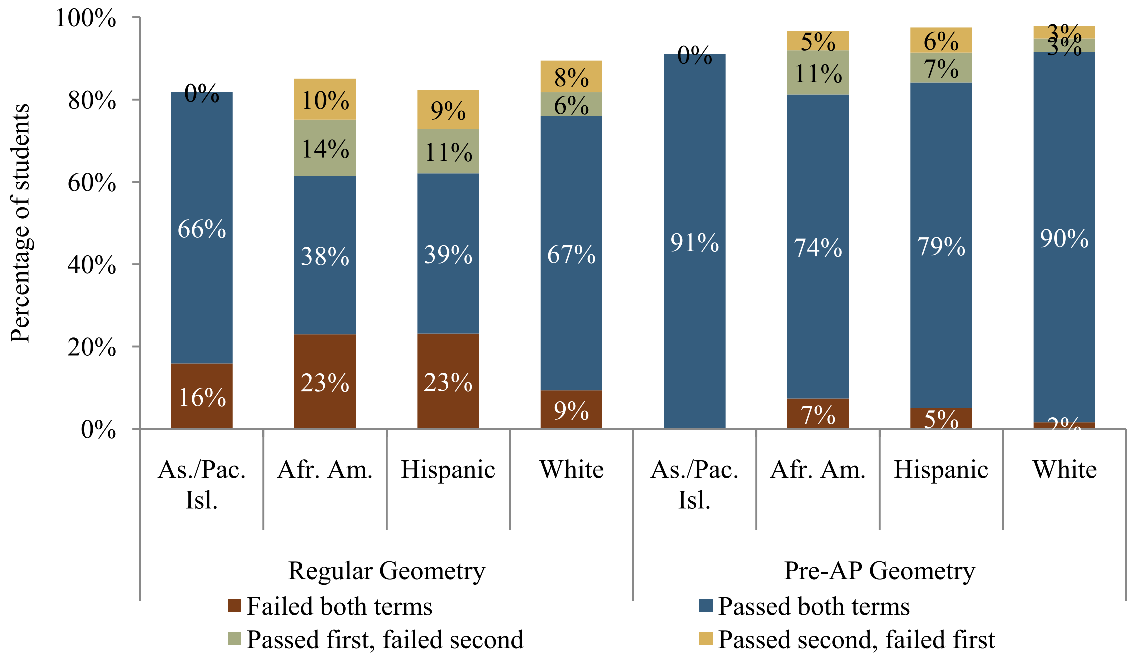
Gaps between student course passing rates were evident. Further, the passing rates did not markedly improve within or across school years and declined for African American students. These outcomes might be expected, given that few classrooms were observed employing instructional practices presented in professional development sessions and encouraged by professional developers.

In sum, gaps between student course passing rates were evident. Further, the passing rates did not markedly improve within or across school years and declined for African American students. These outcomes might be expected, given that few classrooms were observed employing instructional practices presented in professional development sessions and encouraged by professional developers.

Who Earned Credit for their Geometry Course?

Failure to earn course credit puts a student at-risk of not graduating from high school, therefore Geometry students were segmented according to their course credit status for each enrolled semester during the 2008–2009 school year to determine whether a student failed both semesters, passed both semesters, passed the first semester only, or passed the second semester only. Irrespective of course type, fewer African American and Hispanic Geometry students passed both semesters, compared with the percentage of their peers who passed (Figure 10). Only 38% of African American students earned credit for both semesters of regular Geometry, while 67% of White students and 66% of Asian students earned credit for both semesters. Even among students enrolled in pre-AP Geometry, African American and Hispanic students underperformed in terms of credit acquisition relative to their peers. African American students also were more likely to earn course credit during the first semester and to fail the second semester than were all other student groups.

Figure 10. Geometry Course Passing Status, by Ethnicity, 2008–2009



Source. AISD course and student records, DPE

These findings carry important implications for district practice. First, any interventions to improve student math performance should target campuses uniformly because, particularly among African American and Hispanic students, differences between schools are minimal. Second, the poor performance of African American students as the school year progressed warrants deeper exploration. Several explanations, untested in this report, could account for the negative relationship, such as poorer attendance or more misbehaviors in the second semester. This suggests that, particularly at campuses with large African American populations, campus staff should be cognizant of this deterioration of performance and tailor programs or efforts to counteract this trajectory.

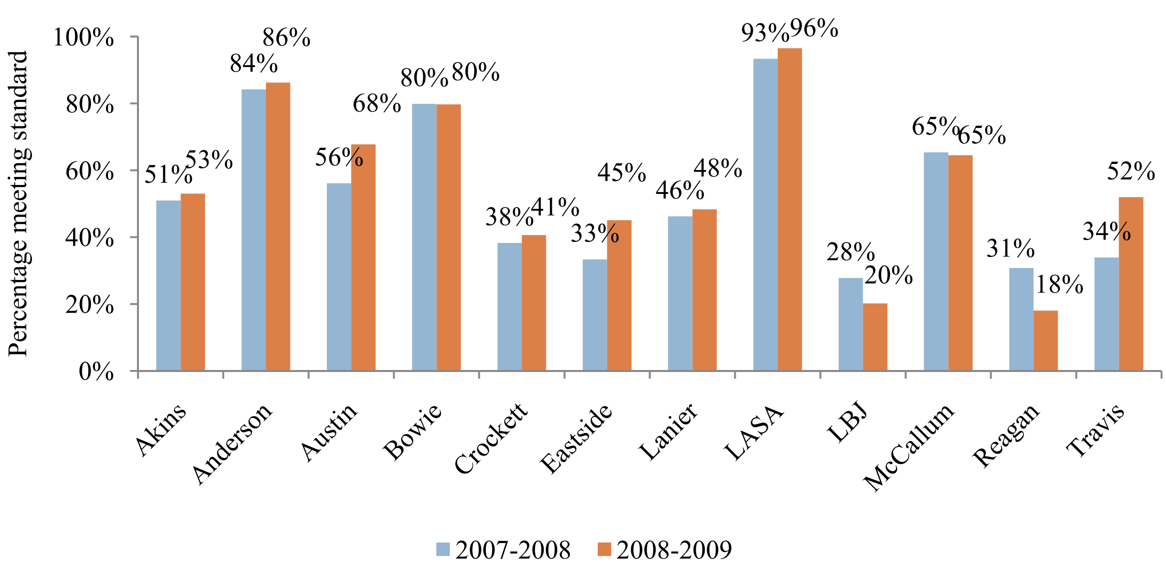
Higher percentages of pre-AP Geometry students earned course credit. Lower percentages of African American and Hispanic students earned credit for both semesters of regular and pre-AP Geometry, compared with their White and Asian peers.

Who Passed Their TAKS Test?

Tenth-grade TAKS Math passing rates increased at nine campuses between 2007–2008 and 2008–2009.

It is expected that the teacher professional development would assist teachers to improve instruction and enable students, not only to ass their Geometry course and earn credit, but also pass their TAKS Math test. Thus, student passing rates on the 2008–2009 10th-grade TAKS Math test were examined. In 2008–2009, most of the passing percentages for 10th-grade students on the TAKS Math test improved or remained stable for nine high schools, compared with student performance from the previous year (Figure 11). These improvements followed the gains achieved from 2006–2007 to 2007–2008 for the 9th-grade students on the TAKS Math (Alderete-Looby & Garland, 2008). The passing rates varied markedly across high schools, ranging from 18% of Reagan 10th-grader students to 96% of LASA 9th-grade students meeting the standard. Reagan had the largest single-year decline in the percentage of students meeting the 10th-grade TAKS Math standard.

Figure 11. Students Who Met Standard for 10th-Grade TAKS Math, 2007–2008 to 2008–2009

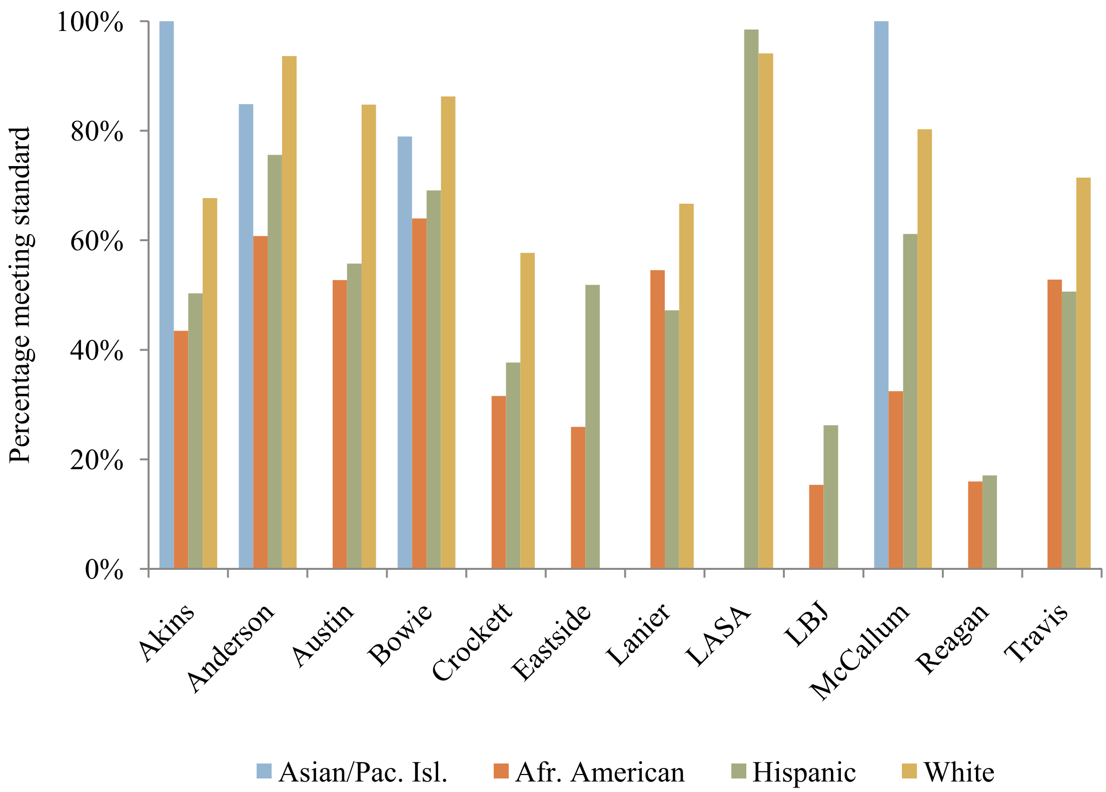


Source. AISD TAKS files, DPE
Note. Data were restricted to only 10th-grade students who were enrolled in a regular or AP Geometry course during the fall or spring of the 2008–2009 school year. Thus, the information presented here may differ slightly from official TAKS results.

Tenth-grade TAKS Math passing rates also varied widely among student ethnic groups within schools (Figure 12). These gaps were wider at some campuses than at others, and were much more pronounced between particular ethnic groups. With the exception of LASA, the passing rates of African American and Hispanic students were lower than the rates of their White peers. At Austin, White students were approximately 30% more likely to meet the 10th-grade TAKS Math standard than were African American or Hispanic students. At Anderson, the gap was particularly wide between White students and African American students (33 percentage points).

TAKS Math passing rates varied among ethnic groups within schools. Lower percentages of African American and Hispanic students passed the test, compared with White and Asian students.

Figure 12. Students Meeting the TAKS Math Standard, by Student Ethnicity and Campus, 2008–2009

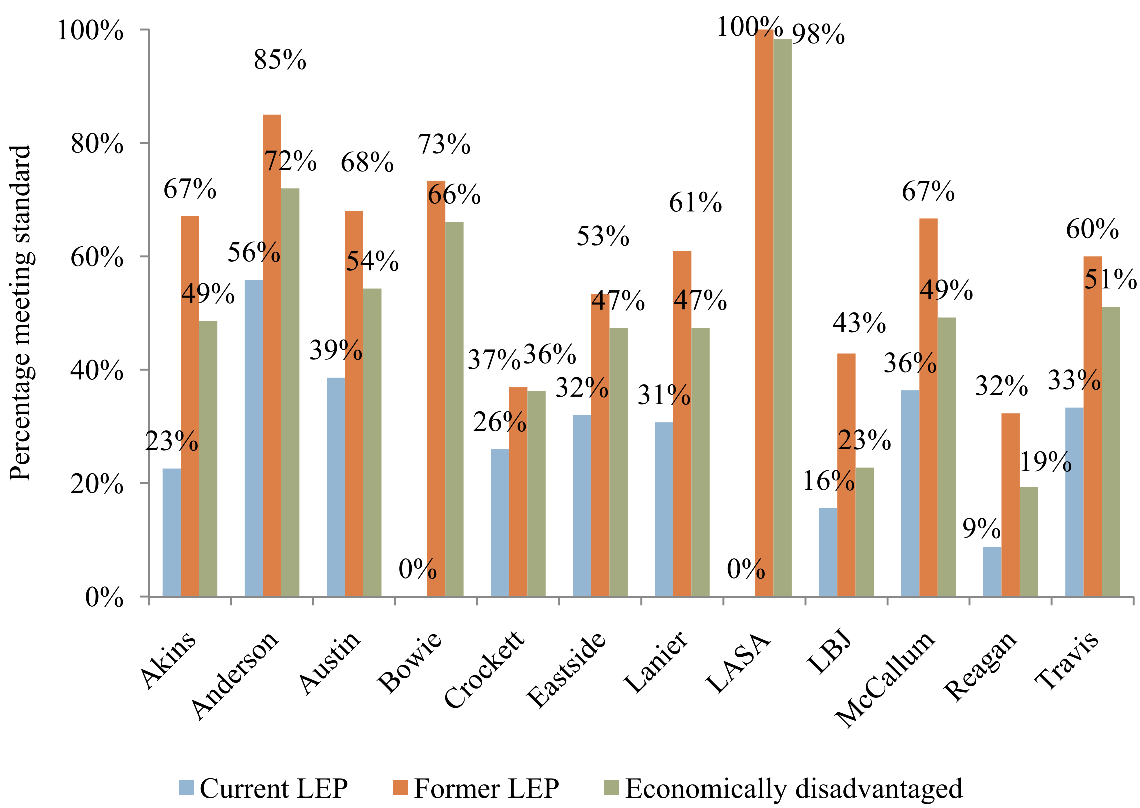


Source. AISD TAKS and student files, DPE
Note. Student subgroups with fewer than five students are omitted to preserve student anonymity.

TAKS Math passing rates were further segmented by students' economic disadvantage and LEP status (Figure 13). TAKS Math passing rates of LEP and economically disadvantaged students varied across schools, and in many cases, the passing rates were considered abysmally low. Among all high school students from regular, non-magnet campuses, economically disadvantaged students at Anderson reported the highest TAKS Math passing rate (72%), while Reagan's economically disadvantaged population scored the lowest (19%). Among students classified as LEP during the 2008–2009 school year, 56% of Anderson's LEP population met the TAKS Math standard. However, only 9% of Reagan's current LEP students satisfied the TAKS Math standard.

TAKS Math passing rates of LEP and economically disadvantaged students varied across schools, and in many cases, the passing rates were considered abysmally low.

Figure 13. Students Who Met Standard for 10th-Grade TAKS Math, by Campus, LEP, and Economic Disadvantage Status, 2008–2009



Source. AISD TAKS and student files, DPE
Note. Schools with fewer than five students in a category are omitted to preserve anonymity.

Did Students Master Geometry Objectives on the TAKS Math Test?

The district's Math Improvement Initiative was designed to help Geometry teachers improve their content knowledge and instructional practices related to the Texas Essential Knowledge and Skills (TEKS). These Geometry concepts are tested specifically on the 10th grade TAKS math test. Three TAKS objectives from the 10th-grade TAKS Math test specifically capture students' mastery of Geometry concepts: objectives 6 through 8 (Table 2). Overall, student performance on each TAKS objective improved from 2007–2008 to 2008–2009, with objective 6 showing the largest percentage increase in items answered correctly (3.6 percentage points). At the district level and across both years, students answered the highest percentage of items correctly for objective 7.

Despite these aggregate gains, performance on TAKS objectives varied widely across high schools. For instance, on objective 6 and objective 7, Eastside Memorial showed the largest improvements, with the percentage answered correctly increasing by approximately 8 percentage points from 2007–2008 to 2008–2009. Similarly, on objective 6, Austin demonstrated sizeable gains (7.8 percentage points). However, at McCallum, LBJ, and Reagan, the percentage of items scored correctly fell from 2007–2008 to 2008–2009 on both TAKS objective 7 and objective 8.

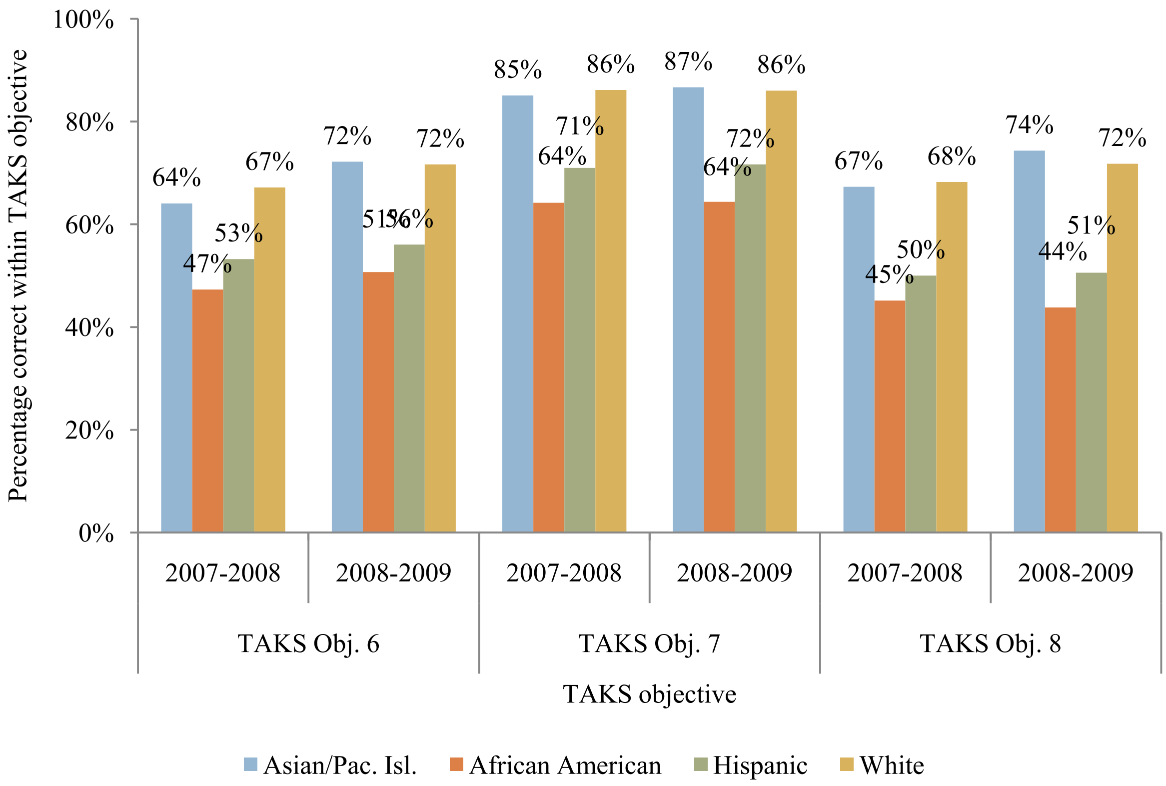
Table 2. Percentage of Items Answered Correctly Within Each TAKS 10th-Grade Math TAKS Objective, by Campus and School Year

	TAKS objective 6 (Geometric relationships and spatial reasoning)		TAKS objective 7 (2-D and 3-D representations)		TAKS objective 8 (Measurement)	
	2007–2008	2008–2009	2007–2008	2008–2009	2007–2008	2008–2009
Akins	56.4%	**58.1%**	72.1%	**73.9%**	48.5%	**50.9%**
Anderson	72.7%	**75.9%**	86.0%	**87.6%**	74.5%	**74.0%**
Austin	56.4%	**64.3%**	78.1%	**78.7%**	55.1%	**61.6%**
Bowie	65.4%	**67.2%**	85.9%	**84.2%**	66.7%	**71.2%**
Crockett	48.1%	**53.6%**	69.2%	**70.1%**	49.7%	**46.8%**
Eastside	46.7%	**55.5%**	64.0%	**72.4%**	47.6%	**49.5%**
Lanier	56.7%	**55.5%**	70.0%	**67.4%**	48.6%	**49.3%**
LASA	67.1%	**74.0%**	89.3%	**85.3%**	74.0%	**74.2%**
LBJ	39.7%	**43.7%**	60.3%	**56.3%**	41.7%	**37.6%**
McCallum	63.7%	**64.4%**	81.0%	**78.5%**	62.7%	**61.2%**
Reagan	45.6%	**46.1%**	63.2%	**62.2%**	42.9%	**33.8%**
Travis	47.8%	**53.3%**	65.7%	**71.9%**	43.7%	**50.7%**

Source. AISD TAKS records, DPE
Note. Declines in the percentage of items answered correctly between 2007–2008 and 2008–2009 are shaded red; increases are shaded green.

In addition to wide disparities across campuses with respect to students' proficiency in the specific Geometry concepts within each TAKS objective, these gaps appeared across student ethnic groups. Hispanic and African American students scored below their White and Asians peers on each TAKS objective examined. Furthermore, African American test takers lagged behind all other ethnic groups for each objective section. Collectively, and affirming the gains reported in Table 1, each ethnic group showed marked improvements on objective 6 between 2007–2008 and 2008–2009; however, these gains were dissimilar across ethnicity, ranging from 8 percentage points for Asian students to 3 percentage points for Hispanic test takers (Figure 14). Thus, the improvements demonstrated in Table 1 appear to have been magnified among particular ethnic groups.

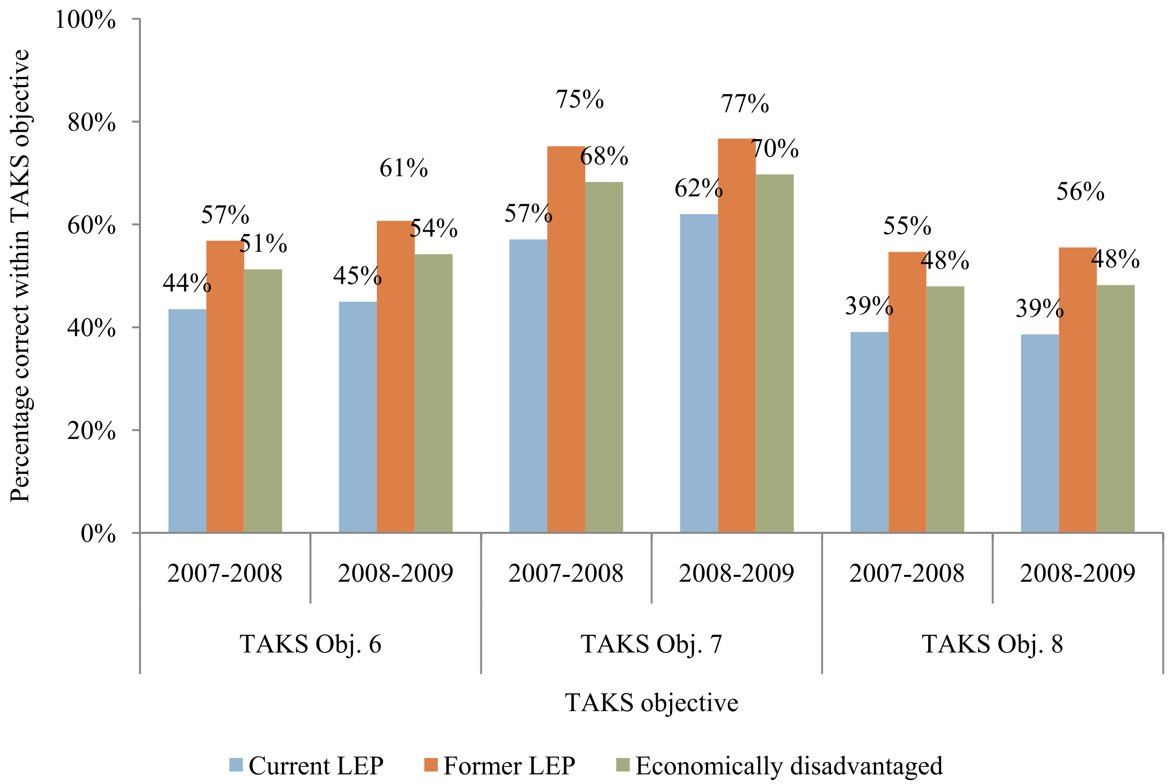
Figure 14. Items Answered Correctly on 10th-Grade TAKS Math, by Objective Number and Student Ethnicity, 2007–2008 to 2008–2009



Source. AISD TAKS and ASTU files, DPE

Student performance on the 10th-grade TAKS Math objectives was further segmented by economic disadvantage and LEP status (Figure 15). Across these three student subgroups, students in 2008–2009 scored higher on objective 6 and objective 7 than did test takers in 2007–2008. Again, improvements were largest on objective 6 and negligible on objective 8.

Figure 15. Items Answered Correctly on 10th-Grade TAKS Math, by Objective Number and Economic Disadvantage and LEP Status, 2007–2008 to 2008–2009



Source. AISD TAKS, SNAPS, and STXL files, DPE

Overall, student performance on each TAKS objective addressing Geometry concepts improved from 2007–2008 to 2008–2009. However, gaps in achievement were found among student groups. This may indicate teachers were addressing the concepts more effectively overall, however more work needs to be done to address the gaps in student achievement.

SECTION 3: ACADEMIC YOUTH DEVELOPMENT PROGRAM

In the this section of the report, the fall Algebra I course outcomes of AYD participants during Summer 2008 are examined. Results include Math TAKS test and Algebra I course grade outcomes, along with student focus group findings.

How Did AYD Students Perform on TAKS?

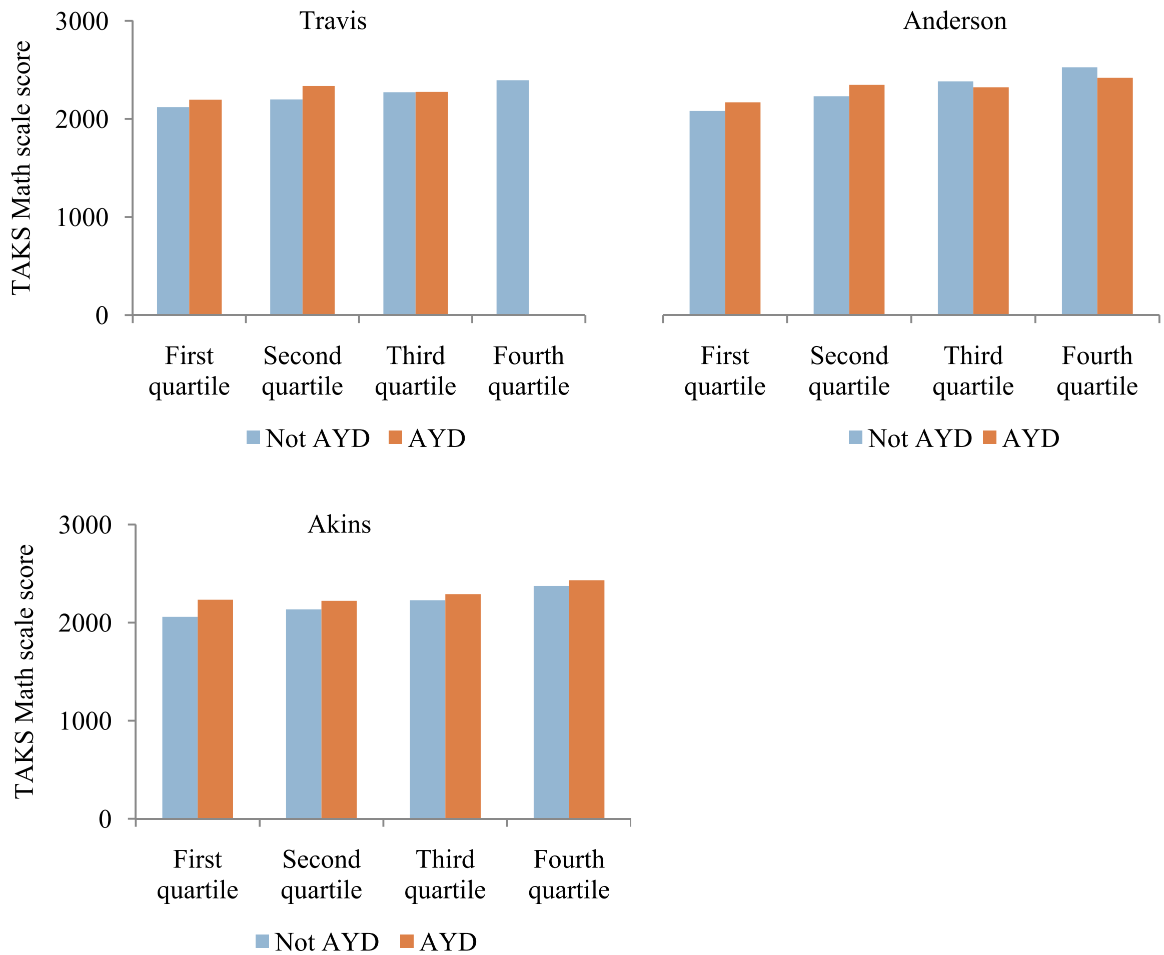
As part of AISD's ongoing Math Instructional Improvement Initiative, 51[1] incoming 9th-grade students participated in the UT Dana Center's AYD program. Briefly, the AYD initiative was designed to bolster the Algebra I readiness of incoming 9th graders by "bridging" the transition with activities that build academic confidence and math skills. Students were recruited based on teacher recommendation of students who had leadership skills, yet were considered "barely passing" their math class. They must have passed their 8th grade TAKS Math test to participate. Campuses selected for the pilot program were Akins, Anderson, and Travis. Because the program was targeted at incoming 9th-grade students, the analyses presented here are confined to 9th-grade students enrolled in an Algebra I class during the 2008–2009 school year.

To assess how well AYD students performed on the 9th-grade TAKS Math test administered in Spring 2009, compared with their non-AYD peers, Figure 16 on the next page presents students' scores on this metric, while simultaneously considering students' 8th-grade TAKS Math score. Irrespective of high school of enrollment, AYD students who scored in the bottom two quartiles on their 8th-grade TAKS Math test outperformed their non-AYD peers on the 2009 TAKS Math test. At Anderson, these differences eroded among students in the top two quartiles. This finding appears to align with the expectations of the AYD initiative, according to which "bubble" students are posited to derive the greatest benefit from participation.

Inferences drawn from these findings, and any implications they have for program implementation and district-wide deployment of AYD, should be interpreted cautiously. The program was limited to only three campuses, and AYD participants comprised approximately only 2% of the incoming freshman class of these campuses. Thus, the small number of AYD participants hampers the generalizability and robustness of the findings.

[1] Due to incomplete student participation records or student mobility, 12 AYD students could not be linked to their corresponding assessment data. In addition, three students transferred to a non- AYD campus, and thus were excluded from the analyses.

Figure 16. 9th-Grade TAKS Math Scores, by 8th-Grade TAKS Math Performance, 2008–2009

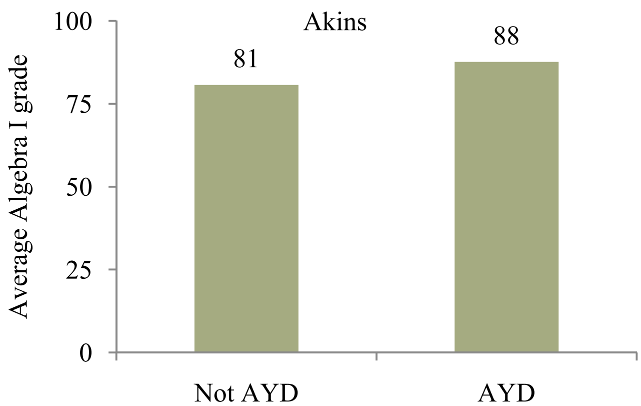


Source. AISD TAKS files and district AYD participation records, DPE
Note. Analysis was restricted to students who met the 8th-grade TAKS Math passing minimum.

How Did AYD Students Perform in their Algebra I class?

Figure 17 on the next page compares the Fall 2008 Algebra I grades of AYD students with the scores of their non-AYD peers. To achieve some comparability between the groups, the comparison was restricted to only those students who earned the minimum passing score on the 8th-grade TAKS Math test administered during the 2007–2008 school year. With the exception of students at Anderson, AYD students earned higher grades in their Fall 2008 Algebra I course than did their non-AYD peers.

Figure 17. Average Fall 2008 Algebra I Grades, by AYD Participation, 2008–2009



With the exception of students at Anderson, AYD students earned higher grades in their Fall 2008 Algebra I course than did their non-AYD peers.

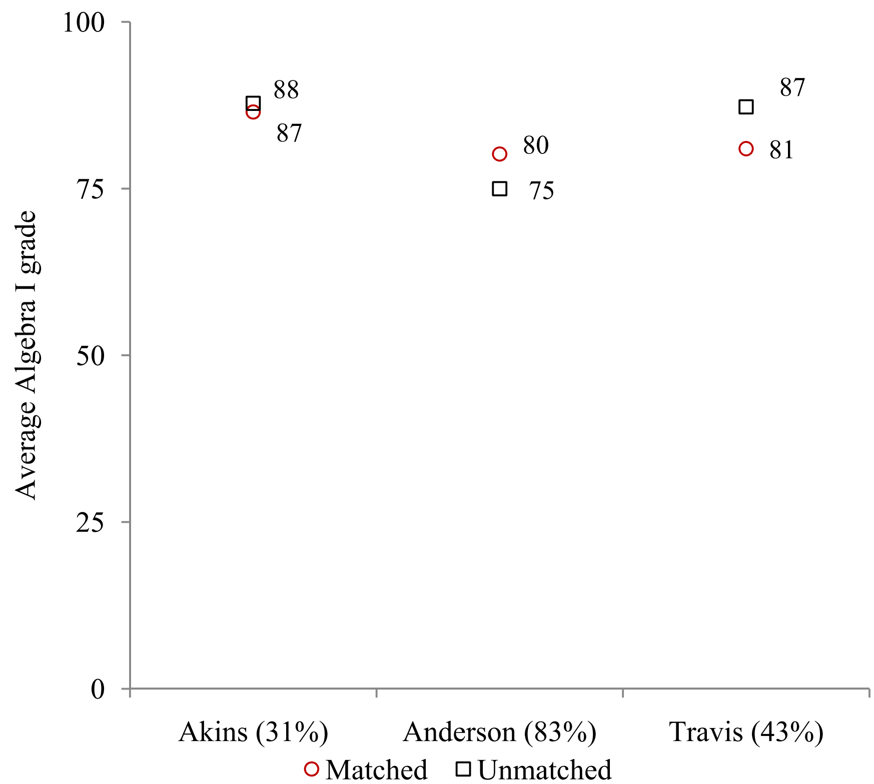
Source. AISD course records and district AYD participation rosters, DPE
Note. Results include only Algebra I classes. The analysis was restricted to students who met the 8th-grade TAKS Math passing minimum.

Campuses were strongly encouraged to match AYD students to their AYD teachers in their 9th-grade Algebra I courses. Theoretically, the matching allowed teachers to reinforce the strategies and behaviors students learned during the AYD summer course, while also harnessing these skills to boost the academic achievement of non-AYD classroom peers. The effect of AYD students being matched with the AYD teacher was inconsistent across the campuses (Figure 18). For instance, AYD students at Travis who were matched with their AYD teacher scored lower in their Algebra I course than did AYD students who were not matched to their AYD teacher (6 points). Conversely, at Anderson, matched AYD students outperformed their unmatched peers in course grades.

It is important to note, however, that campuses varied widely in their ability to assign AYD students to their AYD instructor. The campus labels in Figure 18 include the percentage of AYD students at each campus who were matched to their Summer 2008 AYD teacher during the Fall 2008 semester. Thus, Anderson (83%) linked AYD students to their AYD teachers far more successfully than did Akins (31%) or Travis (43%). This finding suggests campus staff may need guidance from district program staff to ensure students are properly assigned to their AYD teacher. However, given the inconsistent relationship between matched and non-matched AYD students, this assignment may not be integral to program effectiveness.

Campuses varied in their ability to assign AYD students to their AYD instructor in the fall semester. However, this match was not found to be essential to program effectiveness.

Figure 18. Average Grade in Fall 2008 Algebra I Class, by Whether Students Were Matched With Their AYD Teacher



Source. AISD course records and district AYD participation rosters, DPE
Note. Results include only Algebra I classes. Percentages conjoined to campus labels denote the percentage of AYD students at each campus who where matched to their Summer 2008 AYD teacher during the Fall 2008 semester.

Did AYD Have a Direct Influence on Student Academic Achievement?

The students recruited for the program were not selected randomly, and they all had a choice to participate. Therefore, further analysis was completed to neutralize the bias in the student selection process by matching their academic outcomes with other students with similar characteristics.[2] As a result of the analysis, several student-level characteristics were predicted to have a sizeable statistically significant effect on Algebra I course grades (Figure 19 on the next page). For instance, "Difference compared to non-AYD students" represents the predicted difference in students' Algebra I course between AYD students in the matched sample and non-AYD students. More concretely, AYD students, after considering student self-selection, earned an Algebra I grade that was 6.6 points higher than that of non-AYD students in the Fall 2008 semester.

How Do I Interpret Figure 20?

Vertical bar graphs are visual tools to illustrate the estimated impact of specific variables on student outcomes. Put simply, the taller the vertical bar, the more decisive the impact of the factor on students' grades. Each bar represents the predicted change in a student's Algebra I grade for students who were similar in most respects, but who differed on one particular characteristic of interest. For Figure 21, the primary difference of interest is participation in AYD. Thus, students who participated in AYD earned an Algebra I grade 7 points higher than did students who did not participate, even after controlling for differences in student characteristics. Other statistically significant variables (p <.05) are displayed in the figure and include economic disadvantage status, attendance, discipline and previous TAKS Math scores.

In addition to AYD participation, addition factors were found to significantly influence student achievement outcomes. Students who had a scale score of 2400 on their 8th grade TAKS math test had a higher Algebra I grade (9.5 points) compared with students who received low scores on the 8th-grade TAKS Math test (2036). Furthermore, chronically absent students (8 unexcused absences during the Fall 2008 semester) struggled considerably in their Algebra I course, compared with their peers who had perfect attendance during the semester. Other classroom variables included in the analysis that

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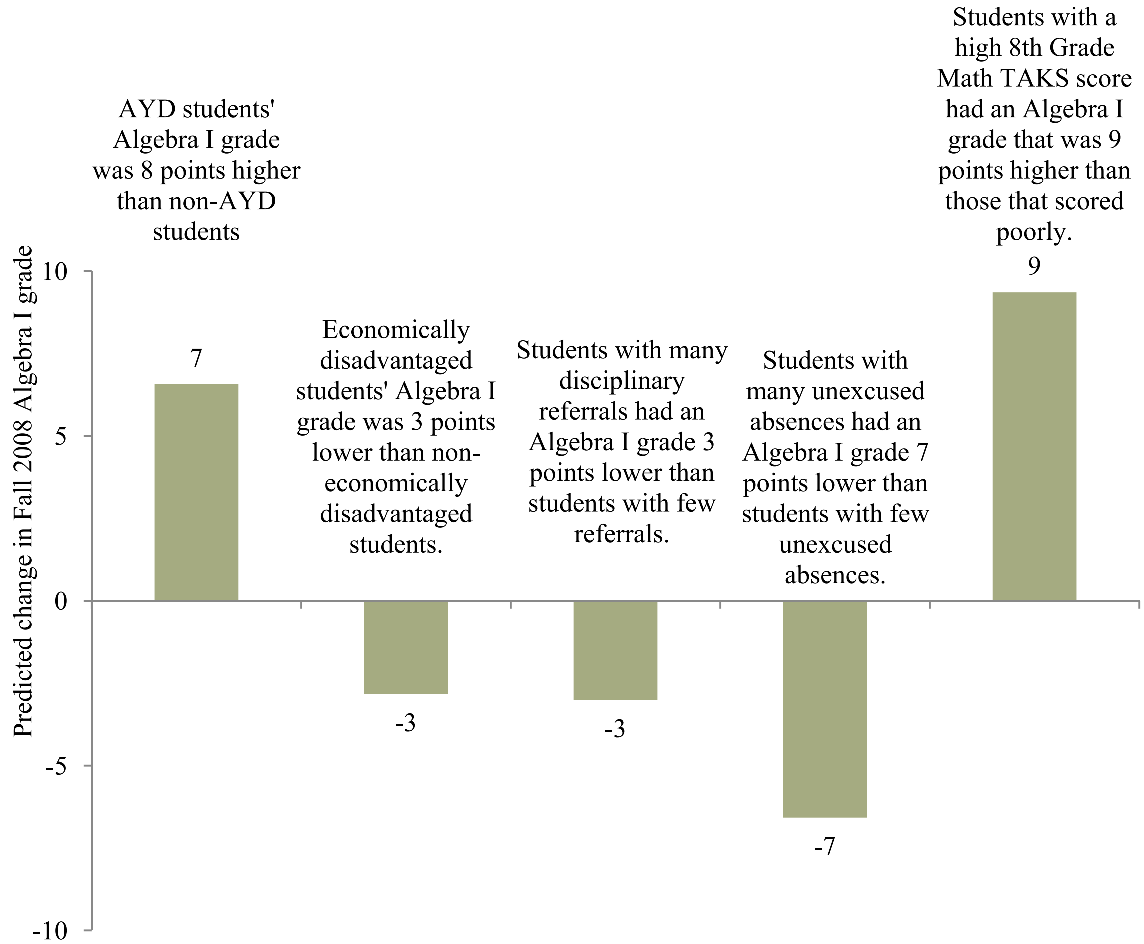
[2] Technical matter relating to this analysis, including a synopsis of the selection model and the empirical justifications for it, and the specified functional form and complete results, are contained in Appendix C.

did not have a meaningfully impact on student performance included teacher experience and education, and classroom composition.

Figure 19. Estimates of the Impact of Student Variables on Fall 2008 Algebra I Course Grade, Matched Sample



Source. AISD course records and district AYD participation roster, DPE
Note. The technical errata pertaining to the estimation procedure used to generate the results are available in *Appendix B.*

AYD participation appears to have had a positive influence on student academic performance in Algebra I . To increase the generalizability and robustness of these findings, further study should take place including more schools and a larger number of students.

What Did Students Think about AYD?

During the Spring 2009 semester, staff from the AISD DPE conducted a series of focus groups at all tier 1 campuses selected for the AYD pilot program. These campuses included Akins, Anderson, and Travis. Students were asked a range of questions about their involvement in the summer pilot program. Several overarching themes emerged from these discussions.

Recruitment

How well the pilot program was publicized to prospective middle school students varied considerably across feeder schools. Students reported differential levels of staff recruitment efforts. Several students, particularly from those middle school campuses with less intensive outreach, recommended district and campus staff amplify recruitment efforts. Related to these augmented recruiting efforts, students also had suggestions for bolstering recruitment. For instance, several students recommended a tour of their high school to familiarize them with the campus. Some students thought previous participants should be involved in the recruitment campaign. This could provide prospective students with a firsthand account of student experiences with the program. In addition, several students cited parental encouragement as the principal reason for participating in the AYD summer program. This feedback suggests that recruitment strategies should target parents as well as students and should tout the advantages of participation for student achievement and academic success. District or campus staff may arrange to weave AYD recruitment efforts into a preexisting parent gathering on campuses to maximize the effect of the outreach attempts.

“I feel so smart…I’ve seen this already!” – AYD participant

Academic preparation for freshman-year Algebra I

Students reported they felt well prepared during their first semester of Algebra I. One student reported, “I feel so smart...I’ve seen this already!” However, as their familiarity with the material declined (i.e., as they moved away from the subjects covered in AYD), their feelings of preparation decreased. The evaluation presented in this report did not investigate the empirical footings and generalizability of these statements. However, future research should explore whether the strong first-semester performance of AYD students relative to their peers was sustained as the school year progressed.

These feelings of preparation provided the AYD students with the confidence to assist their struggling peers, particularly in a group context. However, this varied across schools. For instance, at one school, students reported these collaborative sessions were hampered by discipline problems among their classmates. However, this sentiment was expressed only at one campus. According to one student, this student apathy and disengagement among "repeaters [was] frustrating." When asked if, as AYD leaders, they had a role to play in assisting apathetic students, one student said, "We can't do anything…they'll make fun of you."

Despite these isolated concerns with student teasing, AYD participants were uniformly positive about the program. Students' excitement about the program was noticeable across all of the focus groups sessions. Such enthusiasm was encouraging, if not surprising, given that the voluntary program occurred during the summer prior to their freshman year. Moreover, several students mentioned sharing their enthusiasm for the program with their peers, and urging them to join them in the program.

DISCUSSION

In 2008–2009, the partnership between the district's curriculum staff, Office of Redesign staff, and Charles A. Dana Center staff provided Geometry teachers across the district with ongoing support throughout the school year. Across high schools, 80% of the district's Geometry teachers who participated in the professional development sessions believed they improved their instructional practice. Despite these positive assessments of the usefulness of the trainings, attendance was variable throughout the school year and across campuses.

Considering district expectations for instructional improvement, regular participation in this professional development initiative is critical to ensure teachers are able to implement the instructional practices taught. This is particularly important because research has pointed to the effectiveness of professional development opportunities in the improvement of math teachers' instructional skills (Darling-Hammond & Sykes, 2003). In this study, students experienced increased academic outcomes when their teachers provided experiential learning opportunities and focused on higher order thinking skills.

The Dana Center walk-through evaluations provided a useful snapshot of the classroom environment, the learning activities, and curricular structures of each school. The walk-through observation data across the district indicated teacher instructional practices were focused on developing student knowledge and comprehension levels, with few of the activities addressing higher order cognitive skills. In their responses to the Math Improvement Survey, however, only 10% of Geometry respondents reported giving assignments that required "low cognitive demand." These conflicting findings may indicate teachers need to be more consistent in their professional development participation to truly build their instructional skills or indicate teachers need more time to become proficient in providing increasingly engaging and rigorous instruction.

Engaging and rigorous classroom instruction is paramount in improving student academic outcomes, and improvement is still needed. Student performance in Geometry and on the math section of the TAKS test was found to be variable across student groups. The Geometry course passing rates for African American and Hispanic students were the lowest among rates for all ethnicities and differed considerably from the rates of their peers from other ethnic groups. Indeed, across both years examined, African American students' Geometry course passing rates fell between the fall and spring semesters. Moreover, while 67% of White students passed both semesters of their Geometry course during the 2008–2009 school year, less than 40% of African American and Hispanic students did so. Furthermore, those categorized as economically disadvantaged, as LEP, or as both had low passing rates, compared with the rates of other student groups. These disparities also were evident for the TAKS Math test passing rates.

Furthermore, it is not clear to what extent teachers are supported on their campus to use the information and strategies presented in the professional development offered by this initiative or to what extent expectations for instructional improvement have been communicated by campus and district leaders. Teachers may need more intensive individualized support to apply the concepts and practices presented in professional development sessions. Instructional leaders may need to develop better ways to encourage change and hold teachers accountable for providing increasingly engaging and rigorous instruction.

While more study is needed, the AYD program appears to be a promising intervention for students who are considered "on the bubble," precariously balanced between success and failure. Students developed their academic confidence and familiarity with the upcoming course content as they were going through the uncertain transition from middle to high school. They experienced positive academic outcomes relative to their peers. This intervention warrants expansion and further study.

The initiative will continue in the 2009-2010 school year with a focus on support of Algebra II teachers and AYD, however it is unclear at this time what plans are being made to sustain the program after grant funding ends in September 2010. Clearly, math teachers need ongoing, intensive support to provide engaging and rigorous instruction and to enable students to reach greater academic achievement. While the support from the Dana Center has been considered a valuable contribution and the program staff would like to continue the partnership, much of the teacher professional development work could be maintained by the district's curriculum department, instructional specialists, and teacher leaders. The increase in district capacity would not require the current level of funding needed to sustain the math instructional support. AYD also is considered to be a promising program, however resources must be allocated for continued development and expansion beyond the 2009-2010 school year.

CONCLUSIONS AND RECOMMENDATIONS

The partnership between AISD and the Charles A. Dana Center, designed to improve the teaching and learning of math, showed promise in its second year of implementation. TAKS passing rates continued to improve throughout the district and the AYD program showed encouraging results for participants from tier 1 schools. The initiative addressed the instructional improvement needs of teachers and the academic achievement needs of their students. Most teachers believed that the professional support they received was valuable for the improvement of their instructional practice. However, ongoing support should be sustained to realize instructional improvement and student achievement goals. Recommendations are provided to assist district and program staff to facilitate decisions about program implementation and improvement.

1. *Investigate the patterns of participation in professional development opportunities across schools to identify any impediments to participation across campuses and to improve rates of teacher participation*. Attendance at professional development activities continued to show considerable variability across campuses. Poor attendance jeopardizes the impact of the professional development opportunities on teachers' instructional practices, and ultimately on student achievement. Moreover, survey evidence suggests teachers were less likely to attend if they reported they did not have any additional professional development needs compared with respondents who stated they needed additional professional development support.

2. *Ensure observation walk-throughs are conducted with consistent fidelity to the look-for guidelines and instructions provided by the Dana Center.* Classroom observation walk-throughs of Geometry courses showed sizeable differences on several look-for items, compared with the walk-throughs conducted in Algebra I classes by Dana Center staff during the previous school year. This may be an artifact of district-staffed

walk-through teams' unfamiliarity or inexperience with the look-for protocol. District staff should investigate the need for additional support and training for observation teams. District staff also faced attendance problems among campus staff selected for walk-through team membership. Considering the amount of financial and personnel resources dedicated to training team members, only staff who are able to make a definite long-term commitment to the program should be selected.

3. *Recruit more African American, Hispanic, economically disadvantaged, and LEP students to enroll in pre-AP Geometry courses.* Course enrollment data revealed student demographics in regular and pre-AP Geometry sections were not representative of the campus population. Concerted effort must be made to recruit underserved students to take more rigorous coursework, thereby improving their academic achievement.

4. *Develop a better understanding of why the Geometry course performance of African American students deteriorated as the school year unfolded.* During the four semesters covered in this report (Fall 2007 to Spring 2009), the percentage of African American students scoring at least a 70 in their Geometry course fell cumulatively 11 percentage points. Moreover, only 38% of African American students passed both semesters of the Geometry course during the 2008–2009 school year. These disparities also arose among pre-AP Geometry students.

5. *Consider expanding the AYD program and strengthening recruitment.* AYD students generally outperformed their peers in the first semester of their Algebra course. This finding was robust even with attempts to control for self-selection into the program and other student- and teacher-level confounding explanations.

6. *Identify resources for continued program development and support.* The primary expense of the program was consulting fees. While the expertise of Dana Center staff was valuable to the development to the programs, much of the work could be sustained through the district's curriculum department.

APPENDICES

APPENDIX A. DATA COLLECTION MATERIALS FOR THE DANA CENTER WALK-THROUGH OBSERVATIONS

Figure A1. Look-for Forms for Geometry Classroom Walk-throughs

School:
Walkthrough Team Lead:

Data Collection Tool: LOOK-FORS

D080108

Date: Course/Content: Geometry

Time: Beg Mid End Period:

Comments:

1. Focus on Curriculum

1a. Determine the learning objective(s) for the lesson:

Objective(s):

1b. Learning objective(s) evident to the students:

☐ Evident ☐ Not evident ☐ Unable to determine

1c. Learning objective(s) on target for grade-level standards:

☐ Yes ☐ No ☐ Unable to determine

2. Focus on Instruction

2a. Identify instructional practices:

☐ Coaching
☐ Discussion
☐ Hands-on experiences
☐ Learning centers
☐ Lecture
☐ Modeling
☐ Presentation
☐ Providing directions/instructions
☐ Providing opportunities for practice
☐ Teacher-directed Q and A
☐ Testing
☐ None

2b. Identify grouping format:

☐ Whole group ☐ Small group ☐ Paired ☐ Individual

2c. Identify research-based categories of instructional strategies: ** SKIP - Not part of training **

☐ Identifying similarities and differences
☐ Summarizing and note-taking
☐ Reinforcing effort and providing recognition
☐ Homework and practice
☐ Nonlinguistic representations
☐ Cooperative learning
☐ Setting objectives and providing feedback
☐ Generating and testing hypotheses
☐ Cues, questions, and advance organizers
☐ None

3. Focus on the Learner

3a. Identify student actions:

☐ Listening
☐ Reading
☐ Speaking
☐ Writing
☐ Working with hands-on materials
☐ None

3b. Identify instructional materials:

☐ Computer software
☐ Content-specific manipulatives
☐ Hand-held technology
☐ Lab/activity sheet
☐ Oral
☐ Overhead/board/flip chart
☐ Published print materials
☐ Real-world objects
☐ Student-created materials
☐ Textbook
☐ Video
☐ Websites
☐ Worksheets
☐ None

3c. Determine level(s) of student work:

☐ Knowledge–recalling information
☐ Comprehension–understanding information
☐ Application–using information in a new way
☐ Analysis–breaking down information into parts
☐ Synthesis–putting information together in new ways
☐ Evaluation–making judgments and justifying positions
☐ None

3d. Determine level of class engagement:

☐ Highly engaged—Most students are authentically engaged.
☐ Well managed—Students are willingly compliant, ritually engaged.
☐ Disengaged—Many students actively reject the assigned task or substitute another activity.

4. Focus on the Classroom Environment

☐ Materials are available in the classroom
☐ Models/exemplars of quality student work are posted
☐ Routines and procedures are evident
☐ Scoring rubrics are displayed/provided
☐ Students interact with the classroom environment
☐ Student work is displayed
☐ None

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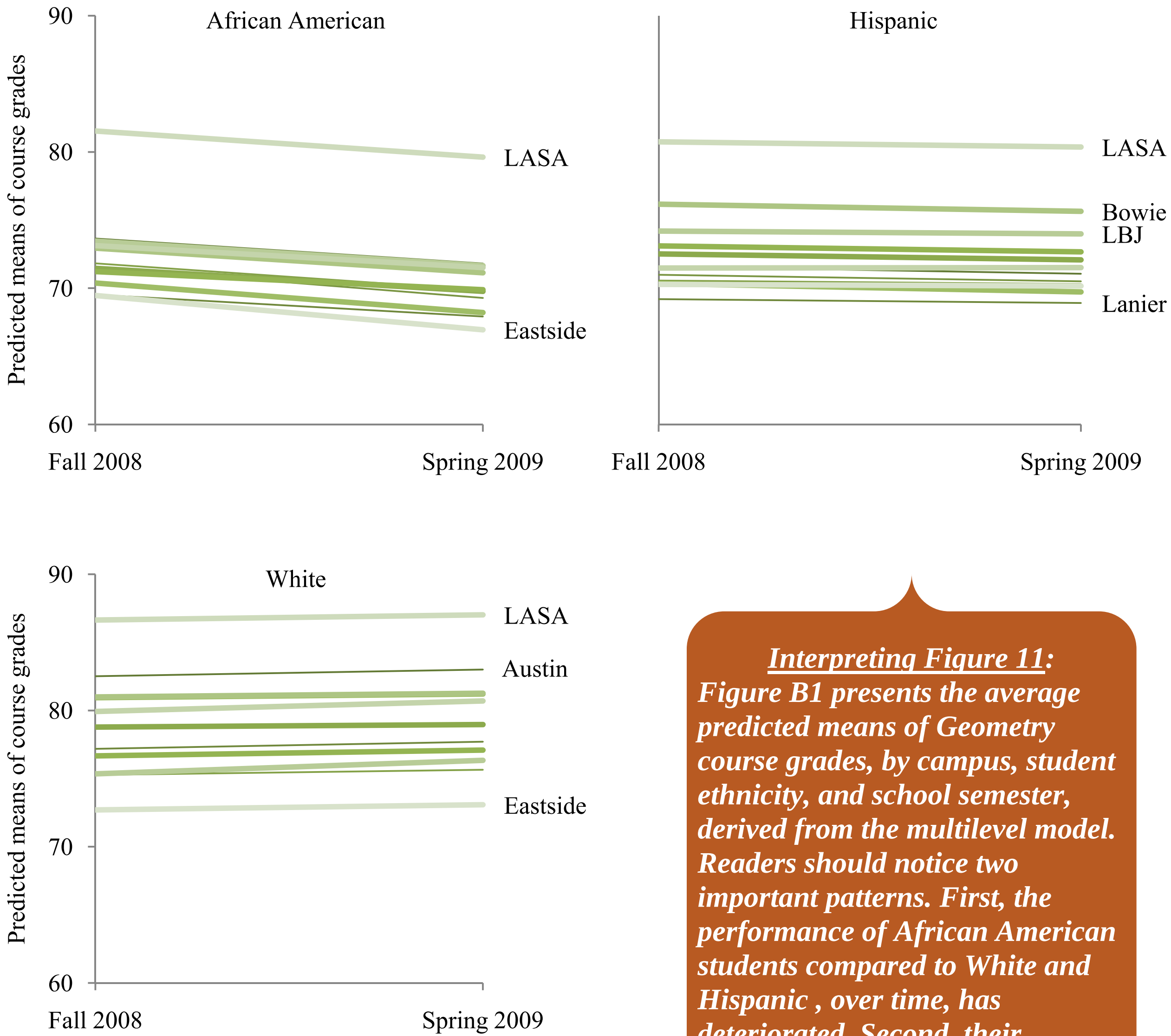
Classroom Walkthrough for Continuous Improvement

APPENDIX B. TECHNICAL MATTER FOR PREDICTED GEOMETRY COURSE GRADES BY CAMPUS AND SEMESTER, 2008-2009

Figure B1. Predicted Geometry Course Grades by Campus and Semester, 2008–2009



Source. AISD course and student records, DPE

<u>Interpreting Figure 11</u>:
Figure B1 presents the average predicted means of Geometry course grades, by campus, student ethnicity, and school semester, derived from the multilevel model. Readers should notice two important patterns. First, the performance of African American students compared to White and Hispanic , over time, has deteriorated. Second, their performance, even after controlling for other factors, is not as variable as other groups. In other words, campuses are consistently struggling to improve the Geometry course outcomes of their African American students.

APPENDIX C. TECHNICAL MATTER FOR FIGURE 20

Observational data present formidable challenges to researchers attempting to isolate the impact of an intervention on student outcomes (Nichols, 2007). Students who were recruited for and ultimately participated in AYD exemplified these challenges. For instance, students recruited to participate in the AYD program were not chosen randomly. Moreover, students who agreed to participate in the AYD summer program may have differed from those who were invited to participate across a number of observed and unobserved student-level characteristics. For instance, students who were recruited and elected to participate may have been more motivated to improve their Algebra I readiness, or more eager to bolster their academic credentials for their college applications, than were students who declined. When these underlying characteristics are correlated with the decision to participate in a program designed to boost student achievement, any inferences drawn from the impact of the program on student outcomes may be confounded by these unobserved factors. Put another way, without knowing the counterfactual scenario (i.e., what the student outcome would have been if he or she had declined to participate in the program), the impact of the intervention cannot be accurately determined.[3] Self-selection is a bedeviling, but not insurmountable, challenge that commonly afflicts educational program participation data.

To neutralize the biases introduced by self-selection, the unobserved outcome was estimated by identifying nonparticipating students who shared observable characteristics comparable to those of students who participated.[4] Propensity score matching (PSM) accomplished this by estimating each individual's likelihood of, or propensity for, participating in a given intervention and then matching individuals with similar propensities for program involvement. Then the means of each observed student characteristic were compared between the two matched groups.

The estimation was restricted to Algebra I courses. In Figure 22, value labels indicate the point change in Fall Algebra I course grades associated with a 1 standard deviation change above and below the mean for each variable presented, holding all other variables' values constant at their means. For binary variables (e.g., AYD and economic disadvantaged status), change in course grade was determined by comparing the predicted course grade of non-AYD

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[3] More formally, $E(Y_0|D = 1)$ is unknown, where Y_0 is the unobserved counterfactual outcome of a program participant $(D = 1)$ if he or she had elected not to participate.

[4] Variables used for the matching procedure included student ethnicity, economically disadvantaged status, feeder middle school, 8th-grade TAKS Math scale score, and gender.

students or non-economically disadvantaged students with the predicted course grade of AYD students or economically disadvantaged students.

The two-level model functional form was specified as:

Level 1:

$$Y_{ij} = \beta_{0j} + \beta_{1j(AYD)} + \beta_{2j(Gender)} + \beta_{3j(Ethnicity)} + \beta_{4j(Discipline\ referrals)} + \beta_{5j(Unexcused\ absences)} + \beta_{6j(TAKS\ Math\ score)} + e_{ij}$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01(Mean\ classroom\ referrals)} + \gamma_{02(Years\ of\ teacher\ experience)} + \gamma_{03(Teacher\ education\ level)} + u_{0j}$$

$$\beta_{qj} = \gamma_{q0}, \text{for } q = 1 \text{ to } 6.$$

Table B1 (next page) presents the results of the hierarchical linear model (HLM) estimating the effect of student and school-level attributes on students' Fall 2008 Algebra I grade. Two groups of results are presented. The first group (Unmatched sample) displays the model estimates for all students enrolled in an Algebra I class during the Fall 2008 semester. The second group (Matched sample) includes students who were, according to results of the PSM procedure, comparable to students who elected to participate in the AYD program. This ensures that comparisons between AYD and non-AYD students are confined to students who shared similar observable characteristics. As discussed in the body of the report, AYD students outperformed their non-AYD peers in Algebra I during the Fall 2008 semester, even after controlling for observable factors associated with participation in the program, and characteristics correlated with Algebra I course performance.

Table B1. Two-Level HLM Estimates for Fall 2008 Algebra I Grades, Unmatched and Matched Samples

		Unmatched sample			Matched sample		
		β	SE		β	SE	
Student-level variables	AYD	5.50	1.89	***	6.57	2.41	***
	Female	1.80	0.62	***	1.02	0.81	
	Economically disadvantaged	-0.91	0.78		-2.85	1.09	***
	Hispanic	-1.47	0.92	*	-0.66	1.14	
	African American	0.27	1.29		-0.24	1.91	
	Asian/Pac. Isl./Native American	2.20	1.92		-1.29	2.84	
	Discipline referrals	-0.77	0.12	***	-0.65	0.15	***
	Unexcused absences	-0.81	0.07	***	-0.81	0.09	***
	8^{th}-grade TAKS Math	0.03	0.00	***	0.03	0.00	***
Classroom-level variables	Years of experience	-0.11	0.09		-0.06	0.09	
	Graduate degree	-0.37	1.57		0.28	1.61	
	Mean classroom referrals	0.22	0.33		-0.05	0.38	
	Constant	24.72	5.70	***	26.40	8.35	***
	N	801			535		

***p <.001; **p <.05; *p <.10

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