THE NATIONAL CENTER ON SCALING UP EFFECTIVE SCHOOLS

# Scaling Up STEM Academies Statewide: Implementation, Network Supports and Early Outcomes

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# Introduction

Mathematics and science—long the acknowledged domain of the academically gifted—lies at the crux of the knowledge economy, now and for the foreseeable future. For policymakers and reformers, however, endorsing a small, educated elite with strong academic training in science, technology, engineering and mathematics (STEM) while a large proportion of the population remains ill-fitted to the new economy is untenable (National Research Council, 2005; PCAST, 2010). Inclusive STEM schools are predicated on the dual premises that math and science competencies can be developed; and that students from traditionally underrepresented subpopulations need access to opportunities to develop these competencies to become full participants in areas of economic growth and prosperity. Inclusive STEM schools do not screen prospective students on the basis of strong prior academic achievement. Rather, they build in supports to engage students in STEM and provide them with opportunities to master STEM content and related skills. Although inclusive STEM programs can exist in a wide variety of school contexts, this paper focuses specifically on standalone, whole STEM schools or schools-within-schools that operate as autonomous units.

This paper presents early results on the effects of a large-scale inclusive STEM school initiative—T-STEM in Texas—and highlights factors that facilitated and constrained early implementation at the T-STEM academies and culminates in key lessons taken from this statewide STEM scale-up. Data come from the 4-year longitudinal evaluation of the Texas High School Project (THSP).[1] The evaluation studied the implementation and impact of T-STEM and the other THSP reforms using a mixed-methods design, including qualitative case studies; principal, teacher, and student surveys; and a quasi-experimental approach to examining the effects of the programs on student achievement and achievement-related behaviors.[2]

# The T-STEM Initiative

With an investment of approximately $120 million in 51 academies and 7 T-STEM technical assistance centers (as of 2009–10), the T-STEM initiative in Texas was the largest investment in inclusive STEM high schools in the U.S. at that time. The first T-STEM schools were funded in 2006-07. In addition, seven regional T-STEM centers formed a statewide technical assistance infrastructure, intended to support T-STEM academies specifically and to improve math and science education statewide.

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1 T-STEM was one of multiple high school reform initiatives under the Texas High School Project, formed by an alliance of state public agencies and private foundations The alliance included the Texas Education Agency (TEA), Office of the Governor, Texas Legislature, Texas Higher Education Coordinating Board (THECB), Bill & Melinda Gates Foundation (BMGF), Michael & Susan Dell Foundation, Communities Foundation of Texas (CFT), National Instruments, Wallace Foundation, Greater Texas Foundation, and Meadows Foundation. THSP included the following initiatives: T-STEM, Early College High School, New School/Charter Schools, and various comprehensive high school reform programs—High Schools That Work, High School Redesign and Restructuring, and High School Redesign, and District Engagement.

2 See the third comprehensive annual report of the evaluation of THSP for full methods details (Young et al., 2011).

A relatively detailed T-STEM "blueprint"[3] guided school leaders' planning and implementation of T-STEM academies. The blueprint articulated central tenets for T-STEM academies such as providing a rigorous academic curriculum, instruction relevant to real-world problems and careers, accelerated access to STEM coursework, and personalized learning supports for students. The blueprint described school design features organized into seven general areas: mission-driven leadership; T-STEM culture; student outreach, recruitment, and retention; teacher selection, development, and retention; curriculum, instruction, and assessment; strategic alliances; and academy advancement and sustainability. Within each of these seven areas, the blueprint provided two to five design statements. For example, the blueprint directed academies to regularly offer advisory periods, provide common planning time for teachers, and host parent seminars on college readiness. Central to T-STEM academy design, the blueprint required that teachers organize instruction around project-based and problem-based learning, that students earn 12 to 30 college credit hours by graduation, and that they complete an internship or senior capstone project.

By design, T-STEM academies were also small schools, serving approximately 100 students per grade, run by the local school district or a charter management organization (CMO). The blueprint stipulated that T-STEM academies must be nonselective; they could not select students based on prior performance and must have a student population that is more than 50% economically disadvantaged or more than 50% from ethnic/racial minority groups. The T-STEM academies were typically located in high-need areas, mainly the inner cities of the major metropolises, the Rio Grande Valley, and rural East Texas. Exhibit 1 illustrates the characteristics of students attending T-STEM academies and other THSP schools that were in operation at 2009–10, compared with non-THSP schools. In keeping with the blueprint, a larger proportion of students in T-STEM schools was economically disadvantaged and drawn from racial/ethnic minorities than in non-THSP high schools.

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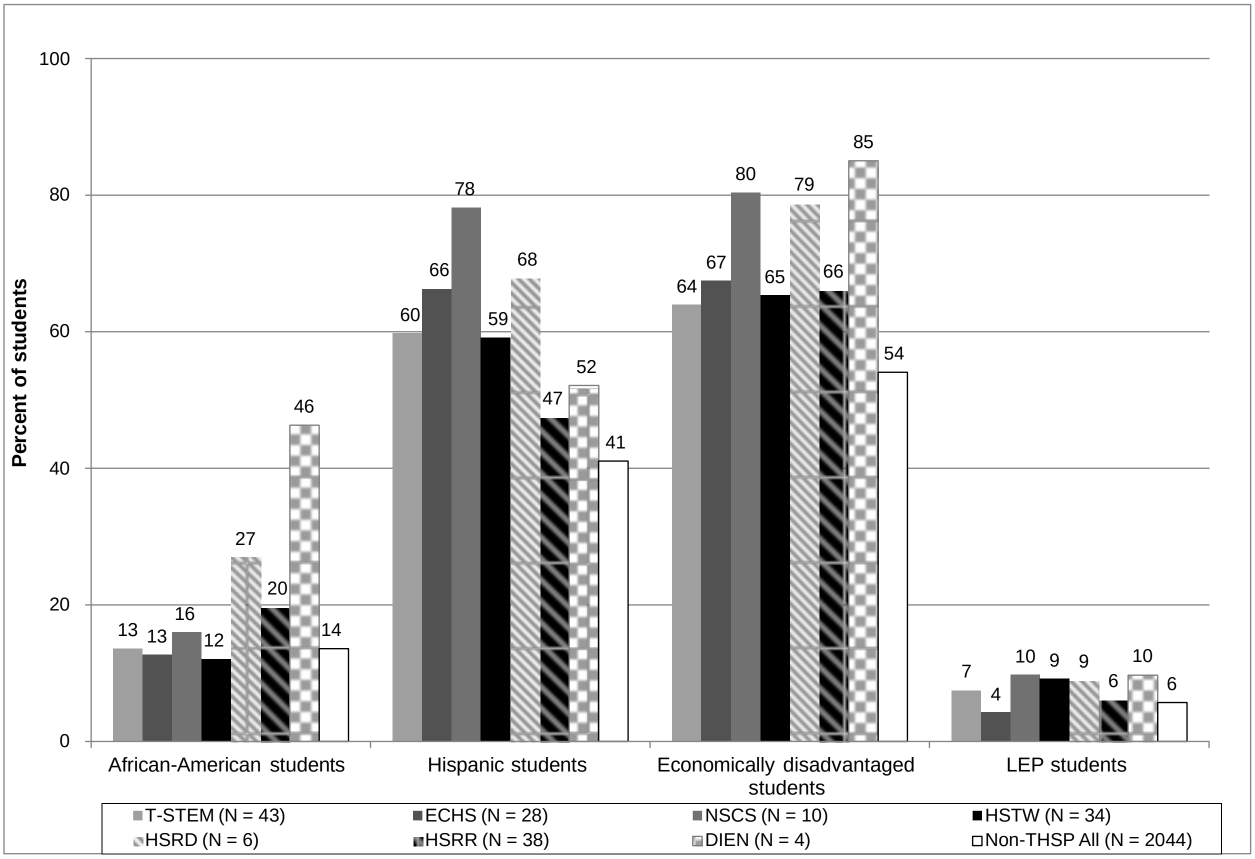
3 T-STEM Design Blueprint, Rubric, and Glossary, 2010 revision available at http://nt-stem.tamu.edu/Academies/blueprint.pdf

**Exhibit 1**
**Selected Student Characteristics of T-STEM, Other THSP, and non-THSP Schools, 2009–10**




Notes: The number of schools is shown in parentheses after each school category. Non-THSP schools refer to all non-THSP schools in the state serving grades 9, 10, 11, or 12.

T-STEM, Early College High School (ECHS), and New Schools/Charter Schools (NSCS) fund new start-ups; High Schools That Work (HSTW), High School Redesign (HSRD), High School Redesign and Restructuring (HSRR), and District Engagement (DIEN) fund reforms at existing comprehensive high schools.

Source: Academic Excellence Indicator System (AEIS) 2009–10 academic year. Excerpt from Young, et al., 2011, Exhibit 1-3, p. 9.

## Early Outcomes of the T-STEM Initiative

Not surprisingly, the achievement outcomes that T-STEM academies commonly pursue are determined largely by the broader state accountability context. Although T-STEM academies have attained acceptable, recognized, or exemplary ratings in the Texas accountability system—thus escaping the turnaround pressures at underperforming schools—they nonetheless monitor student performance closely throughout the year to ensure that students meet or exceed the annual Texas Assessment of Knowledge and Skills (TAKS)[4] proficiency standards. These outcomes constitute the most heavily emphasized measurable outcomes in the state. Success on TAKS is essential to the

[4] The study period of the THSP evaluation preceded the change to end-of-course exams in the Texas state testing system. At the time of data collection, all students in grades 9 through 11 took the TAKS.

prospects of any given T-STEM academy, not only because of its importance for students, but also in terms of building a reputation for academic excellence that will attract future students.

The THSP evaluation tracked cohorts of students beginning in the ninth grade, using TAKS achievement results and other measures of academic progression for 9th-, 10th-, and 11th-graders served by T-STEM academies. The last year of results under the THSP evaluation—for outcomes from the 2009-10 school year—combined the effects for T-STEM academies that began operations in 2007–08, 2008–09, or 2009-10.[5] To estimate the effect of T-STEM and the other THSP programs, we matched comparison schools outside the THSP program to each THSP school (including T-STEM academies) using a combined exact matching and propensity score matching method.[6] Our approach took into account a wide range of observable school-level characteristics that included student demographics, prior achievement, accountability rating, teacher experience, and teacher demographics. The effects for each of the THSP programs, including T-STEM, were estimated together in the same hierarchical models to maximize the precision of the estimates, controlling for student-level demographics and prior achievement and school-level characteristics. (Detailed methods are described in Young et al., 2011.)

Overall, T-STEM academies demonstrated some impact in math and science achievement and pro-academic behaviors; however, the T-STEM advantage appears to be subject-specific and inconsistent across grade levels. In 2009–10, T-STEM academy students scored slightly higher than matched comparison school peers on 10th-grade TAKS-Math.[7] The effect size is relatively small at 0.08 standard deviations, but is positive and in one of the core STEM areas. In addition, 10th-graders in T-STEM schools had a higher likelihood (1.5 times) of meeting or exceeding TAKS in all four core subjects tested in that grade (a combined measure). Students in T-STEM academies had a higher likelihood (1.4 times) of passing Algebra I by ninth grade, compared with peers in comparison schools. Tenth-grade students in T-STEM academies also had a lower likelihood (82%) of being absent from school than did students in the matched comparison schools. However, T-STEM academy students achieved similar scores as their matched comparison school peers on each of 9th-grade TAKS-Reading and TAKS-Math, 10th-grade TAKS-English, TAKS-Social Studies, and TAKS-Science, and 11th-grade TAKS-Math, TAKS-English, TAKS- Social Studies, and TAKS-Science. Exhibit 2 tabulates the results for all of the outcomes analyzed through the THSP evaluation.

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5 See the third comprehensive annual report of the THSP evaluation (Young et al., 2011) for details of the analysis. Although the THSP evaluation included the T-STEM academies that began serving ninth-graders in 2006-07, the results are not reported here because of the small sample size (two T-STEM academies only). T-STEM academies funded to begin as middle schools were not included in the THSP evaluation until they year they began serving ninth-graders.

6 THSP schools were matched within specified ranges on key school-level characteristics affecting student achievement, including grad span, campus accountability rating, TAKS math and TAKS reading passing rates for the prior year, urbanicity, enrollment, Title I status, and percentage of African-American and Hispanic students. Where more than six comparison schools met these criteria, the six schools closest in propensity score to the THSP school were retained as the comparison schools. Appendix A provides further details.

7 All results statistically significant at $p < 0.05$ unless otherwise specified.

**Exhibit 2**
**T-STEM Effect on Ninth-, Tenth- and Eleventh-Grade Outcomes in 2009–10**

| Student Outcome | Ninth Grade | Tenth Grade | Eleventh Grade |
|---|---|---|---|
| TAKS-Math | | | |
| Coefficient | 6.77 | 14.71 * | 3.27 |
| *SE* | 7.25 | 7.00 | 9.12 |
| TAKS-Reading | | | |
| Coefficient | -3.99 | -1.56 | 6.41 |
| *SE* | 5.04 | 5.01 | 8.33 |
| TAKS-Science | | | |
| Coefficient | | 7.32 | -2.34 |
| *SE* | | 6.93 | 8.36 |
| TAKS-Social Studies | | | |
| Coefficient | | 7.59 | -18.13 ◊ |
| *SE* | | 7.93 | 9.83 |
| Passing all core TAKS | | | |
| Coefficient | 0.07 | 0.38 * | -0.11 |
| *SE* | 0.13 | 0.16 | 0.26 |

Note. Passing all core TAKS is logit and coefficient needs to be interpreted as odds ratio.
*$p$ < 0.05. ◊$p$ <.10.

**Exhibit 2 (continued)**
**T-STEM Effect on Ninth-, Tenth- and Eleventh-Grade Outcomes in 2009–10**

| Student Outcome | Ninth Grade | Tenth Grade | Eleventh Grade |
|---|---|---|---|
| Passing Algebra I | | | |
| Coefficient | 0.33 * | | |
| *SE* | 0.13 | | |
| Accelerated learning | | | |
| Coefficient | | | 0.41 |
| *SE* | | | 0.45 |
| Absence rate | | | |
| Coefficient | -0.11 ◊ | -0.29 * | -0.02 |
| *SE* | 0.06 | 0.07 | 0.07 |
| Promoted to tenth/eleventh/twelfth grade/graduation | | | |
| Coefficient | 1.51 * | 0.35 | -0.76 |
| *SE* | 0.40 | 0.48 | 2.33 |
| Number of students in the analysis[a] | | | |
| T-STEM program | 3,332 | 1,371 | 652 |
| Comparison | 40,852 | 27,173 | 10,662 |
| Total | 44,184 | 28,544 | 11,314 |
| Number of schools in the analysis[a] | | | |
| T-STEM program | 44 | 31 | 15 |
| Comparison | 166 | 146 | 82 |
| Total | 210 | 177 | 97 |

[a]The Ns are the number of students and schools used in the absence rate analysis.
Notes: Passing Algebra I, accelerated learning, absence rate, and promoted to 10th or 11th grade are logits and coefficients need to be interpreted as odds ratio.
$*p < 0.05$. $◊p < .10$.

## Explaining T-STEM Initiative Outcomes

The T-STEM blueprint envisioned academies with rigorous academic programs that have strong connections to the real world; small, tightly-knit school communities with robust relationships between teachers and students; and powerful opportunities for students to prepare for college and career through internships with industry representatives, among other goals. Considering this highly ambitious set of blueprint elements, it is not surprising that T-STEM academies were challenged to fulfill them all during early implementation. As we discuss in this section, the early phases of T-STEM implementation posed their own trials amid certain successes and T-STEM blueprint implementation varied in important ways across the schools.

### T-STEM Academies Early in Implementation

In the early years covered by the THSP evaluation, the T-STEM academies were primarily focused on putting in place the components specified in the T-STEM blueprint, instructional and otherwise. As many of them were new schools, they also needed to attend to the typical start-up pressures—finding and retrofitting facilities, recruiting and training teachers, recruiting students, establishing procedures for an expanding school, and so on. T-STEM academies experienced the predictable pains of conversion and start-up described in prior studies of small high schools (cf. AIR/SRI, 2005; Kahne, Sporte, & de la Torre, 2006; Young et al., 2009). Moreover, the schools confronted the pressing needs of ninth-graders, who often enter these schools academically ill-prepared. The T-STEMs concentrated on bringing them up to grade level in one year and then sustaining their achievement to avoid falling under Texas's accountability sanctions. The T-STEM academies' aims to improve high school achievement, graduate their students, and get them accepted to college is best understood within this context.

Beyond these start-up demands at the school level, T-STEM academy teachers were still developing their understanding and practice in project-based learning. Although many T-STEM academies were schools of choice and therefore could hire teachers who expressed commitment to PBL, teachers nonetheless needed time to master a complex, non-traditional instructional approach. During the early years, it is not surprising that these inchoate practices did not yield more definitive impacts on student achievement and the other outcomes analyzed in the evaluation.

## Implementation Varied Across T-STEM Academies

As T-STEM academies undertook blueprint implementation, their particular organizational contexts and capacities meant that they began implementing different aspects of the blueprint, began at different readiness levels, and achieved different levels of depth. Drawing on both site visit and survey data from the THSP evaluation, we describe below the variation in curriculum and instruction, student support strategies, and partnerships with higher education and business, all key blueprint elements.

### Developing an Ambitious Vision of Curriculum and Instruction

The T-STEM blueprint called for an approach to curriculum and instruction that was distinct from traditional approaches, including providing students with accelerated access to STEM content and integrating technology into classroom teaching and learning. The most far-reaching instructional component of the T-STEM blueprint, however, was the vision of project-based learning (PBL). The blueprint required that T-STEM academies "organize instructional expectations around problem-based and project-based learning" (THSP, 2010, p. 8) and defined PBL as "an inquiry-based instructional approach, in a real-world context, where students generate the pathways and products that meet defined, standards-based outcomes…." (THSP, 2010, p. 40). When implemented well, PBL can infuse a curriculum with both rigor and relevance, challenging students to use their skills in an immersive and meaningful setting (Boaler, 1997, 1998; Gallagher, Stepien, & Rosenthal, 1992; Penuel, Means, & Simkins, 2000).

On the whole, T-STEM teachers implemented PBL more than teachers at other THSP schools, based on teacher surveys of THSP schools.[8, 9] However, site visit data from spring 2010

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8 All THSP schools receiving grant funding in 2006–07, 2007–08, 2008–09, or 2009–10 were asked to respond to principal, teacher, and student surveys in spring 2010. Survey data pertain only to THSP schools as non-THSP schools were not included in the survey sample.

9 Level of PBL is a composite of multiple survey items. The mean for T-STEM teachers is .39 and for teachers at other THSP schools is .29, $p < .05$, where 1 = Teacher asked students to complete projects over an extended period

revealed that PBL implementation varied substantially, both across and within T-STEM academies. All of the visited T-STEM schools implemented PBL in some form and to some degree—but implementation varied from widespread use of PBL strategies by most of the teachers in a school, to very infrequent use of PBL strategies by just a few teachers. For example, at one school, many teachers implemented long-term, standards-based projects that asked students to apply their knowledge in a real world setting.[10] At this school, leadership strongly promoted PBL, teachers were given common planning time to develop projects, and all teachers received training in PBL strategies. In contrast, at another school, only some teachers participated in a voluntary one-time PBL training and they struggled to incorporate PBL into their classroom instruction. At this school, a handful of teachers sporadically implemented PBL, but the practice had yet to permeate the instructional norms of the school. Several staff members attributed the low implementation to the fact that PBL training was not sustained or embedded and that participation was inconsistent across the faculty. Together, these cases support earlier findings suggesting that schools that train the entire staff in PBL strategies and schedule regular time for planning project-based units have greater success in implementing PBL schoolwide (see Young et al., 2010).

Individual teachers further explained why PBL was hard to implement in the classroom. An ELA teacher at one T-STEM school emphasized the need to transition to the more student-centered approach entailed in PBL: "I understand that it takes 2 to 3 years for instructors to feel really comfortable [with PBL], where students are driving the learning, where instructors quietly guide." At another academy, a science teacher was reluctant to offer PBL because she felt students did not have the prerequisite skills to access project-based lessons. She reflected, "[The students] need to be taught how to work in groups and how to focus, and then they also need some basic coursework in order to get them to the level to where they can use their math and science to solve problems." Thus overall, student readiness, teacher learning about PBL, and time to experiment with, adapt, and refine instructional practices to be more student-centered and project-based accounted for variation in the extent to which T-STEM academies reflected the PBL ideal expressed in the blueprint. These two examples point to the central role that students play in their own learning within a project-based curriculum and to the difficulty that some teachers had in shifting from traditional teacher-focused instruction.

### Supporting Student Success

Strategies to support students was an essential characteristic of the T-STEM academies. Because T-STEM schools fostered a climate of high academic expectations and required students to take more advanced math and science courses, entering students—many coming from lower-performing schools—faced real risks of not meeting these expectations.

T-STEM academies offered different types of supports to try to mitigate that risk. In addition to the extensive tutoring typical in Texas high schools, T-STEM academies also established student advisories, as required by the blueprint. Advisories provided teachers with dedicated time to support

of time, aligned with state and district content standards, used technology, and addressed real-world problems once or twice a month or more and 0 = Teacher engaged in these practices a few times this year or less.

10 For example, English, math, and social studies teachers collaborated to design a project that involved the Great Wall of China. In math class, students produced comprehensive measurements of the Wall. In English class, students read literature that connected to the Wall, and in history class, students studied the historical conditions that precipitated the Wall's construction.

students in small class settings but outside of regular courses.[11] The advisories as implemented in T-STEM academies differed in purpose and frequency. For example, one school focused advisory on fostering relationships between teachers and students, building character through readings and discussions, and supporting academic success through regular check-ins about courses, homework, grades, and attendance. Another school focused advisory on preparatory skills, such as practicing for the SAT and preparing college materials like resumes, personal statements, and financial aid applications. At T-STEM academies that used advisories less, staff relied on the small school structure to ensure that each student felt connected to the school community.

Across the majority of T-STEMs, teachers and students reported that the small size of their schools supported student success in and of itself because it facilitated strong relationships. Indeed, T-STEM staff articulated the criticality of every student having teachers who know them as learners and as individuals, in whom the student can confide about the personal concerns they bring to school that affect their concentration and engagement. Insofar as all T-STEM academies adhered to a small-school size, the small school community fostering positive teacher-student relationships was fairly consistent across the academies.

CMO and district strategies did vary in whether and how they prepared younger students for a demanding high school STEM curriculum. Some CMOs and, to a lesser extent, districts, turned their attention to middle schools. One charter management organization funded under T-STEM served middle and high school students and strove for vertical alignment, particularly in math and science, to help middle school teachers increase the rigor of their courses. In another instance, a district promulgated project-based instructional strategies and provided corresponding training to its middle and elementary school teachers as a strategy to help students at those levels develop the skills they need to succeed at the T-STEM academy in grades 9 through 12. Other districts, however, placed less emphasis on STEM preparation at the earlier grades. These differences in district and school strategies in supporting students were likely a further factor in the mixed T-STEM results in the early years.

### Offering College and Work-Based Experiences

In line with T-STEM's college- and career-readiness mission and blueprint specifications, T-STEM academies began developing dual credit programs (where students earn high school and college credit simultaneously) and work internship opportunities. Because the majority of T-STEM academies included in the evaluation had served only one to two 11th-grade cohorts at the time, this aspect of the model was most immature in implementation at the time.

To offer dual credit courses, the majority of T-STEM academies had IHE partnerships in place; however, fewer than half (44%) of the 11th-grade T-STEM students surveyed reported enrolling in college courses, whether offered on a college campus, online, or at the high school campus. These results reflected the limited college course offerings as the T-STEM academies developed their upper-year programs, as well as student challenges in accessing college courses. Students typically faced difficulties in passing the prerequisite college placement exam. Supports to prepare for that exam differed, with 62% of 11th-grade T-STEM students surveyed reporting receiving assistance. Even so, almost 10% of the 11th-graders in T-STEM schools reported that

[11] The T-STEM blueprint defines advisories as a time "that is regularly scheduled,… and focuses on personalizing the student experience, (builds relationships with students and parents, develops character, and fosters global literacy)" (THSP, 2010, p. 5).

failing the college placement exam prevented them from taking college credit, the most frequently cited barrier.

During the early implementation years, which coincided with the economic downturn, T-STEM leaders also reported that gaining sufficient partnerships with local businesses to provide many students with internships was elusive. T-STEM students were less likely to complete internships compared to other postsecondary supports, with 25% of 11th-grade students reporting participating in them. Approximately 20% also reported job shadowing or observations at work sites as part of their T-STEM experiences.

T-STEM academies, then, were clearly still putting in place the college- and career-related opportunities specified in the blueprint during the years of the evaluation. Both the early stages of development and the range in T-STEM students' experiences with college and career-related opportunities at that time mean that this aspect of the T-STEM model couldn't be expected to contribute to impact student achievement yet.

## Policy and Organizational Contexts Shaped Implementation

The expectations for T-STEM academies' development, as laid out in the T-STEM blueprint, were multidimensional and ambitious. Evaluation findings during the early stages that T-STEM academies could not implement the many blueprint elements all at once, and that they deliberately staged how they established different components, postponing those involving upper-year students for later implementation. Program officers revised the T-STEM blueprint in 2010 to acknowledge such developmental phases and to provide guidance on priorities during planning, the first year, and the second year of operation. Cutting across the differences in the degree and nature of implementation among T-STEM academies were two key factors, the specificity of the T-STEM model and each school's primary affiliation with a district, CMO, or external support network.

### Specifying T-STEM Model Elements

In part, varying implementation across T-STEM sites was a function of the level of specificity in the blueprint language. Different blueprint features were articulated with differing amounts of precision, which in turn influenced implementation. For example, the blueprint included direction to use a lottery system for enrollment when student demand exceeded availability. This policy was relatively simple and the lottery process was commonly understood across the T-STEM schools. However, the requirement that T-STEM academies implement an advisory period was not as clear. While advisory can be broadly understood as a support system for students, its content, frequency, staffing, and philosophy of what supports to provide and how to provide it led to very different approaches. The advisory sessions that T-STEM schools offered varied in structure and purpose: some advisories met daily, while others met only once per week or less, and program content ranged from relationships and character-building to college skills (such as work ethic and study skills) to academic guidance and tutoring.

T-STEM academies were also less likely to implement more complex aspects of the blueprint, at least early on in their development. They more easily implemented structural elements of the model (e.g., school size requirements, mandates regarding admissions policy, specific required social support structures like advisory) than instructional components (e.g., using project based learning as the primary instructional strategy in classrooms). Although all T-STEM schools assigned their students projects, very few delivered a majority of instruction in a project-based format.

### Determining Priorities Based on T-STEM Academies' Primary Affiliations

The primary affiliation of the T-STEM academy—the organization upon which an academy depends most for school design and ongoing support—constituted one of the largest influences on its instructional vision, approach, and capacity. The T-STEM academies included in the THSP evaluation had one of three types of primary affiliations: district, CMO, or external support provider. These affiliations emphasized different features of the T-STEM blueprint. For example, T-STEM academies belonging to the New Tech Network, an external support provider, pursued project-based learning with team-teaching across subject areas, week in and week out. All students served by one of the CMOs were required to participate in a science fair that consumed their extracurricular and sometimes class time for about four months of the school year. Other CMOs and districts allocated instructional coaches, had literacy initiatives, or promoted family education strategies at their T-STEM academies. The T-STEM blueprint elements plus these local efforts became the instantiation of T-STEM at that locale or for that district or CMO.

Affiliations with districts, CMOs, and external support providers provided important capacity-building, in personnel, resources, and expertise regarding the features they emphasized (e.g., literacy across the curriculum or team-teaching). For example, the New Tech Network offered institutes that trained teachers in a systematic approach to scaffolding project-based learning and student collaboration. In cases where CMOs with solid replication strategies and experience were opening T-STEMs, they centralized how they provided some or many of the start-up supports to new campuses and they often transferred teacher leaders from schools already up and running to launch their new campuses. Such influences were not unique to T-STEM, but were integral to the initiative's enactment.

## Supporting Implementation at Scale Through T-STEM Network

The successes and challenges regarding the T-STEM implementation described above underscore the schools' need for assistance in translating the T-STEM vision into their daily operations. Ideally, such assistance would help each academy understand the T-STEM academy design (i.e., the blueprint), plan for implementation within its unique context, and address any ongoing roadblocks to implementation. Outside of the supports provided through their respective districts, CMOs and/or external support providers, T-STEM academies also received supports from T-STEM centers and coaching from T-STEM initiative coaches.

The seven T-STEM centers located at universities and regional education centers throughout the state were designed to serve as statewide resources for T-STEM academies (and for other schools requesting assistance regarding STEM education). The centers provided guidance, resources, and professional development related to T-STEM blueprint implementation, pedagogy (particularly PBL), STEM content, and community partnerships. All seven T-STEM centers provided coaching for school leaders and professional development for teachers. The centers also worked together to provide some coordinated services, including a foundational PBL workshop for teachers and an annual T-STEM Best Practices Conference.

Individual T-STEM centers also provided supports, reflecting both the unique resources of each center as well as the specific needs of each academy. These customized supports included offering a residential engineering camp for students on a university campus, helping provide equipment such as computers and science lab equipment, and conducting a school needs assessment (including the use of validated content knowledge assessments) to design a PD plan.

The T-STEM centers became an increasingly prominent support for the T-STEM academies over the course of the THSP initiative. Like the T-STEM academies, the centers matured with time, they gradually shifted to building a coordinated and collaborative relationship, and they cultivated relationships with area partners such as universities and businesses. These changes contributed to the creation of a statewide network that benefitted the work of the T-STEM academies.

In addition to T-STEM centers, the other major resource available to T-STEM academies was school coaching provided through the initiative. T-STEM program officers and coaches worked directly with academies to provide supports on school design (e.g., designing the school to meet the T-STEM blueprint), administration, and instructional leadership (e.g., by co-designing a classroom observation tool). They also responded to the T-STEM academy leaders' individual needs and requests. Many coaches developed strong relationships with T-STEM academy leaders, which in turn allowed the coaches some influence over how to increase the alignment between CMO or district models and the T-STEM blueprint. One school leader described their coach as "a sounding board, giving direction, clearing hurdles, running interference for us to do what we need to do." A T-STEM project officer also reported that the coaches typically supported practical matters such as budgeting, planning teacher professional development, working with the community and school boards, as well as many other tasks that school leaders faced.

Although the T-STEM network did not exert as much influence over the academies as the schools' primary affiliations, the T-STEM network did become an increasingly prominent and valuable resource for academies as the initiative matured. Whereas the T-STEM centers and coaches initially provided incidental support for academies, often on an ad-hoc basis, these relationships grew and deepened over time. As centers increased their collaboration with one another, and expanded their reach and influence on T-STEM academies, the T-STEM network itself became stronger.

## Drawing Lessons from T-STEM's Early Implementation at Scale

The T-STEM initiative represented a large investment in a statewide scale-up effort, creating 51 inclusive STEM academies over its first 5 years. While the data described here was collected during early phases of implementation for some academies, evaluation results showed some positive student outcomes, specifically for higher 10th grade mathematics scores, higher likelihood of passing Algebra I by 9th grade, and higher attendance rates than students in matched comparison schools.

Nonetheless, overall student outcomes were mixed. These mixed findings are, in part, attributable to the variation in how and the extent to which T-STEM academies implemented blueprint elements, the strong influences exerted by districts, CMOs, and external support providers, and the complexity of implementing the ambitious school design, even while the T-STEM network grew increasingly influential. From these outcome and implementation findings, we draw three lessons regarding this statewide initiative.

### Lesson 1: Communicating a vision and specifying school reform requirements may be an important first step, but the complex array of factors that make up the context for reform influences implementation on the ground.

In the case of the Texas High School Project, the school vision and requirements were embodied into a T-STEM blueprint, which served as the guiding design document for the T-STEM academies. Contrary to the image of big-box stores opened according to a "blueprint," however, the academies were by no means identical. Rather, the academies enacted the T-STEM blueprint ranging in the depth of implementation, strategies for implementation, and whether the elements were enacted at all.

Reform—in this case opening new schools or in a few instances transforming an existing school—is a slow, arduous, and complex activity with multiple intervening factors. These factors include the specificity of the blueprint itself, the developmental stages as the schools experience them, and a wide variety of factors known to influence the complex process of policy implementation. Implementing agents (such as teachers, and school and district administrators) enact policy messages in various ways according to: individual sense-making and cognitive processes (Spillane, 2000), and previous policy exposures (Coburn, 2005), among other factors. Regardless of how a policy message is interpreted, local capacity—the skills and knowledge of the implementers—heavily influences policy outcomes (McLaughlin, 1987). And inevitably, easier, more straightforward components of any model are more readily implemented than those that are more complex, as was the case among T-STEM academies.

Despite variation in implementation at the school level, the T-STEM scale up highlights the idea that actors with an understanding of the principles at the core of a particular reform can stay true to the intended policy goal (McLaughlin and Mitra, 2001). For example, one T-STEM academy offered advisory only monthly because meeting weekly was too difficult to schedule. However, as the school culture was very collaborative and tight-knit, teachers and students were well aware of who their advisors and advisees were and checked in informally on a daily basis. The policy goal seemed to be accomplished, even though local conditions prevented advisory from being implemented in the ideal way expressed in the blueprint.

The blueprint was a critical communication tool between the academies and program managers, describing design elements and, hopefully, core principles. But it was one among other factors at work influencing the design, culture, and practices of the T-STEM academies.

### Lesson 2: Even with a blueprint, technical assistance is still required to help interpret and enact it.

Given the large number of influences on the T-STEM academies, simply sharing a blueprint is not enough to scale a model statewide. In the case of T-STEM, the T-STEM Centers and coaches were necessary technical assistance providers to help the academies understand the blueprint requirements, interpret them for their own contexts, and to address implementation barriers as they arose.

Implementing instructional reforms moreover entails a heavy investment in reaching every teacher and principal with strong supports. The T-STEM academies had multiple sources of professional development, including the T-STEM Centers, T-STEM coaches, districts, CMOs, and the external support providers that supplied their own coaches, training, and other forms of assistance (e.g., the New Tech Foundation). The districts, CMOs, and external support providers came to the academies with their own understandings of the blueprint elements (e.g., project-based learning, advisory, partnership), including which were priorities, what they aim to accomplish and look like in practice. One set of schools, for example, emphasized mastery of the state knowledge and skills standards, while others emphasized student engagement with content through open-ended projects. The network of T-STEM Centers and coaches afforded program developers the opportunity to bring a more centralized and unified understanding of the blueprint elements to address these differing interpretations on the ground.

**Lesson 3. Districts, CMOs, and external support networks can provide expertise and capacity in scaling up rapidly; their influence shapes the extent to which implementation reflects the envisioned school model.**

As the T-STEM scale-up illustrates, leveraging existing resources—replication expertise, established school models and educational programming, and relational networks—can accelerate growth plans.

While T-STEM expansion began with a blueprint that characterized key elements of the T-STEM model, the early implementation experiences within the contexts of the districts and CMOs that won T-STEM grants led to several realizations for program managers. The blueprint itself described a mature T-STEM academy and school leaders needed clear priorities in developing the academies and implementing the blueprint. Moreover, in establishing the academies, districts, CMOs, and external support providers brought critical resources to bear that shaped what the academies looked like on the ground. Based on their own school model, vision of the T-STEM academy, community contexts, and experience in opening new schools, the districts' and CMOs', and external support providers' expertise and capacity influenced how smoothly the start-up went. Given that the academies could not do everything at once, the district and CMO contexts also determined the priorities the academy focused on in the first few years (e.g., student recruitment or professional development or curriculum development)

The districts', CMOs', and external support providers' respective roles arguably allowed the T-STEM program overall to achieve statewide scale more quickly than it otherwise would have by, for example, recruiting individual operators. The CMOs and external support providers in particular were able to bring school designs and start-up procedures to use in opening new T-STEM academies. Yet the CMOs had gained experience in replicating their own specific school models and because they were the dominant influence on their schools, the T-STEM academies they opened were amalgams of the model envisioned in the blueprint and their own school model. To the extent that the school model was fairly well aligned with the blueprint elements—e.g., the principles of interdisciplinary learning as applied to math and science subjects, or project-based learning embedded in the core curriculum—the schools were closer to the [ideal] T-STEM academy. Indeed, they helped their academies reach relatively quickly "mature" and "role model" levels of implementation, as defined by the blueprint. Where the school model diverged from the blueprint, leveraging existing CMOs' capacity to start new schools required more negotiation and time to bring the school model closer to the T-STEM vision.

Leveraging external support providers, districts, and CMOs was a strategic decision that allowed the T-STEM initiative to open and operate a cohort of T-STEM academies at scale within a target timeframe set by policymakers. Had a smaller number of academies been opened, the initiative would have been more limited in reaching students and establishing a sustainably foundation in the Texas high school landscape. At the same time, the role of districts, CMOs, and external support providers shaped what T-STEM meant in actuality.

Scaling up reform models, T-STEM being only one such example, ultimately challenges the degree of control program managers have over the model itself. Schools unfunded by the program, adopting certain elements but not the whole model, for example, may be a mark of success. Local contexts, as well as district/CMO priorities and capacities inevitably shape what the implementation will look like. Over time, as reforms scale up, program directors may need to evaluate which elements are critical and required, which they are flexible about in implementation, and strategies for improving implementation of critical elements across wide ranging contexts.

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## Appendices

All appendices are excerpted from the Evaluation of the Texas High School Project. Third Comprehensive Annual Report (Young et al., 2011). Full models are included here for the outcomes for which T-STEM academies demonstrated a significant effect. See the appendices in the third comprehensive annual report for the full set of models, as well as detailed methods.

**Exhibit F-10**
**HLM Results for Passing Algebra I in Ninth Grade**
**(11,454 Students Repeating Ninth Grade in 391 Schools)**

| Fixed Effects | Coefficient | | SE |
|---|---|---|---|
| Model for school means | | | |
| Intercept | 1.48 | * | 0.10 |
| **T-STEM** | **0.13** | | **0.45** |
| **HSTW** | **0.23** | | **0.19** |
| **HSRD** | **0.54** | | **0.42** |
| **HSRR** | **-0.01** | | **0.22** |
| **DIEN** | **1.08** | **◊** | **0.56** |
| T-STEM & Comparison | 0.11 | | 0.18 |
| HSRD & Comparison | 0.31 | ◊ | 0.17 |
| HSRR & Comparison | 0.08 | | 0.13 |
| DIEN & Comparison | 0.11 | | 0.19 |
| Small school | -0.30 | | 0.31 |
| Accountability rating - Unacceptable | 0.18 | | 0.16 |
| Accountability rating - Recognized | -0.20 | ◊ | 0.11 |
| Accountability rating - Exemplary | -0.99 | | 0.73 |
| Rural | -0.37 | * | 0.14 |
| Mobile students (%) | 0.04 | * | 0.01 |
| Special education students (%) | -0.04 | * | 0.02 |
| Teachers in first year of teaching (%) | -0.01 | | 0.01 |
| Passing Algebra I before ninth grade (%) | 0.06 | * | 0.01 |
| Student-level model | | | |
| Ninth-grade TAKS reading score | 0.00 | * | 0.00 |
| Ninth-grade TAKS math score | 0.00 | * | 0.00 |
| Female | 0.25 | * | 0.05 |
| African-American | -0.12 | | 0.11 |
| Hispanic | 0.10 | | 0.10 |
| Asian | 0.56 | * | 0.24 |
| Limited English proficiency | -0.14 | * | 0.07 |
| Economically disadvantaged status | -0.18 | * | 0.08 |

| Random Effects | Variance Component | SE |
|---|---|---|
| School mean | 0.40 | 0.06 |

**p* < .05, ◊*p* < .10
Note: T-STEM and NSCS had too few students repeating ninth grade to be included in the analysis.

**Exhibit F-14**
**HLM Results for Promotion to Tenth Grade (143,016 Students in 781 Schools)**

| Fixed Effects | Coefficient | | SE |
|---|---|---|---|
| Model for school means | | | |
| Intercept | 4.10 | * | 0.13 |
| **T-STEM** | **1.51** | ***** | **0.40** |
| **HSTW** | **0.20** | | **0.28** |
| **HSRD** | **0.68** | | **0.49** |
| **HSRR** | **0.40** | | **0.27** |
| **DIEN** | **-0.23** | | **0.60** |
| **NSCS** | **-0.08** | | **0.52** |
| **ECHS** | **1.81** | ***** | **0.41** |
| T-STEM & Comparison | -0.08 | | 0.16 |
| HSRD & Comparison | 0.14 | | 0.22 |
| HSRR & Comparison | 0.00 | | 0.15 |
| DIEN & Comparison | 0.23 | | 0.26 |
| NSCS & Comparison | 0.35 | | 0.26 |
| ECHS & Comparison | 0.14 | | 0.17 |
| Small school | 0.94 | * | 0.16 |
| Accountability rating - Unacceptable | 0.06 | | 0.18 |
| Accountability rating - Recognized | -0.23 | * | 0.11 |
| Accountability rating - Exemplary | -0.46 | ◊ | 0.24 |
| Rural | 0.50 | * | 0.13 |
| Mobile students (%) | -0.06 | * | 0.01 |
| Special education students (%) | 0.06 | * | 0.01 |
| Teachers in first year of teaching (%) | 0.01 | | 0.01 |
| Student-level model | | | |
| Ninth-grade TAKS reading score | 0.00 | ◊ | 0.00 |
| Ninth-grade TAKS math score | 0.00 | * | 0.00 |
| Ninth-grade TAKS science score | 0.00 | * | 0.00 |
| Ninth-grade TAKS social studies score | 0.00 | * | 0.00 |
| Female | 0.76 | * | 0.02 |
| African-American | 0.62 | * | 0.05 |
| Hispanic | 0.16 | * | 0.04 |
| Asian | 0.83 | * | 0.12 |
| Limited English proficiency | 0.30 | * | 0.04 |
| At-risk status | -2.08 | * | 0.05 |
| Economically disadvantaged status | -0.65 | * | 0.03 |

| Random Effects | Variance Component | SE |
|---|---|---|
| School mean | 1.12 | 0.09 |

*$p < .05$, ◊$p < .10$

## Exhibit F-15
## Results for Tenth-Grade TAKS Math, English, Science, and Social Studies Achievement (Promoted Students in 772 Schools)

| | Math (*N* = 131,939) | | | English (*N* = 132,295) | | | Science (*N* = 131,453) | | | Social Studies (*N* = 131,062) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixed Effects | Coefficient | | SE | Cofficient | | SE | Cofficient | | SE | Cofficient | | SE |
| Model for school means | | | | | | | | | | | | |
| Intercept | 2222.20 | * | 3.15 | 2274.07 | * | 2.18 | 2218.07 | * | 3.13 | 2373.77 | * | 24.68 |
| **T-STEM** | **14.71** | * | **7.00** | **-1.56** | | **5.01** | **7.32** | | **6.93** | **7.59** | | **7.93** |
| **HSTW** | **-4.46** | | **6.95** | **4.91** | | **4.79** | **-8.79** | | **6.91** | **-2.25** | | **7.99** |
| **HSRD** | **-6.16** | | **13.12** | **-0.36** | | **9.00** | **-9.16** | | **13.05** | **-2.71** | | **15.10** |
| **HSRR** | **4.13** | | **6.45** | **-0.44** | | **4.49** | **4.04** | | **6.40** | **7.42** | | **7.38** |
| **DIEN** | **-19.07** | | **16.33** | **-20.16** | ◊ | **11.27** | **-23.30** | | **16.22** | **-39.52** | | **18.75** |
| **NSCS** | **69.46** | * | **12.00** | **19.10** | * | **8.61** | **61.78** | * | **11.88** | **41.74** | * | **13.60** |
| **ECHS** | **8.04** | | **7.29** | **-4.69** | | **5.13** | **11.08** | | **7.24** | **22.85** | * | **8.42** |
| T-STEM & Comparison | 1.01 | | 3.90 | 1.04 | | 2.71 | 0.95 | | 3.87 | 0.79 | | 24.98 |
| HSRD & Comparison | 5.82 | | 5.89 | 4.99 | | 4.04 | 7.07 | | 5.85 | 6.51 | | 25.38 |
| HSRR & Comparison | -1.81 | | 3.78 | -0.73 | | 2.63 | -2.12 | | 3.76 | -4.43 | | 24.92 |
| DIEN & Comparison | 27.21 | * | 6.82 | 11.64 | * | 4.68 | 13.52 | * | 6.78 | 11.35 | | 25.68 |
| NSCS & Comparison | 6.00 | | 5.72 | -1.43 | | 4.07 | 1.71 | | 5.68 | 6.54 | | 25.43 |
| ECHS & Comparison | -5.00 | | 4.04 | 0.95 | | 2.80 | -3.54 | | 4.01 | -6.36 | | 24.84 |
| Small school | -2.14 | | 3.18 | -4.46 | * | 2.26 | 3.35 | | 3.15 | -7.75 | * | 3.62 |
| Accountability rating - Unacceptable | 5.75 | | 4.63 | 0.21 | | 3.22 | 3.91 | | 4.60 | -0.54 | | 5.30 |
| Accountability rating - Recognized | 6.94 | * | 2.70 | 3.55 | ◊ | 1.88 | 10.09 | * | 2.68 | 3.16 | | 3.09 |
| Accountability rating - Exemplary | 24.74 | * | 4.97 | 16.33 | * | 3.53 | 19.84 | * | 4.93 | 15.94 | * | 5.66 |
| Rural | -0.18 | | 3.06 | 4.70 | * | 2.13 | -0.19 | | 3.04 | -8.45 | * | 3.50 |
| Mobile students (%) | -0.02 | | 0.23 | -0.56 | * | 0.16 | 0.28 | | 0.23 | 0.03 | | 0.26 |
| Special education students (%) | -0.10 | | 0.32 | 0.00 | | 0.23 | -0.45 | | 0.32 | -0.01 | | 0.36 |
| Teachers in first year of teaching (%) | -0.13 | | 0.13 | -0.18 | ◊ | 0.10 | -0.05 | | 0.13 | 0.12 | | 0.15 |
| Student-level model | | | | | | | | | | | | |
| Eighth-grade TAKS reading score | 0.02 | * | 0.00 | 0.16 | * | 0.00 | 0.08 | * | 0.00 | 0.13 | * | 0.00 |
| Eighth-grade TAKS math score | 0.48 | * | 0.00 | 0.11 | * | 0.00 | 0.19 | * | 0.00 | 0.10 | * | 0.00 |
| Eighth-grade TAKS science score | 0.14 | * | 0.00 | 0.08 | * | 0.00 | 0.27 | * | 0.00 | 0.18 | * | 0.00 |
| Eighth-grade TAKS social studies score | 0.07 | * | 0.00 | 0.08 | * | 0.00 | 0.17 | * | 0.00 | 0.35 | * | 0.00 |
| Female | 4.33 | * | 0.56 | 35.62 | * | 0.47 | -14.58 | * | 0.55 | -15.27 | * | 0.60 |
| African-American | -5.39 | * | 1.03 | 0.62 | | 0.86 | -17.01 | * | 1.01 | -10.61 | * | 1.10 |
| Hispanic | -0.79 | | 0.83 | -2.49 | * | 0.70 | -16.48 | * | 0.82 | -2.58 | * | 0.89 |
| Asian | 38.74 | * | 1.54 | 11.12 | * | 1.30 | 15.62 | * | 1.51 | 11.03 | * | 1.64 |
| Limited English proficiency | 20.28 | * | 1.27 | -24.14 | * | 1.07 | 1.01 | | 1.25 | 5.13 | * | 1.36 |
| At-risk status | -28.90 | * | 0.71 | -22.90 | * | 0.60 | -25.46 | * | 0.69 | -23.33 | * | 0.76 |
| Economically disadvantaged status | -6.24 | * | 0.69 | -10.42 | * | 0.58 | -6.53 | * | 0.67 | -7.35 | * | 0.73 |
| Random Effects | Variance Component | | SE | Variance Component | | SE | Variance Component | | SE | Variance Component | | SE |
| School mean | 815.98 | | 51.31 | 371.66 | | 24.81 | 807.46 | | 50.19 | 1087.90 | | 67.73 |
| Student effect | 9640.01 | | 37.65 | 6840.97 | | 26.68 | 9214.93 | | 36.05 | 10900.10 | | 42.72 |

*$p < .05$, ◊$p < .10$

**Exhibit F-17**

HLM Result for Passing TAKS in Four Subjects In Tenth Grade

(129,834 Promoted Students in 772 Schools)

| Fixed Effects | Coefficient | | SE |
|---|---|---|---|
| Model for school means | | | |
| Intercept | 1.84 | * | 0.06 |
| **T-STEM** | **0.38** | ***** | **0.16** |
| **HSTW** | **-0.10** | | **0.14** |
| **HSRD** | **-0.04** | | **0.25** |
| **HSRR** | **0.18** | | **0.13** |
| **DIEN** | **-0.45** | | **0.32** |
| **NSCS** | **1.28** | ***** | **0.29** |
| **ECHS** | **0.67** | ***** | **0.17** |
| T-STEM & Comparison | 0.00 | | 0.08 |
| HSRD & Comparison | 0.16 | | 0.11 |
| HSRR & Comparison | 0.01 | | 0.08 |
| DIEN & Comparison | 0.37 | * | 0.13 |
| NSCS & Comparison | 0.20 | | 0.12 |
| ECHS & Comparison | -0.07 | | 0.08 |
| Small school | -0.13 | ◊ | 0.07 |
| Accountability rating - Unacceptable | 0.12 | | 0.09 |
| Accountability rating - Recognized | 0.27 | * | 0.06 |
| Accountability rating - Exemplary | 0.72 | * | 0.11 |
| Rural | 0.00 | | 0.06 |
| Mobile students (%) | 0.00 | | 0.01 |
| Special education students (%) | 0.00 | | 0.01 |
| Teachers in first year of teaching (%) | 0.00 | | 0.00 |
| Student-level model | | | |
| Eighth-grade TAKS reading score | 0.00 | * | 0.00 |
| Eighth-grade TAKS math score | 0.01 | * | 0.00 |
| Eighth-grade TAKS science score | 0.00 | * | 0.00 |
| Eighth-grade TAKS social studies score | 0.00 | * | 0.00 |
| Female | 0.09 | * | 0.02 |
| African-American | -0.10 | * | 0.03 |
| Hispanic | -0.09 | * | 0.03 |
| Asian | 0.51 | * | 0.07 |
| Limited English proficiency | -0.01 | | 0.04 |
| At-risk status | -0.87 | * | 0.02 |
| Economically disadvantaged status | -0.18 | * | 0.02 |

| Random Effects | Variance Component | SE |
|---|---|---|
| School mean | 0.29 | 0.02 |

*$p < .05$, ◊$p < .10$

**Exhibit F-20**
**Results for Percentage of Days Absent in Tenth Grade**
**(136,001 Promoted Students in 783 Schools)**

| Fixed Effects | Coefficient | | SE |
|---|---|---|---|
| Model for school means | | | |
| Intercept | -3.29 | | 0.02 |
| **T-STEM** | **-0.29** | ***** | **0.07** |
| **HSTW** | **0.04** | | **0.04** |
| **HSRD** | **-0.01** | | **0.06** |
| **HSRR** | **0.04** | | **0.06** |
| **DIEN** | **-0.05** | | **0.11** |
| **NSCS** | **-0.40** | ***** | **0.11** |
| **ECHS** | **-0.48** | ***** | **0.08** |
| T-STEM & Comparison | 0.03 | | 0.03 |
| HSRD & Comparison | -0.04 | | 0.03 |
| HSRR & Comparison | -0.01 | | 0.02 |
| DIEN & Comparison | -0.04 | | 0.04 |
| NSCS & Comparison | 0.13 | ◊ | 0.07 |
| ECHS & Comparison | 0.08 | * | 0.03 |
| Accountability rating - Unacceptable | 0.00 | | 0.03 |
| Accountability rating - Recognized | -0.02 | | 0.02 |
| Accountability rating - Exemplary | 0.01 | | 0.04 |
| Rural | -0.05 | * | 0.02 |
| Mobile students (%) | 0.00 | | 0.00 |
| Special education students (%) | -0.01 | * | 0.00 |
| Teachers in first year of teaching (%) | 0.00 | | 0.00 |
| Previous absence rate | -0.08 | * | 0.01 |
| Student-level model | | | |
| Eighth-grade TAKS reading score | 0.00 | * | 0.00 |
| Eighth-grade TAKS math score | 0.00 | * | 0.00 |
| Eighth-grade TAKS science score | 0.00 | * | 0.00 |
| Eighth-grade TAKS social studies score | 0.00 | * | 0.00 |
| Female | 0.02 | ◊ | 0.01 |
| African-American | -0.38 | * | 0.02 |
| Hispanic | -0.25 | * | 0.01 |
| Asian | -0.54 | * | 0.03 |
| Limited English proficiency | -0.20 | * | 0.02 |
| At-risk status | 0.30 | * | 0.01 |
| Economically disadvantaged status | 0.26 | * | 0.01 |

*$p$ < .05, ◊$p$ < .10