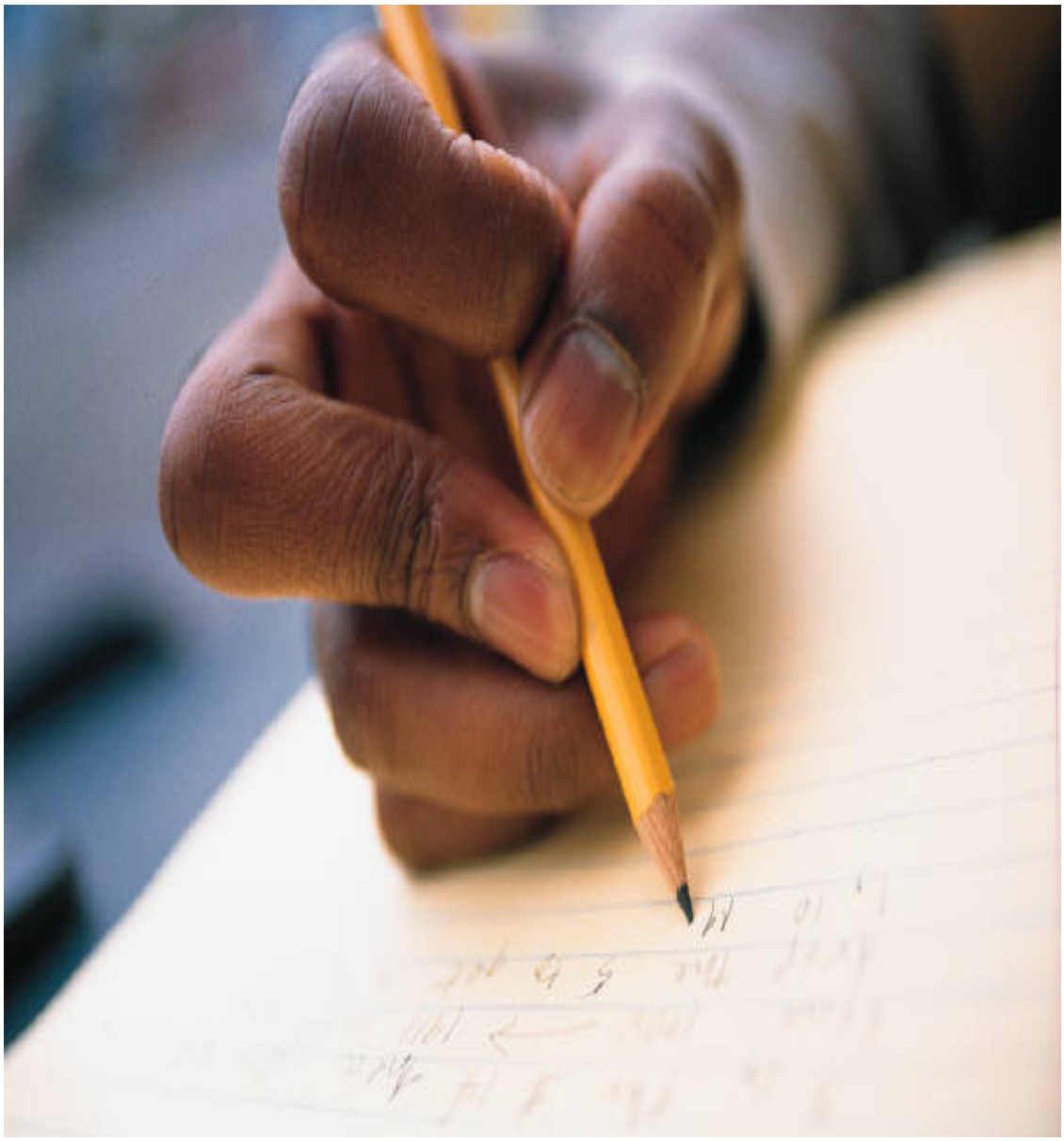
MATH IMPROVEMENT INITIATIVE: ALGEBRA I SUMMARY, 2007–2008



Austin Independent School District
Department of Program Evaluation

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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 at Austin to improve the teaching and learning of mathematics. This partnership aims to improve mathematics instruction in all high schools with expectations of increasing student mathematics achievement across the district, especially for students who have limited English proficiency (LEP). Specifically, the district's Math Improvement Initiative will provide:

- Professional development opportunities to support improved mathematics instruction for each year of the high school math curriculum,
- Support for the design of a new 4th-year mathematics course,
- Leadership development opportunities to support existing and emerging school and district mathematics leaders, and
- Recommendations for improving the mathematics performance of LEP students.

For the 2007–2008 school year, the program evaluation examined the following: (a) Algebra I 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 Algebra I, and (d) student academic outcomes in their Algebra I classes and on state math assessments . Several key findings emerged from this evaluation:

- Seventy-four percent of the district's Algebra I teachers who participated in the professional development sessions rated the trainings either "extremely valuable" or "valuable."
- In 28% of the walk-throughs performed by the Dana Center, the observed teacher's learning objective was evident; in 44%, the teaching target was appropriately matched to the grade level or course. However, most of the learning activities in Algebra I classrooms across district high schools were classified at the lowest level of Bloom's Taxonomy, the knowledge domain (80%).
- Twenty-seven percent of the Algebra I teachers participated in all professional development sessions offered; however, their rate of participation varied throughout the 2007–2008 school year.

- Of the 140 teachers assigned to an Algebra I class and trained in the 2007–2008 school year, only 58% (81) were assigned to an Algebra I course during the 2008–2009 school year.
- Lower percentages of students who were categorized as economically disadvantaged or LEP passed their regular Algebra I course, compared with students in the pre-advanced placement (Pre-AP) Algebra I course.
- Students who scored in higher quartiles on the Texas Assessment of Knowledge and Skills (TAKS) Math section performed, on average, better in their Algebra I course than did those scoring in lower quartiles.

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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 mathematics instruction in all high schools with expectations of increasing student mathematics achievement across the district, especially for students who have limited English proficiency (LEP) and are in high need of specialized support in mathematics. Specifically, the Math Improvement Initiative will provide:

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

During its first year, the partnership focused on ensuring that teachers were receiving the support needed to improve their instruction and student learning. Throughout the 2007–2008 school year, a series of professional development sessions was provided for Algebra I teachers at all high schools. 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 mathematics. 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 Algebra I eligibility status. Fifty students participated at Anderson, Travis, and Akins High Schools for 14 days during Summer 2008. Program evaluation results for AYD will be reported upon the completion of the 2008–2009 school year.

METHODOLOGY

EVALUATION OBJECTIVE

The Department of Program Evaluation (DPE) staff will provide information for decision makers about program participation and outcomes to facilitate decisions about program implementation and improvement.

SCOPE AND METHOD

The program evaluation examined the following: (a) Algebra I 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 Algebra I, and (d) student outcomes for Algebra I and on state assessments. The following questions were used to guide the evaluation of the program in the 2007–2008 school year:

- To what extent did the Algebra I teachers from all high schools participate in professional development opportunities designed to improve mathematics instruction?
- What were the outcomes for the Algebra I teachers as a result of their participation in professional development opportunities?
- What were the academic outcomes for students in Algebra I classrooms across all high schools?

DATA COLLECTION

Both qualitative and quantitative data were collected to measure the initiative's progress toward its articulated goals. Project management timelines and checklists were used to describe program implementation and the availability of resources. District professional development records, professional development evaluation forms, teacher surveys, and classroom observations were used to describe outcomes for teachers. District information systems provided demographic, course grade, and Texas Assessment of Knowledge and Skills (TAKS) testing information for students enrolled in Algebra I.

DATA ANALYSES

A mixed-methods approach was used to provide evaluation information pertaining to the district's Math Improvement Initiative. Quantitative and qualitative data were analyzed using descriptive statistics and contextual analyses. These data were triangulated to determine the effectiveness of the project's service implementation and outcomes for its participants.

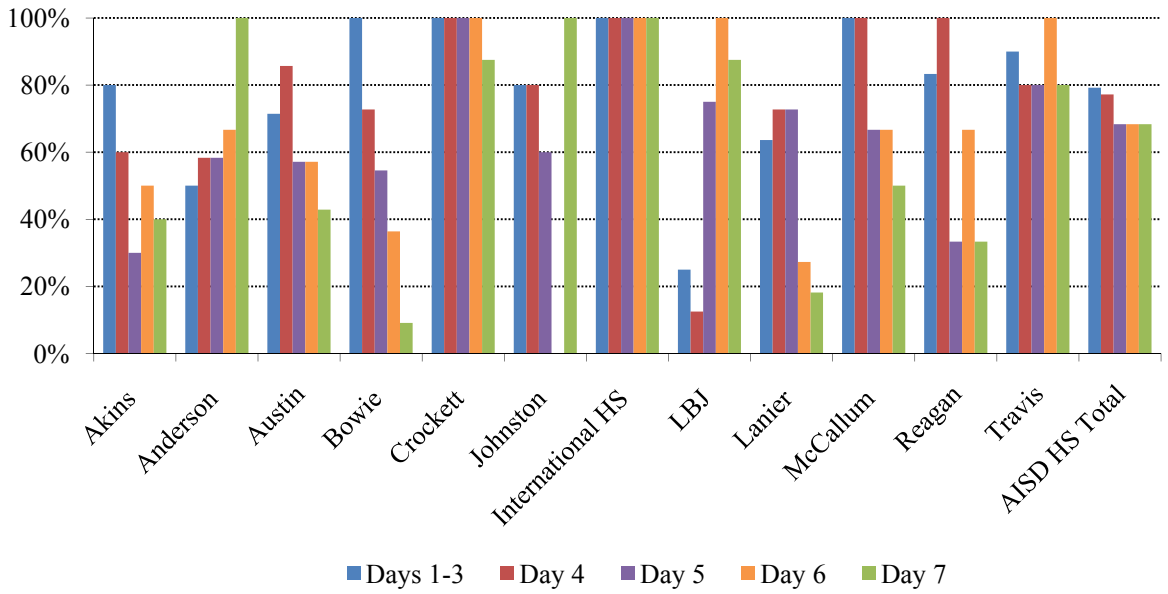
SUMMARY OF RESULTS

TEACHER PROFESSIONAL DEVELOPMENT PARTICIPATION

During the 2007–2008 school year, teacher participation in professional development opportunities was monitored. Twenty-seven percent of the Algebra I teachers had perfect attendance, participating in all professional development sessions offered. At the beginning of the year, relatively higher percentages of Algebra I teachers across all schools attended, and participation decreased as the school year progressed (Figure 1). However, teacher participation varied across the school year when examined at the campus level. Two campuses—Crockett and International High Schools—had consistently higher participation rates across the whole school year. Anderson and LBJ High Schools had lower participation at the beginning of the year, with participation increasing throughout the school year. Teacher participation at Bowie and Lanier High Schools sharply decreased at the end of the school year.

In addition to these professional development days provided through the AISD/Dana Center partnership, Algebra I 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.

Figure 1. Algebra I Teachers Participating in Professional Development Opportunities, 2007–2008



Source. District professional development records, 2007–2008

Of the 140 teachers assigned to an Algebra I class and targeted for the ongoing professional development opportunities in the 2007–2008 school year, only 58% (81) were assigned to an Algebra I course during the 2008–2009 school year. Of the 59 teachers who were not assigned to an Algebra I class in 2008–2009, 41% were no longer teaching in the district.

TEACHER FEEDBACK ON PROFESSIONAL DEVELOPMENT EXPERIENCES

Teachers provided feedback and recommendations about their professional development experiences to help district and campus administrators with program decision making and improvement. When asked about their preferences regarding when professional development sessions should be provided, teachers had mixed responses. Some of the teachers preferred to participate in the summer, while others preferred to participate throughout the school year. Most teachers requested that the professional development opportunities continue to be offered in the summer and during the school year, as was the case during the 2007–2008 school year.

Teachers were asked to assess the value of the professional development experiences provided by the AISD/Dana Center partnership. Fourteen percent of the teachers rated their experiences as "extremely valuable," 60% rated their experiences as "valuable," 25% rated their experiences as "somewhat valuable," and 2% rated their experiences as "of no value." More than half of the teachers reported that they fully understood how the Algebra I professional development sessions aligned with district and campus goals, and 39% reported that they partially understood. Additionally, 54% of the teachers reported that they were highly involved in a PLC on their campus, and 35% had some involvement in a PLC.

Teachers identified the sessions and activities they believed most affected their practice. Many referenced classroom activities they could take back to the classroom to use immediately with students, especially if these activities were TAKS oriented. Teachers also found the time to collaborate and problem solve beneficial to their practice. Others mentioned that they found questioning and feedback strategies helpful.

Some teachers also reported that the strategies and activities were difficult to implement for a number of reasons. Some activities were difficult to complete within a class period. A few teachers mentioned that they had difficulty with the strategy of "wait time, allowing students to come up with their own solutions." A few teachers did not think their time

spent working with the Texas Essential Knowledge and Skills (TEKS) was helpful in implementation.

TEACHER SURVEY OF INSTRUCTIONAL PRACTICE

Teachers also completed a Math Improvement Survey designed to gather information about the use of the instructional practices recommended within the professional development sessions throughout the school year. Eighty-two percent of all Algebra I teachers responded.

Teachers provided information about the types of assignments they gave to students. Approximately 45% of teachers reported that they "never" or "almost never" assigned problems to students that required rote memorization. Seventy-four percent reported that they "always" or "very often" assigned problems to students that required them to use procedures or problem solving strategies with connections tasks.

Teachers answered questions about the ways they gave verbal and written feedback to students. Seventy-nine percent of the respondents reported that they "always" or "very often" asked questions that "push student thinking," and 88% report that they "always" or "very often" asked questions to assess student learning About 83% of the teachers reported that they "always" or "very often" provided wait time for students to process information and solve problems. Teachers were still working on how to phrase their feedback as "noticing" or "wondering" because 45% of the teachers did this "sometimes" and 25% of them "almost never" or "never" did so. Likewise, the teachers reported that the students rarely phrased their feedback to their teachers as "noticing" or "wondering"

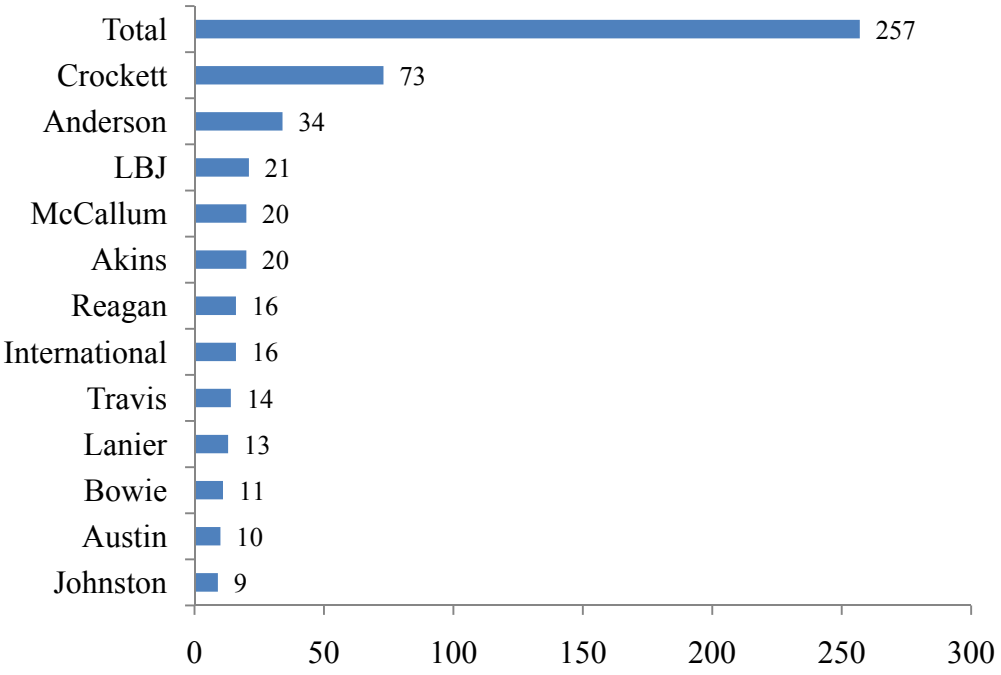
On the survey, teachers also answered questions about their grading practices. Forty-six percent "rarely" or "never" give a grade of 0, and 33% often adjust the grade of 0 to a higher score of 50 or 60. Teachers (62%) observed that the practice of adjusting grades of 0 to grades of 50 to 60 reduced the course failure rates of students, and often had a positive impact on the students' attitudes toward learning mathematics.

CLASSROOM OBSERVATION WALKS

In the spring semester, Dana Center staff conducted a series of walk-through observations in the Algebra I classes at all of the district's high school campuses. Each campus experienced multiple walk-through observations, ranging from 9 at Johnston to 73 at Crockett (Figure 2). In total, Dana Center staff conducted 257 observation walks across all AISD high schools.

The walk-throughs required observers to describe the instructional practices being utilized and student activities taking place in each selected classroom, according to an array of instructional and curricular features. For instance, observers were asked to indicate whether the learning objectives were evident in the classroom, whether the teaching target was matched with the appropriate grade level, what types of instructional strategies were being utilized, and what types of instructional materials were being used.

Figure 2. Observation Walks Performed by the Dana Center, 2007–2008



Source. Dana Center, prepared by the DPE, September 2008.

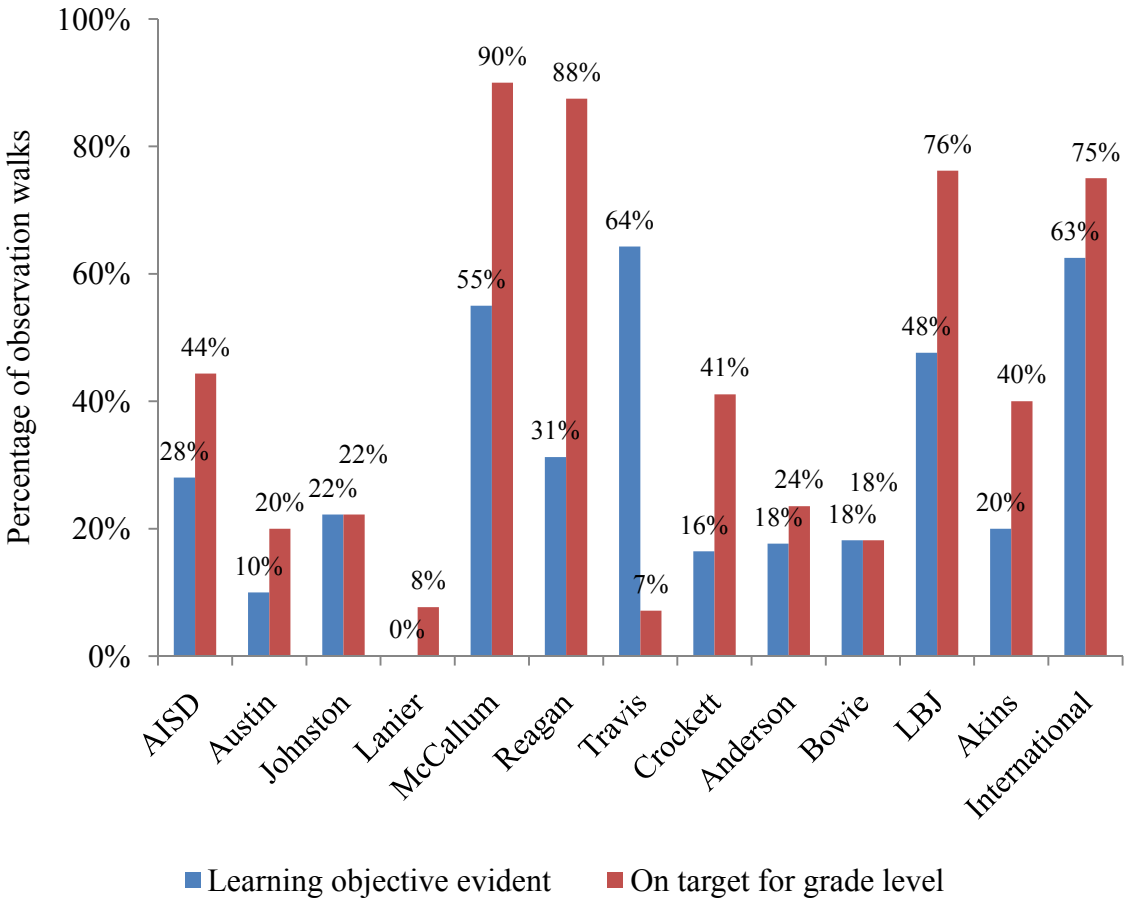
Note. The total number of observations reported by the Dana Center are not equal to the sum total of walks at the individual campuses.

The observation instrument asked questions pertaining to the curricular environment within each classroom selected for a walk-through. One item asked, "Is it evident to students what they are to know and be able to do?" The second question centered upon the alignment of the content with the grade level or course: "Is the teaching target aligned to the appropriate grade level/course? Does the content being addressed align to the scope and sequence?"

The results of the walk-through observations were summarized. Across all AISD high schools, 28% of the walk-throughs indicated that the learning objective was evident, while 44% showed that the teaching target was appropriately matched to the grade level or course (Figure 3). However, these percentages varied dramatically across campuses. For each of the

13 walk-throughs conducted at Lanier, evaluators indicated that learning objectives were not evident to students. Conversely, learning objectives were identifiable in 64% of the walk-throughs performed at Travis. Further, the content was aligned with the grade level or course in only 7% of the observations at Travis, while 90% of the walk-throughs at McCallum indicated that the content was considered aligned.

Figure 3. Dana Center Observation Walk Evaluations, Focus on Curriculum

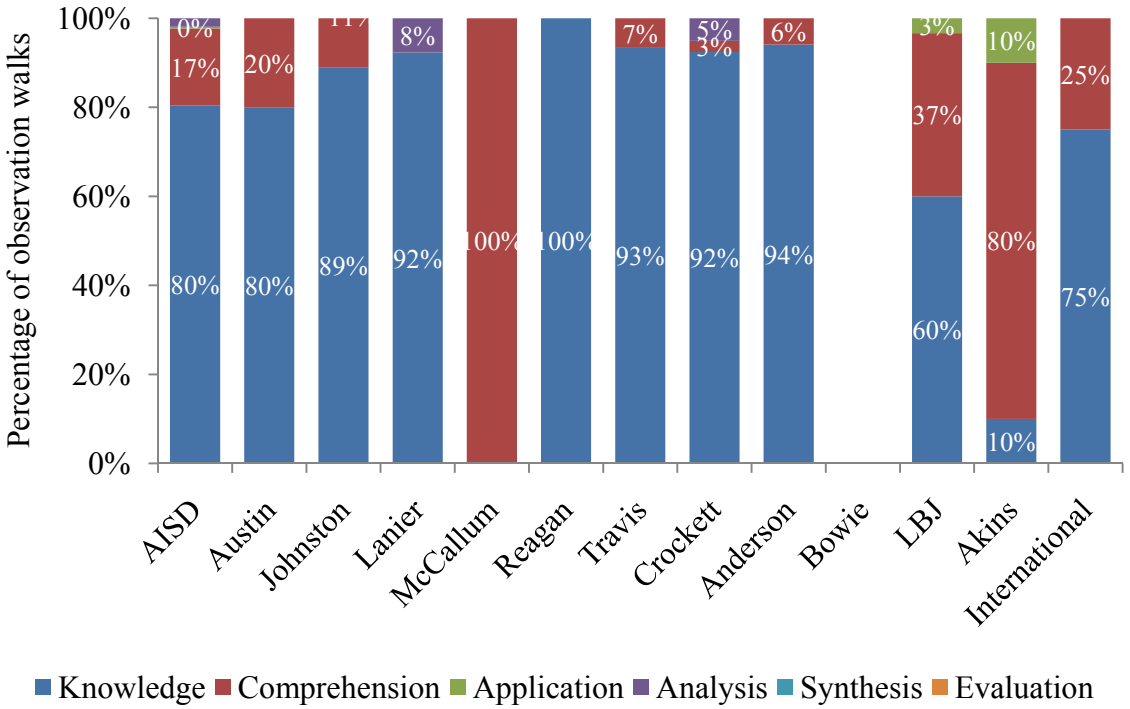


Source. Dana Center, prepared by the DPE, September 2008

Observers also were asked to categorize students' work and learning activities according to Bloom's Taxonomy of Learning (Appendix A1). The cognitive domain of Bloom's Taxonomy describes six levels of knowledge and intellectual development, ordered from the lowest to highest cognitive ability: knowledge, comprehension, application, analysis, synthesis, and evaluation. Most of the learning activities within the Algebra I classrooms across district high schools were classified at the lowest level, the knowledge domain (80%);

however, some variation was noted across campuses (Figure 4). For instance, all of the observations at Reagan indicated that students' activities fit into the knowledge domain, compared with 10% of the activities similarly categorized at Akins. Most or all of the learning activities at McCallum and Akins were categorized at the comprehension level of the taxonomy. Few observers described student learning activities as developing student application, analysis, synthesis, or evaluation skills.

Figure 4. Dana Center Observation Walk Evaluations, Level of Student Work, Based on Bloom's Taxonomy



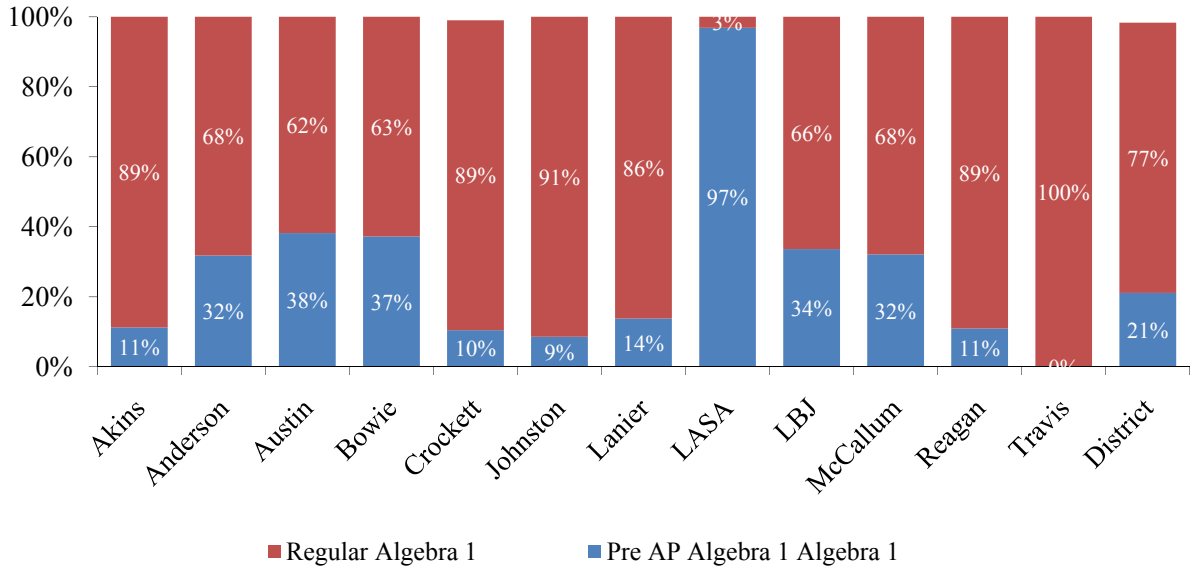
Source. Dana Center, prepared by the DPE, September 2008
Note. The observation summary for Bowie was not completed by the evaluator for this group of questions.

STUDENT COURSE ENROLLMENT AND PASSING RATES

The district's math improvement initiative is based on the idea that quality classroom instruction is principal to the improvement of student academic outcomes. It is expected that all students be successful in their math class and on state mathematics assessments. To describe student characteristics and their academic outcomes, student enrollment in regular and pre-advanced placement sections of Algebra I was determined. Student performance in their respective algebra courses and on the TAKS math test was summarized, and the relationship between student performance in their algebra class and on the TAKS math test was explored.

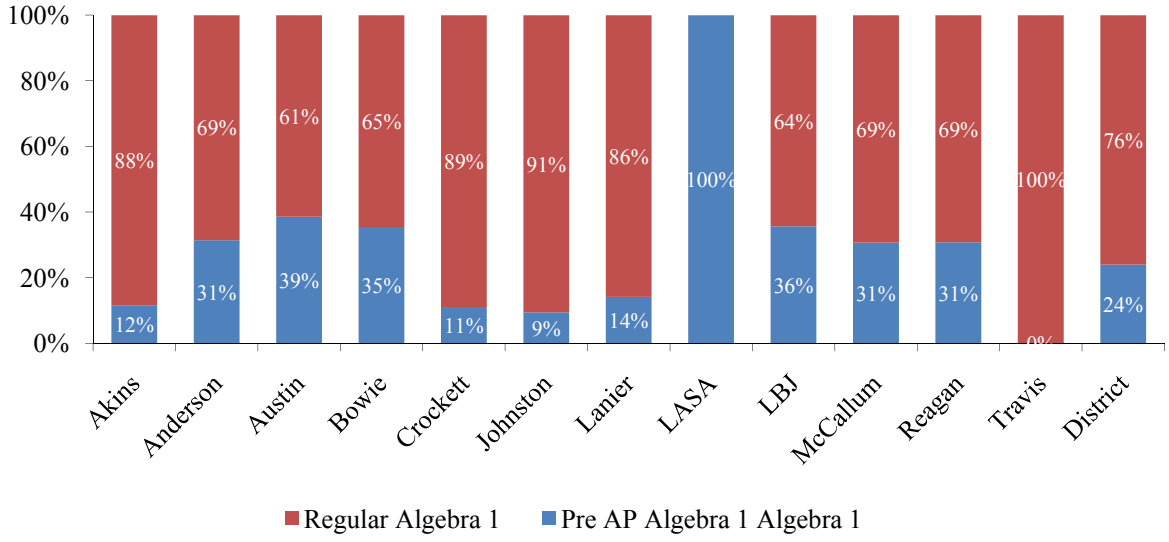
The enrollment of students in regular and pre-advanced placement (Pre-AP) Algebra I classes was consistent across semesters (Figures 5 and 6). Because LASA is a magnet school, most students there were enrolled in Pre-AP or magnet Algebra I classes. Travis had no students enrolled in Pre-AP Algebra I. Austin and Bowie had the highest percentages of Pre-AP Algebra I students, while Crockett and Johnston had the lowest percentages.

Figure 5. Students Enrolled in Algebra I, by School, Fall 2007



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

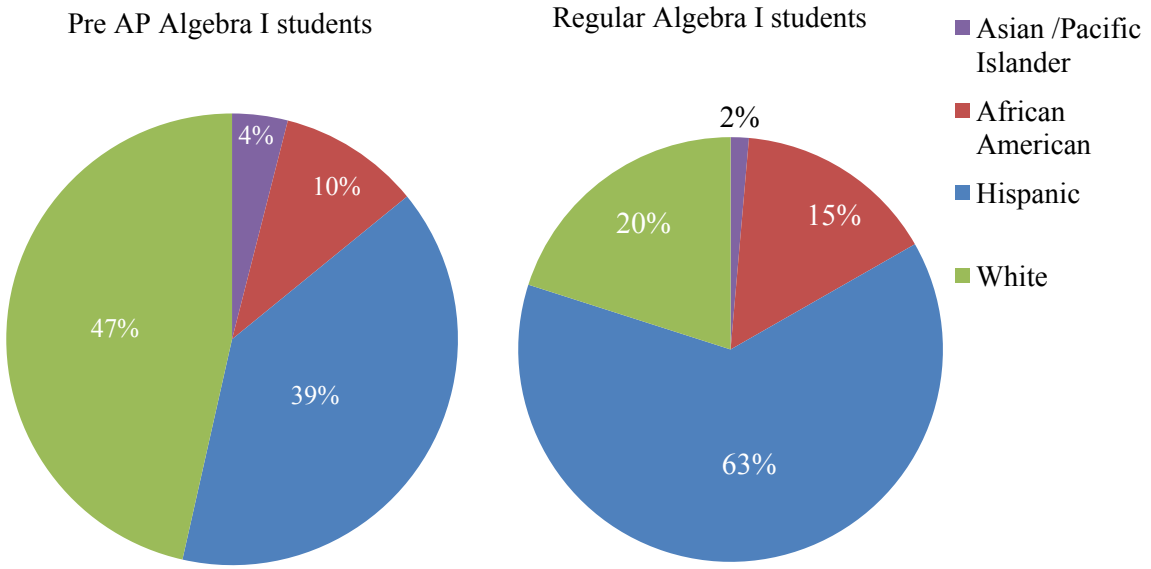
Figure 6. Students Enrolled in Algebra I, by School, Spring 2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

The demographic profiles of students enrolled in Pre-AP or regular Algebra 1 differed. Pre-AP Algebra I courses had higher percentages of Asian and White students than did regular Algebra I. On the other hand, regular Algebra I had higher percentages of African American and Hispanic students than did Pre-AP Algebra (Figure 4).

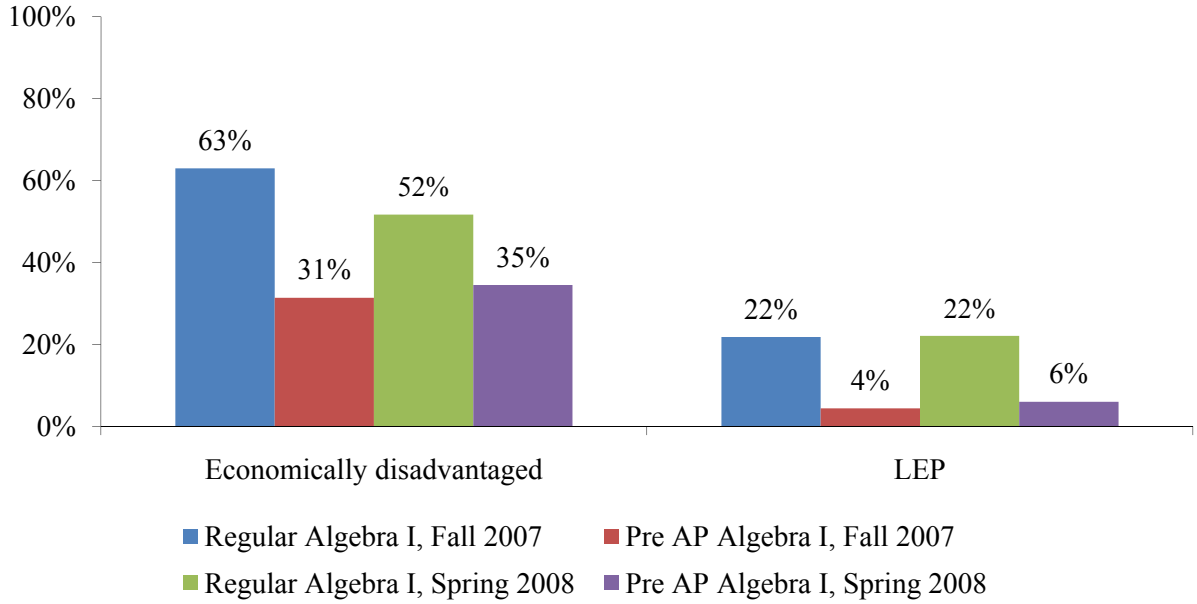
Figure 7. Students in Pre-Advanced Placement and Regular Algebra I, by Ethnicity



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

Differences were also found in the enrollment for Pre-AP and regular Algebra I 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 Algebra I than in Pre-AP Algebra classes (Figure 8).

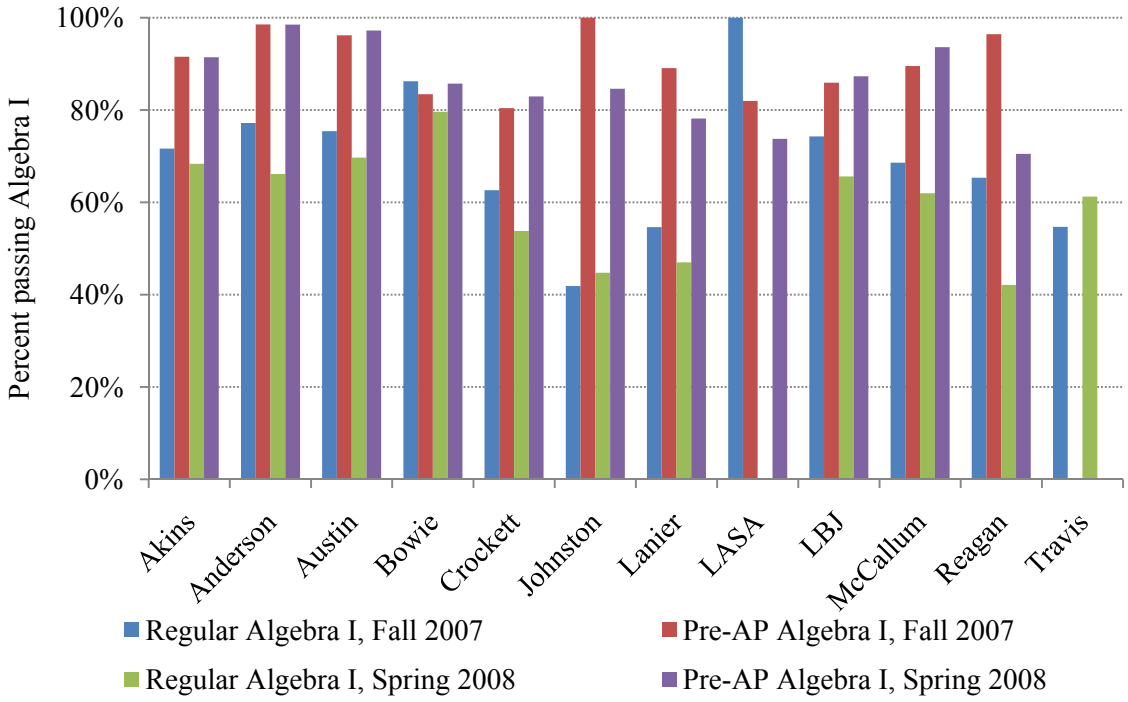
Figure 8. Students Enrolled in Algebra I at All Schools, by Economic Disadvantage and Limited English Proficiency Status, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

Analyses of students earning credit for their regular and Pre-AP Algebra I courses indicated differences in the percentage of students passing the courses. On average, more Pre-AP Algebra I students passed in both semesters, compared with regular Algebra I students (Figure 9). Course passing rates were variable across campuses throughout the year. However, across all high schools, lower percentages of students earned credit during the second semester, compared with the first semester.

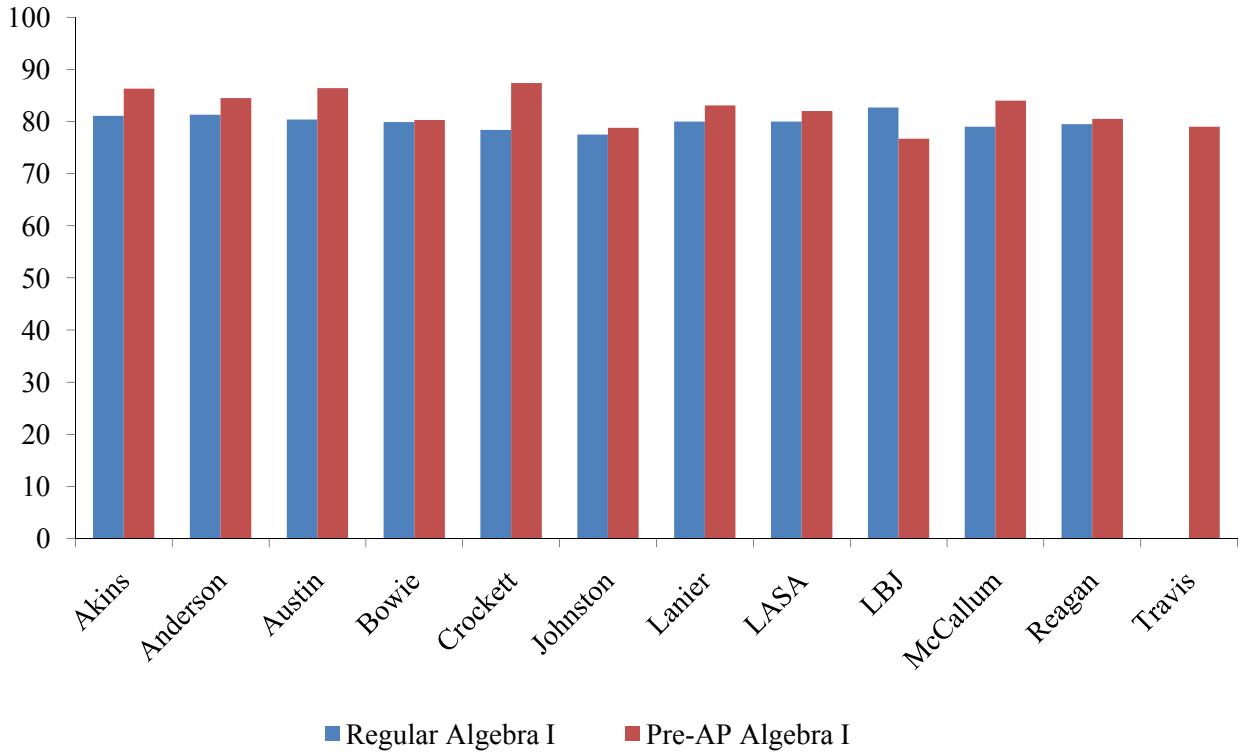
Figure 9. Students Passing Regular or Pre-Advanced Placement Algebra I, by Semester, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

The average grades of the students who passed regular and Pre-AP Algebra I classes also were examined (Figure 10). The district average grade of students who passed regular Algebra I was 80, whereas the average course grade for Pre-AP Algebra I students was 84. Average passing scores were fairly comparable across campuses, with the average passing score for Pre-AP Algebra I slightly higher than that for regular Algebra I at most campuses.

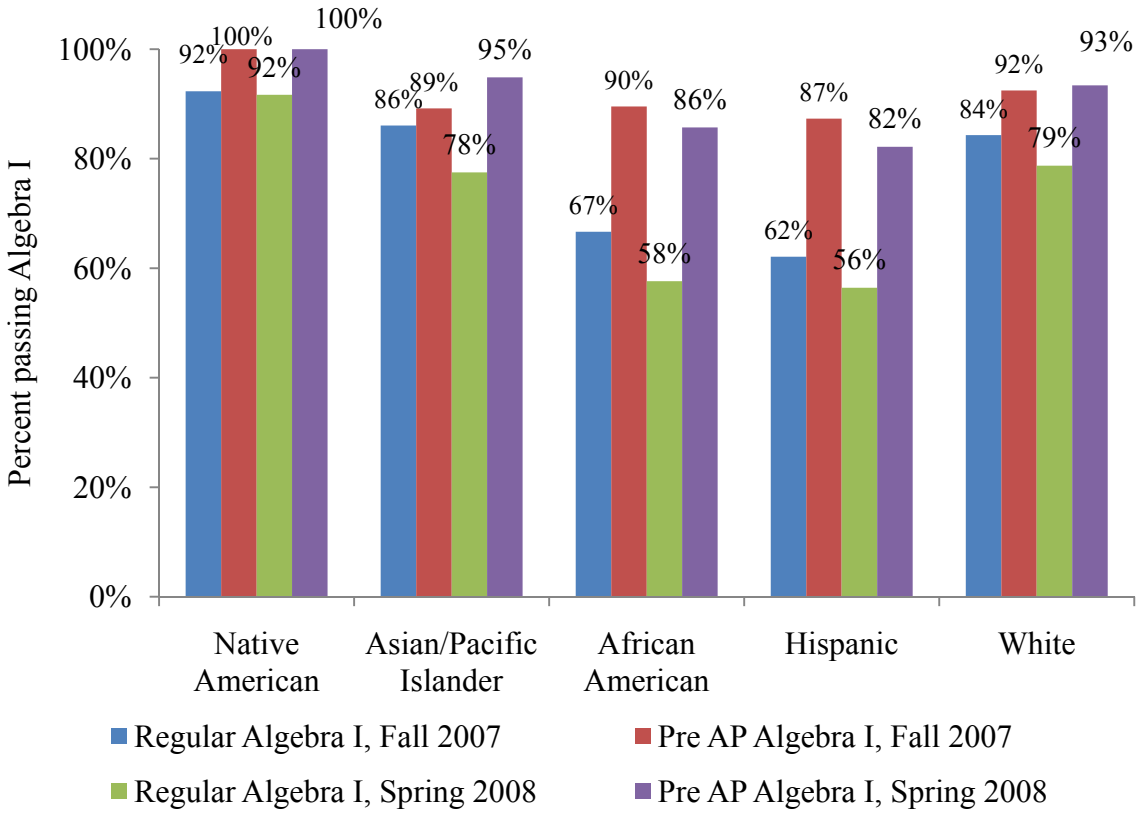
Figure 10. Average Grade for Regular and Pre-Advanced Placement Algebra I Students Who Earned Credit for Their Algebra I Course, by Campus



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

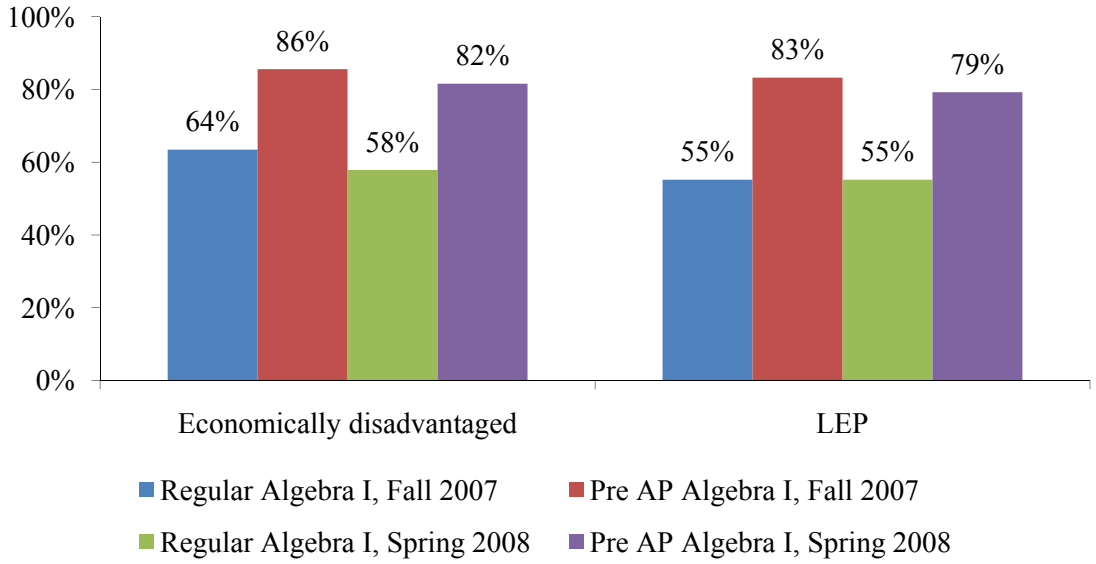
Results were disaggregated by ethnicity, economic status, and LEP status (Figures 11 and 12). Generally, higher percentages of Native American, Asian, and White students passed their Algebra I course, compared with African American and Hispanic students. Among African American and Hispanic students, the passing rates were higher for those taking Pre-AP courses than for those taking regular Algebra I. Lower percentages of students who were categorized as economically disadvantaged or LEP passed their regular Algebra I course, compared with those in these groups in the Pre-AP Algebra I course.

Figure 11. Students Passing Algebra I, by Ethnicity and Course, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

Figure 12. Students Passing Regular and Pre- Advanced Placement Algebra I, by Economic Disadvantage and Limited English Proficiency Status, 2007–2008

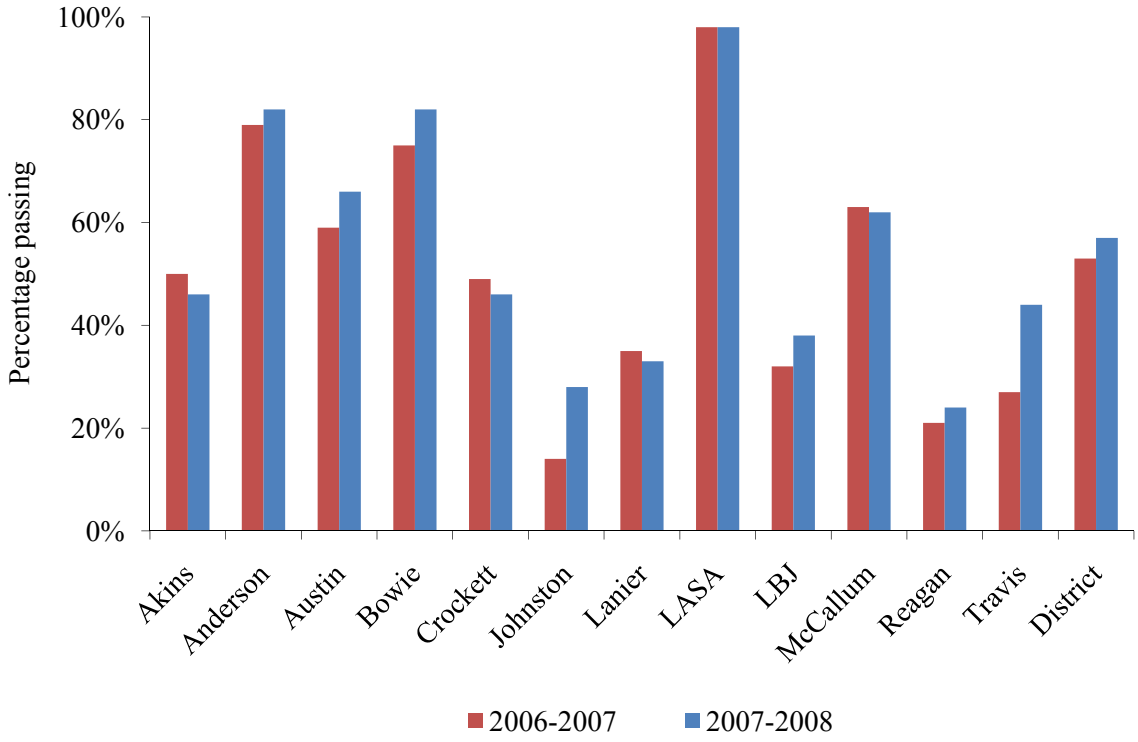


Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

STUDENT TAKS PASSING RATES

The TAKS math test passing rates across AISD high schools during the 2007–2008 school year were described (Figure 13). In 2007-2008, the passing percentages for ninth grade on the TAKS math test improved or remained stable for nine high schools, compared with student performance from the previous year. However, the passing rates were variable across high schools, ranging from 24% of Reagan ninth graders to 98% of the ninth grade students at LASA meeting the standard.

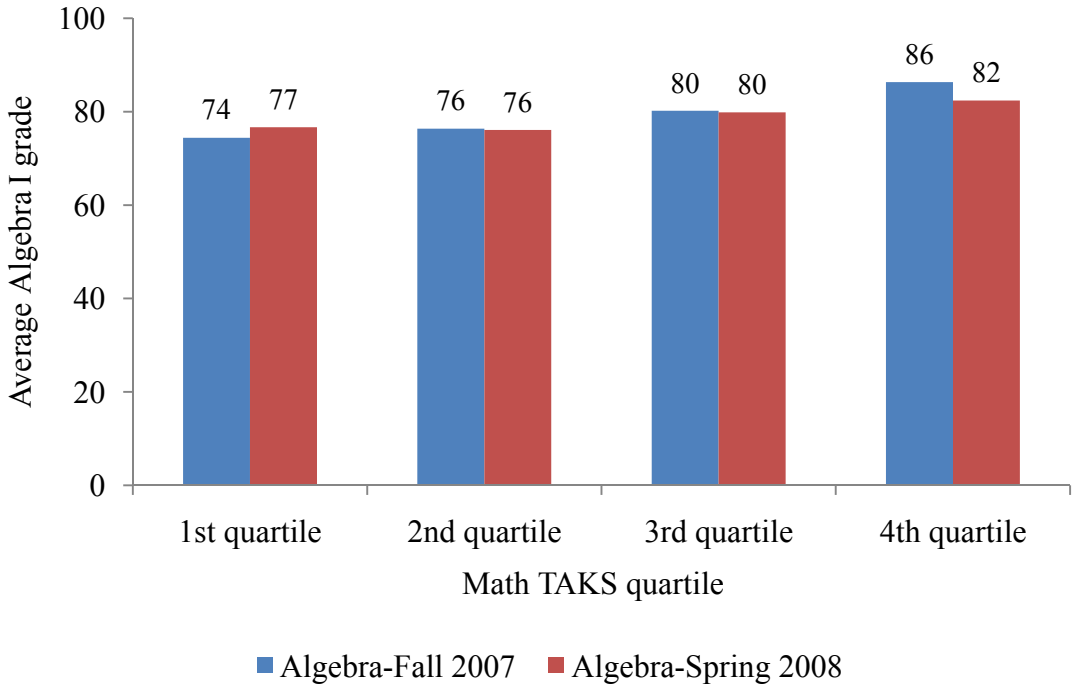
Figure 13. Percentage of Ninth Grade Students Meeting the TAKS Math Standard, by High School, 2006-2007 and 2007–2008



Source. District TAKS files, prepared by the Office of Accountability, Spring 2008

To explore the relationship between Algebra I course performance and Spring 2008 TAKS Math scores, the average Algebra I course grades for Fall 2007 and Spring 2008 enrollments were computed (Figure 14). Average Algebra I course grades were calculated for each TAKS quartile group. Negligible differences appeared in the average Algebra I course grades for each semester within a given quartile; however, students scoring in higher quartiles on the TAKS Math section performed, on average, better in their Algebra I course than did those scoring in lower quartiles.

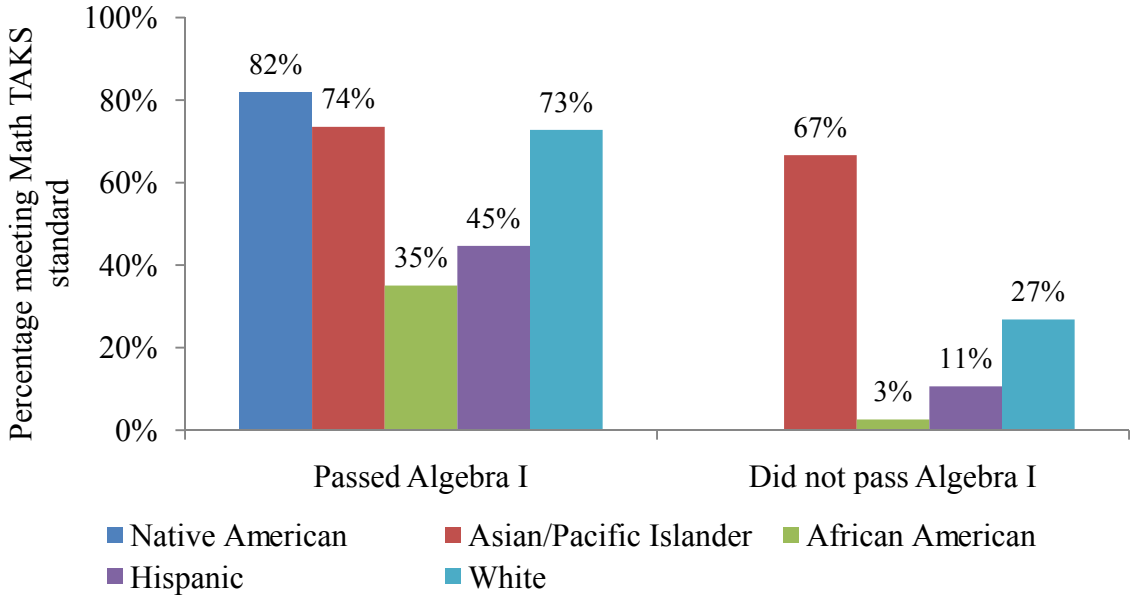
Figure 14. Average Grades for Regular Algebra I Students Who Earned Credit for Their Algebra I Course, by Spring 2008 TAKS Math Performance, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

Furthermore, students' performance on the Math TAKS was disaggregated by ethnicity and by whether they passed their Algebra I course during the fall or spring semester of the 2007–2008 school year (Figure 12). Native American, White, and Asian/Pacific Islander students who passed their algebra course had the highest Math TAKS passing rates, compared with students of other ethnicities. Only 35% of African American and 45% of Hispanic students who passed Algebra I during the fall or spring of 2007–2008 met the Math TAKS passing standard. With the exception of Asian/Pacific Islander students, significantly lower percentages of students who failed their Algebra I course passed their Math TAKS test.

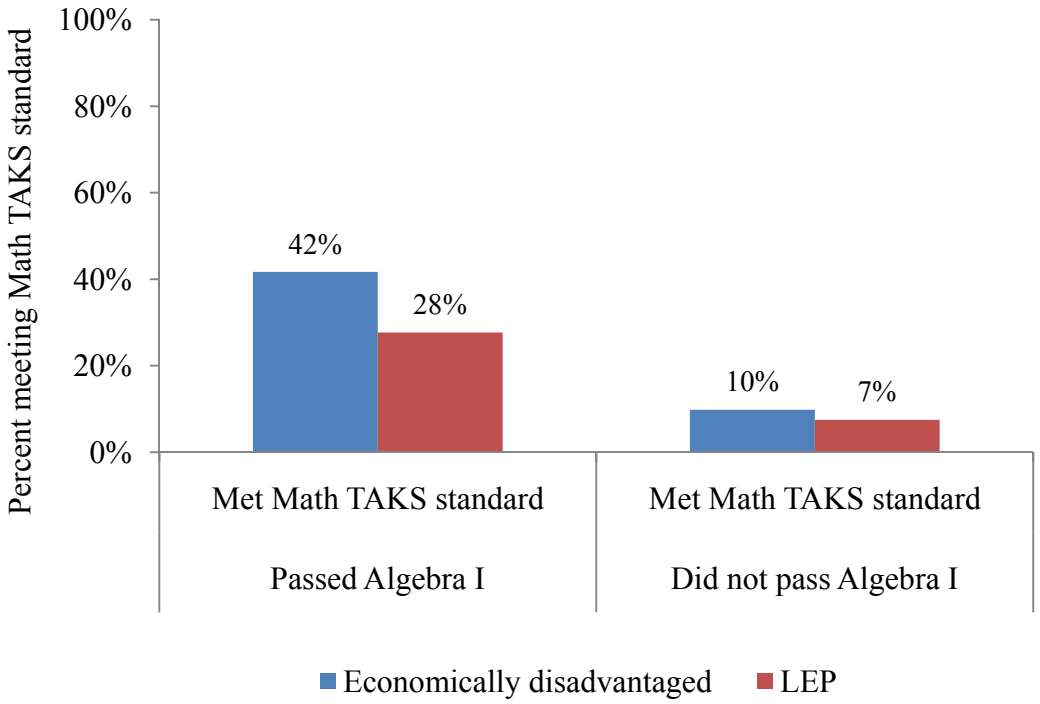
Figure 15. Percentages of Students Meeting the TAKS Math Standard, by Algebra I Credit Status and Ethnicity, 2007-2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

The Math TAKS performance of students who were classified as economically disadvantaged or LEP was calculated (Figure 13). Of students who were identified as either LEP or economically disadvantaged and who did not pass their Algebra I course, lower percentages met the Math TAKS standard on the Spring 2008 test administration, compared with those students who passed Algebra I. Nonetheless, Math TAKS passing rates were considerably higher (14 percentage points) for economically disadvantaged students who passed Algebra than for LEP students who also earned credit for their Algebra I course. In comparison, 64% percent of non-economically disadvantaged students who passed Algebra I also met or exceeded the required Math TAKS threshold.

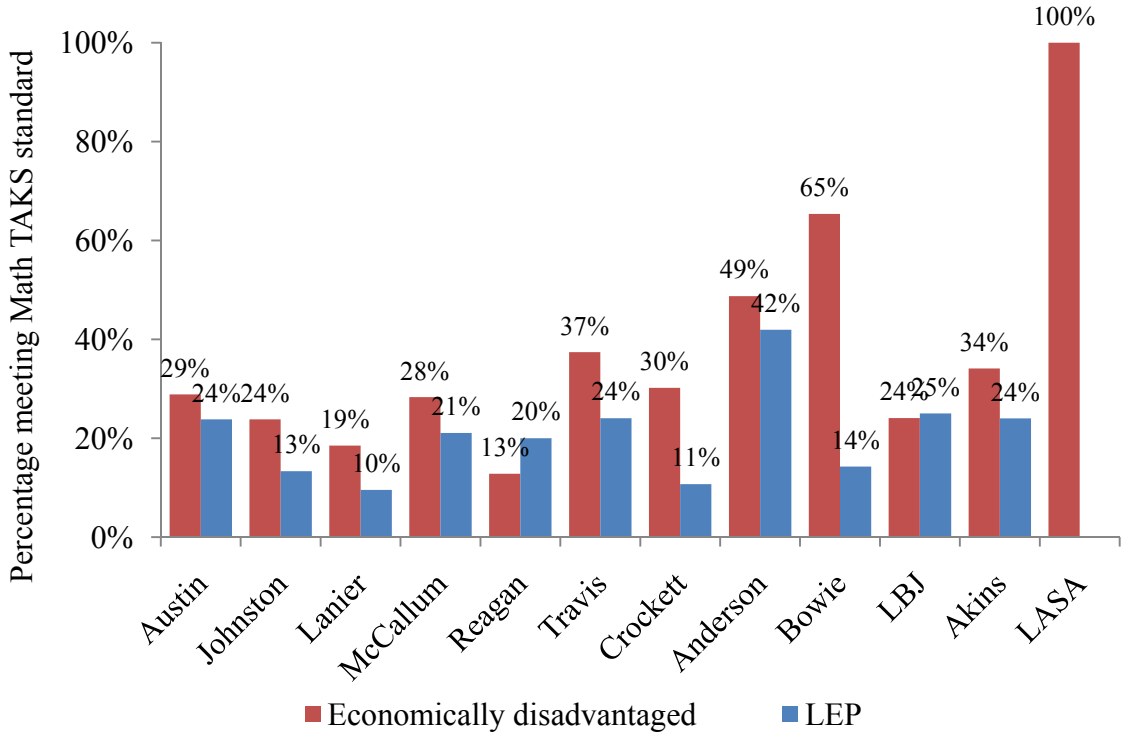
Figure 13. Students Meeting the TAKS Math Standard, by Algebra I Credit Status, Economic Disadvantage, and Limited English Proficiency Status, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

To examine school-level differences in TAKS Math performance, the TAKS passing rates for each AISD high school campus were calculated (Figure 14). These passing rates were further segmented by students' economic disadvantage and LEP status. Economically disadvantaged students at Bowie reported the highest Math TAKS passing rate (65%) among high schools, while Lanier's economically disadvantaged population recorded the lowest (19%). Among LEP students, 49% of Anderson's LEP population met the TAKS Math standard. However, only 10% of Lanier's LEP students satisfied the Math TAKS standard.

Figure 14. Students Meeting the TAKS Math Standard, by Economic Disadvantage, Limited English Proficiency Status, and Campus, 2007–2008



Source. AISD student enrollment and course history files, prepared by the DPE, July 2008

DISCUSSION

In 2007–2008, the partnership between the district's curriculum staff, Office of Redesign staff, and Charles A. Dana Center staff provided Algebra I teachers across the district with ongoing support throughout the school year. Across high schools, 74% of the district's Algebra I teachers who participated in the professional development sessions conducted through the AISD/Dana Center partnership found the trainings either "extremely valuable" or "valuable." Despite these positive assessments of the usefulness of the trainings, attendance was variable throughout the school year. Many of the teachers may have missed critical content and support.

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 mathematics teachers' instructional skills (Darling-Hammond & Sykes, 2003). Furthermore, 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 that teacher instructional practices were focused on developing student knowledge and comprehension levels, with hardly any of the activities addressing higher order cognitive skills. Furthermore, few observations reported that students were authentically engaged. Because the data were limited to a single observation across classrooms, it was difficult to determine whether the instructional practices of Algebra I teachers were responding to the interventions connected to the Dana Center/AISD partnership.

Quality classroom instruction is paramount in improving student academic outcomes, and improvement is still needed. Student performance in Algebra I and on the math section of the TAKS test was found to be variable across student groups. The Algebra I course passing rates for African American and Hispanic students were the lowest among all ethnicities and differed considerably from their peers from other ethnic groups. Students categorized as economically disadvantaged and/or LEP had low passing rates compared with rates of other student groups. These disparities also were evident in the TAKS math test passing rates.

The Algebra I course is often considered a watershed moment in students' high school coursework. Poor mathematics performance or course failure may prompt students to drop out due to being retained (Steen, 2007). Performance in Algebra I courses has far-reaching consequences for students' academic futures, as well. Adelman (1999) found that completion of advanced mathematics courses (i.e., beyond Algebra II) is a robust predictor of entry into and retention in a postsecondary institution.

The finding that African American and Hispanic students lagged behind their peers in math course and test performance corroborates findings in the research literature (Bol & Berry, 2005; McCoy, 2005). However, as Bol and Berry (2005) found, these disparities could be narrowed through professional development opportunities designed to bolster teacher instructional quality, a cornerstone of the Dana Center/AISD partnership. Importantly, attempting to narrow these differentials at schools with large populations of students who are economically disadvantaged raises additional challenges because these schools may have fewer highly qualified teachers than do schools with smaller populations of economically disadvantaged students (Darling-Hammond and Sykes, 2003). This finding, once again, reinforces the need to ensure consistent teacher participation in the training opportunities provided through the Dana Center/AISD partnership.

Moreover, teacher attrition may endanger the effectiveness and sustainability of the professional development opportunities provided for Algebra I teachers. Of the 140 teachers assigned to an Algebra I class in the 2007–2008 school year, only 58% (81) were assigned to an Algebra I course during the 2008–2009 school year. Of the 59 teachers who were not assigned to an Algebra I class in 2008–2009, 41% were no longer teaching in the district. Teacher attrition among Algebra I instructors underscores the importance of maintaining a system of professional development opportunities similar to that provided by the district's partnership with the UT Dana Center in order to assist new instructors.

In the 2008–2009 school year, the Math Improvement Initiative will shift its focus from Algebra I course teachers to providing similarly structured professional development opportunities for teachers of geometry. In this shift, it is critical that Algebra I teachers continue to receive ongoing professional development opportunities and support to improve their practice in hopes of improving student outcomes. At this time, it is not clear how district decision makers plan to sustain the initiative for Algebra I teachers who are in need of ongoing support or for new teachers assigned to teach Algebra I.

CONCLUSIONS AND RECOMMENDATIONS

The partnership between AISD and the Charles A. Dana Center, designed to improve the teaching and learning of mathematics, showed promise in its first year of implementation. 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.

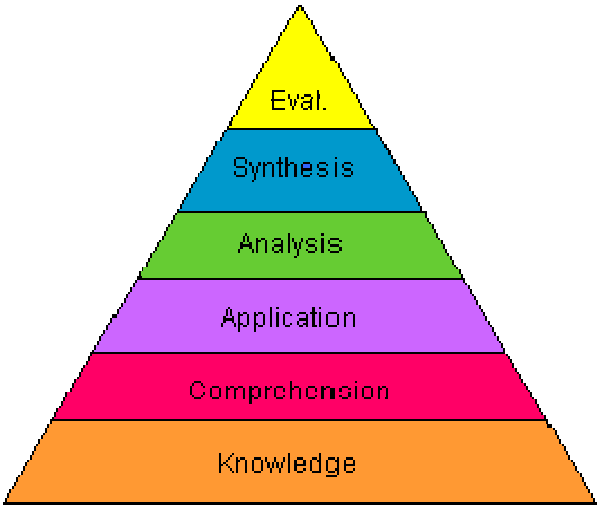
1. *Investigate the patterns of participation in professional development opportunities across schools to identify any impediments to participation across campuses and to improve rates of teacher participation*. Research points to the effectiveness of professional development opportunities in improving mathematics teachers' instructional skills (Darling-Hammond & Sykes, 2003). Thus, the district should have high expectations regarding instructional improvement. Regular participation in this professional development initiative is critical to ensure that teachers faithfully implement and utilize the instructional practices taught.

2. *Conduct more frequent classroom observations throughout the school year to provide a more complete and dynamic portrait of the changing instructional practices of math teachers in AISD high schools*. This practice will help determine whether the instructional practices of Algebra I teachers respond to the interventions promoted by the AISD/UT Dana Center partnership. Observations throughout the school year also will help identify ongoing instructional support needs.

3. *Ensure that instructional improvements and innovations promoted by the initiative are institutionalized and can be provided for both returning and incoming Algebra I teachers in future school years.* Instructor attrition jeopardizes the sustainability and effectiveness of the initiative. Although more intensive and frequent professional development opportunities may help counterbalance this, district or campus staff should ensure that staff receiving professional development through the AISD/UT Dana Center partnership are able to transmit the insights and strategies they have learned to incoming instructional staff.

APPENDIX

A1: Bloom's Taxonomy



Source. (Overbaugh & Schultz, n.d.).

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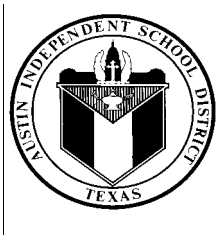

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