The Texas Rural Technology (R-TECH) Pilot Program

Second Interim Evaluation Report

February 2010

TCER
Texas Center for Educational Research

THE TEXAS RURAL TECHNOLOGY (R-TECH) PILOT PROGRAM

SECOND INTERIM EVALUATION REPORT

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Prepared for
Texas Education Agency

Prepared by
Texas Center for Educational Research

Acknowledgments

Texas Center for Educational Research

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Research Funded by

Texas Education Agency

Executive Summary

In 2007, the Texas Legislature (80th Texas Legislature, Regular Session, 2007) authorized the creation of the Texas Rural Technology (R-Tech) Pilot program, which provides $8 million in funding to support rural districts in implementing technology-based supplemental education programs. In order to be eligible for funding, districts must have served fewer than 5,000 students and must not have been located in a metropolitan region of the state in 2007. Districts with limited course offerings and low accountability ratings received priority in grant awards. R-Tech funding is intended to support supplemental educational programs, including online courses, offered outside of students' regularly scheduled classes (e.g., before or after school). Districts that receive funding are required to provide students in Grades 6 through 12 with access to technology-based instructional resources for a minimum of 10 hours a week.

R-Tech grants were awarded in two periods, or cycles. The Texas Education Agency (TEA) awarded approximately $6.3 million in funding to 64 districts[1] in Cycle 1 grant awards, and $1.5 million in funding to 19 districts in Cycle 2 grant awards.[2] Cycle 1 grant awards must be used during the May 1, 2008, through May 31, 2010, project period, and Cycle 2 awards must be used during the January 1, 2009, through May 31, 2010, project period. Grantee districts receive $200 per student served by R-Tech in state funding for each year of the grant and are required to provide matching funds of $100 per student per grant year.

In establishing R-Tech, the Legislature required that the program be evaluated to assess its effects on student and teacher outcomes, as well as the program's cost effectiveness. In addressing these goals, the evaluation considers the following research questions:

1. How is R-Tech implemented across grantee districts and schools?
2. What is the level of student participation in R-Tech?
3. What is the effect of R-Tech on teachers?
4. What is the effect of R-Tech on student outcomes?
5. How cost effective is R-Tech?

The evaluation is made up of two interim reports (fall 2008 and winter 2010) and a final report (fall 2010). The findings presented here are drawn from the evaluation's second interim report (winter 2010). The report's findings are preliminary and consider outcomes from R-Tech's first implementation year for only those districts receiving Cycle 1 grant awards. The evaluation's final report will provide more complete information about Cycle 1 districts' experiences in implementing R-Tech for the full 2-year grant period.

RESEARCH QUESTIONS: KEY FINDINGS

The sections that follow present key findings relative to each of the evaluation's research questions. Results are preliminary and address outcomes for Cycle 1 districts for R-Tech's first implementation year.

Research Question 1: How is R-Tech Implemented Across Grantee Districts and Schools?

The following sections present information about the types of programs districts implemented using R-Tech funds, as well as principals' and facilitators' roles in implementing the program, the challenges to implementation and how challenges were overcome.

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[1] One Cycle 1 district opted not to participate in the grant, which reduced the total number of Cycle 1 grantees to 63.
[2] Three Cycle 2 districts also received Cycle 1 awards.

Supplemental vs. non-supplemental programs. Although R-Tech was intended to support districts' efforts in implementing supplemental educational programs offered outside the regularly scheduled school day, a substantial proportion of Cycle 1 districts (40%) implemented R-Tech as part of classroom instruction (i.e., non-supplemental programs). Many districts used R-Tech funding to update their computer labs, and teachers scheduled class time in the lab for students to access resources. Two districts implemented R-Tech as a technology immersion program and used funding to support the purchase of laptop computers for all teachers and students in Grades 6 through 12. Students and teachers use laptops throughout the school day and may take laptops home.

While some districts planned non-supplemental programs (e.g., technology immersion programs), other districts encountered challenges in implementing supplemental programs that caused them to revise their plans. District representatives explained that many students resisted participating in programs offered before or after school. Further, some students were not able to participate in R-Tech services because of conflicts with extra-curricular activities and bus schedules that limited their ability to arrive early or stay after school.

Self-paced instructional programs. Most districts (87%)[3] implemented R-Tech as a self-paced program focused on tutoring, remediation, or credit recovery. Self-paced programs provide access to online lessons that students work through at their own pace. Many self-paced programs include diagnostic assessments of students' individual learning needs and tailor instruction based on assessment outcomes. Some programs enable students to complete entire courses online, allowing students to make up credit for incomplete or failed courses. Sixty percent of districts offering self-paced instructional programs implemented supplemental programs in which students accessed resources outside of regularly scheduled classes.

Dual credit and distance learning. About 30% of Cycle 1 districts offered dual credit coursework using R-Tech funding. Dual credit courses enable students in Grades 11 and 12 to take courses that fulfill high school graduation requirements and earn college credit. Such courses are generally taught by college or university faculty and students participate online or through the use of video conferencing equipment. R-Tech districts implementing dual credit courses partnered with community colleges and universities to provide instruction, and some programs were facilitated by regional Education Service Centers (ESCs). Sixty percent of districts that offered dual credit programs offered supplemental programs in which students participated in dual credit courses in addition to their regularly scheduled classes.

Other programs. Six Cycle 1 districts offered different types of programs. Two districts used R-Tech funding to purchase iPods, which were loaded with instructional content for students to use at home (supplemental programs). Two districts offered technology immersion programs in which all students received laptops to use as part of regular instruction (non-supplemental programs). Two other districts planned to offer R-Tech as a program that included one-to-one tutoring with online instructional support; however, neither district implemented its program for students during R-Tech's first year. It is not known whether R-Tech services will be implemented as supplemental or non-supplemental programs in these districts.

Implementation roles. R-Tech facilitators had the largest role in implementing district programs. Principals primarily provided support for communicating program goals and planning for the grant, but had lesser roles in the day-to-day management of the R-Tech activities. In most districts, teachers had little or no role in planning and implementing R-Tech activities during the grant's first year.

[3]The percentage of districts included in each program type will not total to 100 because districts were able to implement more than one type of program. Districts were able to implement separate programs in their middle and high schools. For example, a district may have implemented dual credit instruction in its high school, but offered a self-paced tutoring program in its middle school.

Implementation challenges and supports. Principals and R-Tech facilitators indicated that most implementation challenges resulted from the need to clearly communicate program goals to parents and staff, as well as from insufficient planning time and from program reporting requirements. Many principals and R-Tech facilitators also noted the challenges of implementing a technology-based program in districts with outdated computer hardware and insufficient infrastructure to support expanded technology resources. Principals and program facilitators reported that strong administrative support, the additional revenue provided through the grant, as well as staff buy-in were factors that contributed to successful implementation.

Research Question 2: What is the Level of Student Participation in R-Tech?

Across Cycle 1 districts, most students were identified for R-Tech services because of weak academic performance, including poor Texas Assessment of Knowledge and Skills (TAKS) scores, failing grades, and prior academic failure. The number of students participating in R-Tech increased across the program's first year as districts implemented their programs more fully. While less than half of grantee districts (47%) offered R-Tech as part of the 2008 summer session, nearly all districts (92%) had implemented the program for students in spring 2009. Comparisons of the level of participation in R-Tech between students receiving services in summer school and students receiving services as part of the regular school year (i.e., fall 2008 and spring 2009) suggest differences in how resources may be used during the regular school year and summer school.

Regular school year vs. summer school. In fall 2008, 8,795 students accessed R-Tech resources (an average of 97 students per campus) and used resources for an average of 3.7 hours a week. In spring 2009, 12,736 students accessed R-Tech resources (an average of 129 students per campus) for an average of 3.8 hours per week. There were few differences between the characteristics of students who received R-Tech services and those who did not during the regular school year. That is, R-Tech students largely mirrored the overall student population in their districts in terms of grade levels served and demographic characteristics. The 1,370 students who participated in R-Tech during the 2008 summer session (an average of 37 students per campus) had much higher levels of usage than students using R-Tech during the regular school year. On average, summer school students accessed R-Tech resources for 8.5 hours each week—more than twice the average usage in fall 2008 and spring 2009—and were more likely to be middle school students, with the largest proportion of students (29%) enrolled in the eighth grade. Relative to non-participating students, students participating in R-Tech during summer school were more likely to be from low income (55% vs. 46%) and minority (50% vs. 36%) backgrounds. These differences suggest that some districts implemented R-Tech as an intensive summer school program designed to support at-risk middle school students with the transition to high school and to reduce middle school retention rates.

What students study using R-Tech resources. Results from district student usage data indicate that the largest proportions of students used R-Tech resources to focus on math (70%) or English/language arts (ELA) (46%). Surveyed middle school students were more likely to concentrate on math instruction than high school students (42% vs. 26%), and high school students were more likely to focus on ELA (28% vs. 21%). However, high school students participating in dual credit courses were notably more likely to focus on social studies than other R-Tech students in Grades 11 and 12 (60% vs. 10%).

Barriers to student participation in R-Tech. Student resistance, conflicts with extra-curricular activities, and transportation challenges limited students' ability to participate in R-Tech. To address barriers, districts expanded R-Tech access times, required participation for some students, and implemented incentives to student participation (e.g., offering snacks). Students also reported that slow computers, weak school infrastructure, software that was poorly matched to students' instructional needs, and teachers' lack of technical skills created challenges to participation.

Benefits of student participation. Staff on R-Tech campuses and students who received services during the program's first year reported a range of benefits from participation in the grant. Teachers indicated that R-Tech had improved students' academic outcomes, noting that grades had improved and that students who recovered credits were able to progress to the next grade on time. Teachers and students reported that participation in R-Tech had improved the confidence of some students and that self-paced programs eliminated the pressure students felt to keep up with the pace of classroom instruction. In addition to academic benefits, students appreciated the convenience of using technology for learning and the expanded access to information offered by online resources. Students also felt that their improved proficiency using computers would benefit them in college and the workplace.

Research Question 3: What is the Effect of R-Tech on Teachers?

In grant applications, all Cycle 1 districts indicated that R-Tech resources would be used to expand teachers' access to technology-based professional development activities; however, results from teacher surveys and focus group discussions suggest that many teachers were unaware of the R-Tech resources available to them and that few teachers participated in R-Tech professional development opportunities during the grant's first year.

R-Tech professional development. About 38% of teachers responding to the spring 2009 survey participated in training offered as part of R-Tech. Most teachers reported that training addressed preparation for standardized tests, using technology to provide instruction, working with at-risk students, and topics related to the use of new computer hardware and software. Across training topics, less than a quarter of surveyed teachers reported training was technology-based. Instead, most teachers reported that training was provided in face-to-face formats, such as workshops. District-provided data on teacher use of online training resources indicate that about 800 teachers (approximately 22% of all teachers working on R-Tech campuses) accessed online training opportunities during the 2008-09 school year, spending about 16 hours, on average, using online training resources, and that middle school teachers had higher average rates of usage (19 hours) than high school teachers (16 hours).

Other opportunities provided by R-Tech. Beyond professional development opportunities, teachers reported that they benefitted from the increased access to technology provided by R-Tech, noting that improvements to computer labs enabled them to create lessons that integrated technology. Teachers also appreciated that R-Tech resources facilitated the development of differentiated lessons and increased students' engagement in learning. Teachers also noted that R-Tech resources had been underused in the program's first year. Some principals reported that information about R-Tech had not been fully communicated to teachers and that they would take steps to encourage greater teacher use during the program's second year.

Research Question 4: What is the Effect of R-Tech on Student Outcomes?

The sections that follow present results from analyses of R-Tech on students' TAKS outcomes. However, test results are a limited indicator of R-Tech program effects because most standardized tests lack the sensitivity needed to measure incremental increases in student achievement produced by supplemental programs such as R-Tech. Given this limitation, readers are asked to consider this report's findings as preliminary. The evaluation's final report (fall 2010) will include a broader range of student outcome data, including graduation and attendance rates, advanced course completions, and indicators of college readiness, that were not available at the time of this report's writing.

The effect of access time. Students who spent more time using R-Tech resources did not experience improved testing outcomes relative to students who spent less time with resources. However, results should be interpreted with caution because researchers were not able to control for unobserved student differences that may have affected outcomes. For example, students who spent more time using R-Tech resources may have been at greater academic risk, requiring more remediation time than students who used R-Tech for briefer periods. If this was the case, then the lack of effect for time spent accessing R-Tech may reflect the characteristics of the students identified for more intensive support rather than the effects of the support itself.

Program type. The small number of districts offering one-to-one tutoring with online instructional support, technology immersion programs, and iPods loaded with instructional content prevented their inclusion in the statistical analysis of program type; therefore, analyses were limited to students participating in self-paced programs and dual credit courses. Students participating in self-paced programs experienced reduced TAKS scores in reading/ELA relative to R-Tech students who participated in other program types; however, self-paced programs had no effect on TAKS outcomes in mathematics, science, and social studies. Again, results should be interpreted with caution because it was not possible to control for the student characteristics that may have caused students to be identified for self-paced programs. If students identified for self-paced programs had more serious academic deficiencies than students identified for other types of R-Tech programs, then results may have been produced by unobserved student characteristics rather than program participation.

Supplemental vs. non-supplemental instruction. Students who received R-Tech services as supplemental instruction offered outside of the regular school day experienced reduced TAKS testing outcomes in social studies relative to students who participated in R-Tech as part of the regular school day (i.e., non-supplemental programs). The effects of supplemental programs on students' reading/ELA, science, and mathematics were persistently negative, but not by statistically significant levels. These findings suggest that R-Tech services implemented as part of regular instruction may improve students' TAKS outcomes; however, the characteristics of students identified for supplemental services may have affected outcomes. That is, students identified for supplemental services may have struggled academically, while students participated in non-supplemental services irrespective of academic need, which may indicate that testing outcomes reflect the effects of students' academic characteristics rather than program participation.

Research Question 5: How Cost Effective is R-Tech?

Similar to findings for R-Tech's effects on student achievement, readers are asked to consider results of this report's cost-effectiveness analysis as preliminary. Districts varied in the degree to which they accessed grant funding over R-Tech's first implementation year. While some districts accessed nearly all of their state grant funding during R-Tech's first year (May 2008-May 2009), other districts used little or no state funding. This limitation will be offset in the final evaluation report (fall 2010), which will include data from the full 2-year grant period when districts will have accessed nearly all of their funding. Note that findings on R-Tech's cost effectiveness are limited to districts' use of state grant funding and do not include information on districts' use of matching funds.

The allocation of R-Tech funding. Districts report their expenditures of state grant funding through TEA's Expenditure Reporting (ER) system, which includes five spending categories: (1) payroll costs, (2) professional and contracted services, (3) supplies and materials, (4) other operating costs, and (5) capital outlay. Program budgets included in grant applications indicated that most R-Tech districts characterized purchases of computer hardware as "supplies and materials," but some districts included computer hardware in "capital outlay." Further, most districts characterized computer software as "professional and contracted services," but others included software as "supplies and materials," or "capital outlay." Variations in how districts budgeted computer hardware and software make it difficult to clearly identify these expenditures in the ER system data.

Acknowledging this limitation, analysis of R-Tech expenditures indicates that most districts invested heavily in computer hardware and software during the program's first year. The largest share of grant funding (67%) was allocated to "supplies and materials" and about 10% of funding was spent on "capital outlay." In grant budgets, districts indicated purchases of laptop and desktop computers, LCD projectors, printers, furniture for computer labs, and instructional software in both expenditure categories.

Districts implementing self-paced and technology immersion programs spent more on "supplies and materials" and "capital outlay," as did districts that implemented R-Tech as part of the regular school day (i.e., non-supplemental programs). While districts' average first-year expenditures on "supplies and materials" and "capital outlay" were $29,338 and $4,378, respectively, districts implementing self-paced programs spent about $29,830 on "supplies and materials" and about $4,443 on "capital outlay." Districts implementing technology immersion programs spent about $67,650 on "supplies and materials" and did not allocate funds for "capital outlay."[4] Districts implementing non-supplemental programs spent about $36,890 on "supplies and materials" and $6,625 on "capital outlay."

About 15% of state grant funding was spent on "professional and contracted services" during R-Tech's first year. Expenditures in this category included tuition and fees for dual credit courses and payments for professional development, technical support services, and educational software. Districts implementing dual credit and distance learning courses and one-to-one tutoring and online support spent more in this category. Only 8% of first year grant funding was spent on "payroll costs." Payroll expenditures covered the costs of salaries for newly hired computer lab facilitators, extra-duty pay for teachers who worked before or after school to provide R-Tech services, and the costs of substitutes to enable teachers to participate in professional development. Districts did not spend any state funding for "other operating costs."

The cost effectiveness of program configurations. In spite of substantial start up costs in terms of investments in technology resources, districts that implemented R-Tech for larger numbers of students experienced the lowest per-student program costs. Across Cycle 1 districts, the average per-student cost of providing R-Tech services during the program's first year was $420. Districts that implemented programs serving 500 or more students experienced average per-student costs of $111, while districts that served fewer than 50 students during R-Tech's first year had average per-student costs of more than $1,500. R-Tech districts that implemented self-paced programs had average per-student costs that were slightly above average ($428) and districts implementing dual credit and distance learning programs had per-student costs that well below average ($198). This difference is likely the result of greater investment in technology resources needed to implement self-paced programs. Although technology immersion programs spent heavily on computer resources during R-Tech's first year, districts implementing this type of program experienced below average per-student costs ($269) because large numbers of students participated in the program. Districts that implemented R-Tech using iPods loaded with instructional content served fewer students and had average per-student costs of about $358.[5] Across program configurations, per-student implementation costs are expected to drop during R-Tech's second year as more students gain access to resources purchased in the grant's first year.

Supplemental vs. non-supplemental instruction. Districts that implemented R-Tech as part of regular classroom instruction (i.e., non-supplemental programs) experienced substantially lower per-student costs than supplemental programs ($182 vs. $612, on average). The difference in costs results from differences in the numbers of students served. Districts implementing supplemental programs served an average of

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[4]The notably high expenditures for "supplies in materials" is the result of one technology immersion district budgeting its full grant award ($200,000) to purchase laptop computers for students and teachers. The district accessed 60% of its grant award ($120,886) during R-Tech's first implementation year.

[5]Neither district offering R-Tech as one-to-one tutoring with online instructional support served students during the program's first implementation year. Therefore, it was not possible to identify a per-student cost for this type of program.

172 students during R-Tech’s first year, while districts implementing non-supplemental programs served an average of 350 students.

Sustainability. Nearly half (48%) of principals responding to the spring survey reported that insufficient financial resources created a *moderate* or *substantial* barrier to continuing R-Tech after grant funds expire in May 2010. Most principals (55%) indicated that R-Tech would be offered as part of classroom instruction rather than as a supplemental program at the conclusion of the grant. During interviews conducted as part of spring site visits, several principals said they would only continue R-Tech after the grant period if the program demonstrated positive effects on students’ TAKS scores.

THE ONGOING EVALUATION

The findings presented in this report are preliminary and are drawn from R-Tech’s first implementation year in Cycle 1 districts. The ongoing evaluation will continue to collect information about how Cycle 1 districts implement R-Tech, the challenges and benefits of implementation, and the program’s effect on student and teacher outcomes, as well as its cost effectiveness across the grant’s second year. More conclusive findings for the grant’s full 2-year implementation period will be presented in the final evaluation report (fall 2010).

As discussed earlier in this summary, the final report will include a broader range of student achievement indicators and complete information on Cycle 1 districts’ use of state grant funds. The final report will also include findings from surveys of R-Tech facilitators, principals and teachers on R-Tech campuses, and students who participated in R-Tech services administered in spring 2010, as well as information collected during site visits to R-Tech districts in spring 2010. The inclusion of survey and site visit data gathered at the grant’s conclusion will enable researchers to identify modifications to districts’ implementation plans, changes in respondents’ roles in implementation and perceptions of grant services, and how changes may affect student and teacher outcomes.

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ACRONYMS

AEA	Alternative Education Accountability
AEIS	Academic Excellence Indicator System
askTED	Texas Education Directory
AP	Advanced Placement
BCIS	Business Computers and Information Systems
DIRC	Data Information Review Committee
ELA	English/Language Arts
ELL	English Language Learners
ER System	Expenditure Reporting System
ESC	Education Service Center
FY	Fiscal Year
HSA	High School Allotment Fund
HB	House Bill
HGLM	Hierarchal Generalized Linear Modeling
HLM	Hierarchal Linear Modeling
IEP	Individualized Education Plan
ISD	Independent School District
LEP	Limited English Proficient
MSA	Metropolitan Statistical Area
NCES	National Center for Education Statistics
NCLB	No Child Left Behind
PEIMS	Public Education Information Management System
PEP	Personal Education Plan
RHSP	Recommended High School Program
R-Tech	Rural Technology Pilot Program
SES	Supplemental Education Services
SMSA	Standard Metropolitan Statistical Area
SREB	Southern Regional Education Board
TAKS	Texas Assessment of Knowledge and Skills
TCER	Texas Center for Educational Research
TEA	Texas Education Agency
TEC	Texas Education Code
TEKS	Texas Essential Knowledge and Skills
TxRED	Texas Rural Educational Development Consortium

CHAPTER 1
INTRODUCTION

The purpose of the evaluation of the Texas Rural Technology (R-Tech) Pilot Program is to assess the program's effectiveness. To that end, the evaluation focuses on how R-Tech is implemented, its effects on teacher and student outcomes, as well as its cost effectiveness and sustainability. To address these goals, evaluation activities are guided by the following research questions:

1. How is R-Tech implemented across grantee districts and schools?
2. What is the level of student participation in R-Tech?
3. What is the effect of R-Tech on teachers?
4. What is the effect of R-Tech on student outcomes?
5. How cost effective is R-Tech?

The R-Tech evaluation spans the 2008-09 and 2009-10school years and will produce two interim reports (fall 2008 and winter 2010), as well as a final report (fall 2010). The evaluation's first interim (December 2008) presented descriptive information relevant to Research Question 1. It described the characteristics of R-Tech districts and campuses, the students they enroll, and the teachers they employ. In addition, the first interim report provided baseline[1] information about students' academic outcomes and described districts' implementation plans as outlined in their grant applications to the Texas Education Agency (TEA). The findings presented here comprise the evaluation's second interim report and expand upon the first interim report to present information relevant to each of the evaluation's research questions based on data collected across R-Tech's first implementation year (May 2008- May 2009), including the 2008 summer session, as well as the fall 2008 and spring 2009 semesters.

This chapter provides an overview of the R-Tech program, as well as background information on the challenges faced by rural schools and the potential of technology to overcome these challenges. It also discusses the methodological issues inherent in evaluating the effects of supplemental educational interventions, such as R-Tech, and it introduces the methodologies and data sources that produce the second interim report's findings. The chapter concludes with a discussion of the report's limitations and an overview of the ongoing evaluation.

OVERVIEW OF R-TECH

In 2007, the 80th Texas Legislature authorized the creation of a pilot program designed to provide technology-based supplemental educational services to the state's rural districts. House Bill (HB) 2864 (80th Texas Legislature, Regular Session, 2007) authorized TEA to create R-Tech, which provides nearly $8 million to be used to support technology-based supplemental education programs, including online courses, in the state's rural districts from May 2008 through May 2010. In order to be eligible for R-Tech funding, districts must have enrolled fewer than 5,000 students, and must not have been located in a metropolitan area as of January 1, 2007. Priority in grant awards was given to districts with limited course offerings and to districts with high academic need as demonstrated by their 2007 accountability ratings. Grantee districts receive $200 per school year in state grant funding for each student receiving R-Tech services and are required to provide $100 per participating student per school year in matching funds.[2] As a condition of funding, districts are expected to provide students with access to R-Tech services for a minimum of 10 hours per week.

[1]Baseline indicators are measures of school characteristics and performance prior to program implementation. Such measures provide a "baseline" from which to assess program effects.
[2]Districts may use High School Allotment (HSA) monies to provide matching funds at the high school level.

R-Tech funding was awarded in two grant periods, or cycles. Cycle 1 of the grant awarded about $6.3 million in funding to be used during the May 1, 2008, through May 31, 2010, project period. In the spring of 2008, TEA awarded 64 districts Cycle 1 funding. Over the course of the 2008-09 school year, one Cycle 1 grantee district opted not to participate in the program, which reduced the total number of Cycle 1 districts to 63.[3] In fall 2008, TEA awarded about $1.5 million in R-Tech Cycle 2 funding to 19 districts.[4] Cycle 2 funding must be used during the January 1, 2009, through May 31, 2010, project period. R-Tech funding supports technology-based supplemental education services to students in Grades 6 through 12. Such services may include:

- Research-based instructional support,
- Teacher training,
- Academic tutoring or counseling,
- Distance learning opportunities in the core content areas or in foreign languages, and
- Dual credit coursework in the core content areas or in foreign languages.

RURAL SCHOOLS AND TECHNOLOGY

Although education policy and reform discussions have tended to focus on the problems of urban districts and inner-city students, rural schools, and the students who attend them, confront a range of challenges resulting from social and geographic isolation, inadequate school and community resources, as well as declining enrollments (Johnson & Strange, 2007). In 2003-04, more than half of the nation's school districts and a third of its public schools were located in rural areas, but rural schools enrolled only 20% of the nation's public school students (National Center for Education Statistics [NCES], 2007, p. iii). As these statistics suggest, rural schools tend to enroll fewer students, on average, than their counterparts in other locales, and receive less in terms of overall per-pupil funding (Johnson & Strange, 2007). Beyond funding disparities, the geographic isolation of rural communities makes it difficult to recruit and retain high quality teachers, and teacher shortages prompt many rural districts to rely on unqualified or out-of-field teachers in hard to staff courses (Hobbs, 2004; Jimerson, 2003, 2004; Lemke, 1994; Stern, 1994). In the absence of qualified teachers, many rural districts struggle to provide a comprehensive curriculum, particularly at the high school level, and to provide supplemental educational support to students who need remediation, tutoring, and other services designed to increase academic achievement (Hobbs, 2004; Jimerson, 2003).

Texas enrolls more students in rural public schools than any other state (Johnson & Strange, 2007). Eighteen percent of Texas' more than 4.5 million public school students attend a rural public school, and more than half of the state's public school districts and 27% of its public schools are located in rural areas (authors' calculations using NCES and TEA data, 2007). Relative to non-rural Texas schools and rural schools nationally, Texas' rural schools serve larger proportions of English language learners (ELL) and students from low income backgrounds (Jimerson, 2004; Johnson & Strange, 2007). Texas' rural districts have higher average rates of teacher turnover and a greater incidence of out-of-field teaching relative to the state's non-rural districts or rural schools nationally (Jimerson, 2004). In addition, Texas' rural districts lag the state's non-rural districts and rural districts nationally in providing opportunities for students to participate in supplemental programs focused on enrichment or remediation (Jimerson, 2004).

Technology is increasingly recognized as a cost-effective means to overcoming the challenges faced by rural schools (Malhoit, 2005). Through the use of technology, rural schools may offer students "an advanced, varied, and cost-effective curriculum" by providing access to online courses and distance learning opportunities (Malhoit, 2005, p. 20). In addition to increasing academic rigor and the diversity of course offerings available to rural students, technology also holds the potential to provide supplemental

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[3]The district that chose to withdraw from R-Tech did not access any of its grant award.
[4]Three of the 19 Cycle 2 districts also received Cycle 1 grant awards.

programs, such as online tutoring and remediation, for rural students who struggle academically (Griffin, 2005; Malhoit, 2005). Rural students may also benefit when their teachers participate in online professional development and training designed to improve instruction and classroom management skills (Cullen, Frey, Hinshaw, & Warren, 2004, 2006; Hobbs, 2004; Wright & Lesisko, 2008).

Despite the potential benefits of technology, many rural schools are unprepared to use technology to enhance teaching and learning. A study of school facilities found that many rural districts failed to adequately maintain their buildings, and that long-term underinvestment in school buildings threatened the ability of rural districts to implement new systems of technology and to accommodate new approaches to instruction (Dewees & Hammer, 2000). In addition, many rural schools lack the infrastructure and resources needed to adequately implement programs that rely on technology-based instruction. Nationally, 50% of rural schools have outdated wiring that will not support broad technology use, 84% lack fiber optic cable, and 46% do not have operational computer networks (McColl & Malhoit, 2004, p. 5). Further, the long-term success of technology-based interventions depends on the sustainability of technology. Grant revenue may be sufficient to get projects off the ground, but in order to see long term gains, districts must design plans that are sustainable when grant funding expires (Mason, Smith, & Gohs, 1982). Sustaining technology-based initiatives may be particularly challenging for small, rural districts with low enrollments and inadequate tax bases (Dewees & Hammer, 2000).

Recognizing the potential of technology to expand opportunities for students and teachers in isolated, rural areas, federal- and state-level policymakers have introduced a variety of programs to assist rural schools in obtaining the infrastructure, technology hardware and software, and training needed to effectively implement technology into instructional practice. R-Tech is one of several Texas programs designed to improve access to technology resources and technology-based instruction in low income and underserved districts (e.g., the Technology Integration in Education Initiative, the Texas Technology Immersion Pilot, Vision 2020 Grants). R-Tech is somewhat unique in that it is targeted specifically to Texas' small, rural districts, and for its focus on the provision of technology-based supplemental instruction.

SUPPLEMENTAL PROGRAMS

Supplemental programs, such as R-Tech, are generally offered outside of a student's regularly scheduled classes, often before or after school, and are designed to provide additional instructional support for struggling students. While tutoring before or after school has been a longstanding feature of most educational systems, the provision of formalized supplemental education services, or SES, has gained traction in recent years in response to the No Child Left Behind (NCLB) Act's requirement that low income students attending persistently low-performing schools receive access to free tutoring in math and reading. Although R-Tech operates outside of NCLB's parameters for the provision of SES, the grant's preference for districts with weak accountability ratings reflects NCLB's reasoning that supplemental instruction will improve academic outcomes in poor-performing schools. To date, however, there is little empirical evidence to support this thinking (Burch, Steinberg, & Donovan, 2007; Munoz, Potter, & Ross, 2008; Ross, Paek, & McKay, 2008).

Challenges to Evaluating the Effectiveness of Supplemental Programs

The lack of empirical evidence for the effectiveness of supplemental instruction may indicate that such programs do not have a measurable effect on student learning, but it is also possible that variations in SES providers and the types of services they provide make it difficult to identify what the actual "effect" of services may be. The effects of SES also may be difficult to isolate from the range of other influences that affect student learning during the school year, and the non-random assignment of students to SES makes it difficult to know whether observed effects result from participation in SES or the characteristics of the students who receive services. Each of these challenges to evaluating SES is discussed in greater detail in the sections that follow.

Many SES providers. In part, the lack of evidence of the effectiveness of SES is due to wide variation in the type and quality of services provided to students. That is, SES is not a single intervention implemented in a uniform manner across schools and districts. According to Ascher (2006), approximately 2,000 approved vendors provided NCLB-required SES in one or more states during the 2005-06 school year. The broad range of vendors providing supplemental instruction has made it difficult to arrive at an overall estimate of program effectiveness, although studies of specific SES providers have produced mixed results. For example, a 2-year study of multiple vendors providing SES in Tennessee found statistically significant effects[5] on student outcomes for only two vendors, both of which were negative (Potter, Ross, Paek, McKay, Sanders, & Ashton, 2008). A 3-year evaluation of more than 40 vendors providing supplemental instrucion in the Chicago public school system found wide variations in individual vendor effects (both positive and negative), and concluded that, overall, the district's program had a small, positive effect on student reading outcomes, but a negligible effect on math outcomes (Chicago Public Schools, Office of Research, Evaluation, & Accountability, 2007). A summary of the findings of several state-level evaluations that included more than 200 SES vendors found only four vendors that produced statistically significant positive effects on student outcomes, although 57% produced some margin of positive learning growth (Ross, Paek, & McKay, 2008, p. 30).

Difficulty isolating the effects of SES. In addition to the problem of multiple vendors, researchers struggle to distill the effects of supplemental education from the wide range of other factors that influence student learning. Experiences in core content area classrooms, teacher quality, student motivation and interest, and a range of extraneous variables affect educational outcomes, making it difficult for researchers to isolate the effects of supplemental programs on achievement (Munoz, Potter, & Ross, 2008; Ross, Paek, & McKay, 2008). Some researchers also have noted that students receive supplemental services for a relatively small proportion of the school year, and most standardized tests, such as the Texas Assessment of Knowledge and Skills (TAKS), lack the sensitivity to measure incremental changes in achievement (Baker, 2007; Linn & Miller, 2005; Kane, 2004).

Nonrandom assignment of students to SES. A further challenge to the evaluation of supplemental programs arises because students are not randomly assigned to participate in services. Students choose to participate in SES or are assigned to receive services, and differences in the characteristics of the students who receive services relative to those who do not make comparisons difficult. For example, if SES participants are more motivated students who are willing to come before or after school to receive tutoring, then differences in the test scores between SES and non-SES participating students may reflect differences in students' motivational levels rather than the effects of services. It is not possible for researchers to observe and quantify the many characteristics that affect student participation in supplemental instrucions, and the influence of unobserved traits may distort estimates of program effectiveness.

Given the methodological challenges to assessing the effects of supplemental programs on student achievement outcomes, Ross, Paek, and McKay (2008) suggest that researchers take a larger view of the effects of SES and consider qualitative outcomes such as improved student self-esteem, motivation, and study skills, as well as test scores. The authors warn:

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[5]An outcome is said to be "statistically significant" when the probability of the outcome occurring (e.g., increased reading TAKS scores) by chance is less than an established level of probability. For example, if a program increased TAKS reading scores by a statistically significant amount at the 5% level of probability, then the likelihood of that outcome occurring by chance alone is only 5%.

> To the extent the evaluation studies and the public weigh SES on the basis of immediate achievement gains only, we could well end up with the possibly misleading "black-or-white" conclusion that SES is ineffective and needs to be discontinued (like so many other educational programs in the past) (p. 31).

REPORT METHODOLOGY

These concerns guide the approach to evaluating the supplemental services provided to Texas' rural districts through R-Tech. In order to avoid misleading conclusions drawn from focusing solely on student testing outcomes, the findings presented in the second interim report are drawn from multiple data sources and rely on a variety of quantitative and qualitative methodologies. The sections that follow describe the report's data sources and approach to analyses.

Document Analyses

In order to gain a fundamental understanding of the types of programs implemented in R-Tech districts, district goals for the program, and districts' planned use of grant funds, researchers analyzed grantee districts' grant applications and progress reports to TEA. Analysis of district grant applications enabled researchers to categorize R-Tech programs by type (e.g., self-paced programs and dual credit/distance learning) and to understand how districts planned to use grant funds to support program goals (e.g., the purchase of laptops or software, salaries for computer lab staff). Examination of districts' progress reports allowed researchers to identify changes in districts' implementation strategies across R-Tech's first year and to refine program categories.

Analysis of R-Tech applications and progress reports identified the following five categories of R-Tech programs:

1. Self-paced software, including remediation, online tutoring, and credit recovery programs;
2. Dual credit and distance learning programs that enable students to receive credit for college courses that also meet high school requirements;
3. One-to-one tutoring with online instructional support;
4. School-wide technology immersion programs in which every student receives a laptop computer; and
5. Programs that incorporate iPods to deliver tailored instructional content to specific student groups.

The categories are not discrete across R-Tech districts. That is, districts may offer more than one type of program. For example, a district may offer dual credit and distance learning opportunities at its high school and a self-paced tutoring program at its middle school. Each program category is discussed in more detail in chapter 3.

Analysis of districts' progress reports also revealed that many Cycle 1 districts (40%) implemented R-Tech as part of classroom instruction (i.e., non-supplemental programs). For example, some districts used R-Tech funding to purchase laptop computers and software that teachers incorporated as part of daily lessons. Some districts updated and expanded computer labs, and teachers scheduled class time in the lab to access R-Tech resources, or assigned groups of students to the lab during class as a means of differentiating instruction. Recognizing that districts implementing R-Tech as a supplemental instructional program may have different outcomes than districts implementing R-Tech as part of regular instruction, researchers also categorized programs as supplemental or non-supplemental based on when students accessed R-Tech services.

These categories are used in the report's quantitative analyses to identify whether different implementation strategies and whether R-Tech is provided as a supplemental or non-supplemental program have varying effects on student outcomes and implementation costs. Because the categories used in this report are based solely on document analysis, researchers advise that the categories are preliminary evaluation tools. The ongoing evaluation will include program categories on subsequent surveys of principals and facilitators and ask respondents to identify the program type that best describes their schools' approach to R-Tech implementation. The inclusion of program descriptors on surveys will enable researchers to gain a more refined understanding of variations in districts' implementation strategies and to assess more fully how different approaches to implementing R-Tech may affect student outcomes and program costs.

Quantitative Data Sources

The evaluation incorporates quantitative data drawn from archival sources, such as Texas' Public Education Information Management System (PEIMS) and Academic Excellence Indicator System (AEIS), as well as data collected directly from R-Tech districts.

Archival data. PEIMS is an archival database that contains data collected from Texas public schools by TEA. PEIMS includes student demographic and academic performance data, as well as information about school staffing, finance, and organization. AEIS is an archival database that contains information about the academic performance and accountability rating of each public school district and campus in Texas. Some analyses also incorporate data included in TEA's public school directory, known as AskTED.

District-provided data. Districts awarded R-Tech grants are required to track the average number of hours per week that individual students participate in services provided by R-Tech (TEA, 2008b), and many districts selected software packages and vendors that facilitated the collection of student usage data. In addition, districts collected data about teachers' participation in professional development activities with the use of R-Tech funds. Student and teacher usage data were provided to TEA through a data upload system hosted by the Agency. Districts submitted upload data for students and teachers participating in R-Tech at three points across the project's first implementation year: (1) the conclusion of the 2008 summer session, (2) the conclusion of the fall 2008 semester, and (3) the conclusion of the spring 2009 semester. Districts also provided information on their use of R-Tech grant funds through TEA's Expenditure Reporting (ER) system.

Quantitative Analyses

Descriptive statistics. Analyses included in chapter 2 rely on PEIMS and AEIS data to present descriptive information about R-Tech districts and campuses, as well as the students they enroll. The academic outcomes of R-Tech campuses are compared to statewide averages of campuses serving roughly the same grade levels (i.e., Grades 6 through 12), as well as to TEA-identified peer comparison campuses that serve similar student populations, where appropriate.

Regression analyses. The effect of R-Tech services on students' 2009 TAKS testing outcomes is estimated using PEIMS and student upload data and hierarchical linear modeling (HLM) regression methods, which allow researchers to control for student- and campus-level characteristics. A more detailed discussion of the approach to estimating the effect of R-Tech on student outcomes and estimation results is presented in chapter 6 and Appendix F.

Cost-effectiveness analysis. The cost effectiveness analysis presented in chapter 7 provides preliminary information about how R-Tech districts allocated state grant funding over the course of the pilot's first year. Analyses include calculations of the per-student cost of implementing R-Tech, recognizing wide variations in district levels of implementation across R-Tech's first year, and discuss the project's sustainability once grant funds expire.

Surveys

This evaluation report incorporates the results of three online surveys: (1) a survey of principals of R-Tech campuses and R-Tech facilitators, (2) a survey of teachers working on R-Tech campuses, and (3) a survey of students receiving R-Tech services. Results from surveys are presented in chapters describing R-Tech implementation in 2008-09 (chapter 3), chapters discussing R-Tech's effects on students and teachers (chapters 4 and 5), and the sustainability of R-Tech services (chapter 7). An overview of each survey is presented in the sections that follow.

Online survey of R-Tech facilitators and principals of R-Tech campuses. A voluntary, online survey of R-Tech facilitators and principals was administered in fall 2008 and again in spring 2009. The fall 2008 survey measured respondents' initial understanding of the R-Tech pilot and the early challenges in implementing the program. The spring 2009 survey measured changes in respondents' perceptions of R-Tech across the project's first year, the ongoing challenges to implementation, and the approaches by which districts overcame challenges. The survey also probed the effects of R-Tech on teachers and students, as well as principals' views of the sustainability of R-Tech services after grant funds expire. A detailed description of survey administration procedures, survey response rates, characteristics of survey respondents, supplemental tables cited in report chapters, and copies of the fall and spring surveys are included in Appendix A.

Online survey of teachers on R-Tech campuses. Similar to the survey of R-Tech facilitators and principals, a voluntary, online survey of teachers on R-Tech campuses was administered twice during the 2008-09 school year—once in fall 2008 and again in spring 2009. The fall 2008 survey asked about teachers' roles in planning and implementing R-Tech, the professional development opportunities provided as part of R-Tech, the program's effect on teachers, and teachers' overall understanding of the goals of R-Tech. The spring 2009 survey measured changes in teachers' perceptions of R-Tech and their role in implementation across the 2008-09 school year. The teacher survey, a detailed description of survey administration procedures, survey response rates, and supplemental tables referenced in report chapters are included in Appendix B.

Online survey of students participating in R-Tech. In spring 2009, students who participated in R-Tech services either in summer 2008 or during the 2008-09 school year were invited to participate in a voluntary, online survey that asked about students' access to R-Tech technology resources, their views of technology-based instruction, as well as what students liked most and least about learning with technology. The student survey, a detailed description of survey administration procedures, and respondent characteristics are included in Appendix C.

Qualitative Data and Analysis: Site Visits to R-Tech Districts

In order to gain a more nuanced understanding of the ways in which districts implement R-Tech services, the challenges and benefits of implementation, and R-Tech's effects on students and teachers, researchers conducted site visits to eight R-Tech districts (13 campuses) in spring 2009. Site visits included interviews with campus administrators, R-Tech facilitators, focus group discussions with teachers involved in R-Tech, and focus group discussions with students who received R-Tech services, as well as observations of R-Tech service delivery. Districts selected for site visits differed in the types of R-Tech programs implemented, but had programs that were largely representative of the range of R-Tech programs offered across all 63 Cycle 1 grantee districts. For example, site visit districts included campuses that offered self-paced credit-recovery and tutoring programs, dual credit instruction for high school students, programs targeted to specific student populations (e.g., ELLs), programs offered to all students, programs addressing academic goals, and programs providing interventions for students with behavioral problems (e.g., truancy, disciplinary referrals).

Following site visits, researchers reviewed audio files and notes, transcribed interview and focus group discussions, and identified response categories and themes for analysis. Transcribed interviews and focus groups were analyzed using tables and summaries organized by respondent groups (e.g., principals and teachers) and response content. Across interviews and focus groups, analyses focused on how R-Tech was implemented in site visit districts, the challenges to implementation, how challenges were overcome, the effects of the program on students and teachers, and whether R-Tech would be sustained once grant funds expire. Data collected through site visits are presented in combination with survey data to provide more robust descriptions of R-Tech implementation (chapter 3), the program's effects on students and teachers (chapters 4 and 5), and the sustainability of R-Tech services (chapter 7). A more detailed discussion of the approach to identifying site visit districts and site visit activities, as well as a brief overview of each district and its R-Tech program are included in Appendix D.

LIMITATIONS OF THE SECOND INTERIM EVALUATION REPORT

Although the R-Tech evaluation relies on a diverse set of quantitative and qualitative data sources and methodologies, the second interim report experiences some limitations that arise from the availability of student outcome data, variations in districts' implementation strategies, and survey response rates. Each limitation is discussed in a section that follows. Further limitations that may affect specific analyses are discussed in context in the evaluation chapter that includes the analysis.

Limited Information on Student Outcomes

Although the ongoing evaluation will consider a broader range of student outcome measures, including advanced course completions, attendance and graduation rates, and indicators of college readiness, at the time of the second interim report's writing (spring 2009), the only student outcome data available subsequent to R-Tech's implementation were students' spring 2009 TAKS scores. Therefore, the report's discussion of the first year effects of R-Tech on student outcomes is limited to standardized testing results, which, as noted earlier in this chapter, may produce misleading conclusions. Considerable research has demonstrated that standardized tests are limited indicators of student achievement that must be balanced by consideration of broader measures of learning, such as improved student engagement, motivation, and interest; increased graduation and attendance rates; as well as improved study skills and grades (Archbald & Newman, 1988; Klein, 1971; Koertz, 2002; Ross, Paek, & McKay, 2008; Russell & Higgins, 2003).

Acknowledging the limitations of standardized tests to fully measure improvements in student achievement outcomes, particularly for supplementary instructional programs (Munoz, Potter, & Ross, 2008; Ross, Paek, & McKay, 2008), readers are advised to consider this report's discussion of R-Tech's effects on student outcomes (chapter 6) as preliminary. The final report (fall 2010) will present analyses of a broader range of student outcome data and provide more conclusive findings about R-Tech's effects on student achievement.

Uneven First Year Implementation Across R-Tech Districts

Variations in the levels of R-Tech implementation across Cycle 1 grantee districts also create limitations for the second interim report. During R-Tech's first implementation year (May 2008-May 2009), most districts fully implemented R-Tech, providing students with access to services and enabling teachers to participate in grant-provided professional development activities. However, some districts experienced challenges that delayed their implementation schedules, which meant that students and teachers had reduced access, or in some in cases no access, to R-Tech services across the program's first year.

Researchers had limited ability to control for the range of implementation levels across districts, which again suggests that readers should consider the second interim report's findings as preliminary. The final evaluation report (fall 2010) will include information from the full 2-year grant period in which all Cycle 1 grantee districts will have implemented the program to a largely complete degree, and findings will provide a more complete view of R-Tech's effects.

Survey Response Rates

The second interim report relies on survey data collected across R-Tech's first year of implementation, and survey response rates varied across survey administrations and respondent groups. Table 1.1 presents campus-level and respondent-level survey response rates for each survey administration and respondent group. Campus-level response rates represent the percentage of R-Tech campuses that had respondents who participated in surveys (N=115 for both fall and spring administrations). Respondent-level response rates represent the ratio of individuals who participated in each survey to the total number of the respondent group expected to participate, expressed as a percentage. For example, researchers estimated the number of teachers who worked in R-Tech campuses in 2008-09 using 2007-08 AEIS data as a proxy for 2008-09 staffing patterns,[6] and calculated teacher-level response rates as the ratio of the number of teachers participating in surveys to the total number of teachers expected to work on R-Tech campuses, expressed as a percentage. Because each campus is only expected to have one principal, the campus-level and respondent-level response rates for principals are the same. It was not possible to calculate respondent-level response rates for R-Tech facilitators because campuses used different approaches to facilitating grant implementation—some campuses assigned facilitator duties to one individual, while other campuses distributed responsibilities across several individuals. Student-level response rates represent the ratio of students who participated in the spring survey to the total number of unique students who were included in district upload data submitted to TEA for the summer 2008, fall 2008, and spring 2009 reporting periods. Students included in the data uploads for more than one reporting period were counted only once in the calculation of the response rate. Appendices A, B and C provide more information on survey administration procedures and response rates, as well as the characteristics of survey respondents.

[6]2008 AEIS data were the most current data available at the report's writing.

Table 1.1
R-Tech Campus-Level and Respondent-Level Response Rates, by Respondent Group: Fall 2008 and Spring 2009

Respondent Group	Fall 2008	Spring 2009
Campus-level response rate[a]		
Principals	71.3%	65.2%
R-Tech facilitators	65.2%	56.5%
Teachers	80.0%	67.0%
Students	--	47.0%
Respondent-level response rate[b]		
Principals	71.3%	65.2%
R-Tech facilitators[c]	Unknown	Unknown
Teachers (estimated)[d]	33.0%	15.7%
Students[e]	--	20.1%

Sources: R-Tech Principal/Facilitator Survey: fall 2008 and spring 2009; R-Tech Teacher Survey: fall 2008 and spring 2009; R-Tech Student Survey: spring 2009; Texas Education Agency (TEA) Student Upload data: summer 2008, fall 2008, spring 2009; TEA 2008 Academic Excellence Indicator System (AEIS) campus staff statistics file.
Notes. Principals who serve dual roles—principals and R-Tech facilitators—are included in the campus-level response rates for both groups. The student survey was only administered in spring 2009.
[a]The percentage of R-Tech campuses with survey respondents (N=115 for both fall and spring).
[b]The ratio of survey respondents to the total number of individuals in the respondent group, expressed as a percentage.
[c]Variations in the number of facilitators per campus across R-Tech districts prevented the calculation of a facilitator-level response rate.
[d]The teacher-level response rate is calculated as the ratio of teachers responding to the survey to the total number of teachers working on R-Tech campuses as reported in the 2008 TEA AEIS campus statistics data files, expressed as a percentage. 2007-08 data are used as a proxy for 2008-09 staffing patterns.
[e]The student-level response rate is calculated as the ratio of students participating in the spring survey to the total number of unique students included in data uploads to TEA for the summer 2008, fall 2008, and spring 2009 reporting periods, expressed as a percentage. Students included in multiple uploads were included only once in the calculation.

In spite of weaker response rates to spring 2009 surveys of principals, R-Tech facilitators, and teachers, the second interims report's discussions of survey findings focus more heavily on spring results because spring respondents had greater awareness of the R-Tech program and its effects. As noted in the previous section, R-Tech implementation varied across the program's first year, and many districts delayed implementing services until the spring 2009 semester. Comparisons of fall and spring survey responses indicate that many respondents to the fall survey had little of knowledge of the R-Tech program in their districts. In recognition of this limitation, some findings from the fall 2008 surveys are included in appendices, and chapter discussions focus on results from spring 2009 surveys. In other cases, however, report chapters present parallel findings for the fall and spring surveys as a means to demonstrate changes in respondents' understandings and perceptions of the R-Tech program across its first implementation year.

THE ONGOING EVALUATION

The ongoing evaluation will offset many of the limitations discussed in the previous sections. The final evaluation report (fall 2010) will expand to include a broader range of student outcome indicators, including course completion, attendance, and graduation rates in R-Tech districts, and will provide a more complete understanding of R-Tech's effects on student achievement. The final evaluation report will also present information about districts' full use of grant funding and will link the use of funding as well as program configurations to student outcomes, such as TAKS scores and graduation rates, which will enable a more complete understanding of variations in program cost effectiveness.

The ongoing evaluation will include surveys of R-Tech facilitators, principals and teachers on R-Tech campuses, and students receiving R-Tech services administered in spring 2010, when programs are fully implemented and respondents have greater awareness of R-Tech and its effects. The spring 2010 surveys will provide information about second year implementation of R-Tech, the continued challenges and successes of implementation, as well as changes in respondents' roles in implementation and perceptions of program effects. The spring 2010 surveys will also ask principals and R-Tech facilitators to identify the type of R-Tech program implemented in their districts using the researcher-identified program categories discussed earlier in this chapter, and whether their programs are supplemental or implemented as part of classroom instruction (i.e., non-supplemental). Survey responses will provide more information about the types of R-Tech programs offered and allow researchers to more fully assess the effect of program configuration on student outcomes and cost effectiveness.

In addition, the final evaluation report will include information from a second set of site visits to R-Tech districts, conducted in spring 2010. Second year site visits will include interviews with principals and R-Tech facilitators, focus group discussions with teachers and students receiving R-Tech services, as well as observations of R-Tech service delivery. The spring 2010 site visits will provide detailed information about how R-Tech implementation may have changed in its second year, and how changes may affect program outcomes.

THE STRUCTURE OF THE SECOND INTERIM EVALUATION REPORT

The second interim report for the R-Tech evaluation is organized as follows:

- Chapter 1 provides background on the R-Tech grant, introduces the evaluation's research questions, and reviews the literature on the role of technology-based instruction in improving outcomes for rural districts, as well as the challenges to assessing the effects of supplemental instruction. The chapter also discusses the report's data sources, methodologies, and limitations, and includes information on the ongoing evaluation.
- Chapter 2 presents descriptive information about the characteristics of Cycle 1 grantee districts and campuses implementing the R-Tech program, including information about staff and students.
- Chapter 3 discusses first year implementation of R-Tech in Cycle 1 districts. It provides a detailed discussion of the types of programs districts implemented during the R-Tech's first year, as well as stakeholder roles in program implementation. The chapter also discusses the challenges districts experienced in implementing R-Tech and strategies for overcoming challenges.
- Chapter 4 includes information about R-Tech's effects on students drawn from student upload and PEIMS data, surveys with program stakeholders and site visit interviews and focus group discussions, and includes information about the characteristics of students receiving R-Tech services, the barriers that may limit student participation in the program, strategies for overcoming barriers to participation, and the benefits and challenges of student participation.
- Chapter 5 presents findings of R-Tech's effects on teachers and includes information about professional development provided in support of the grant, as well as the effects of R-Tech on classroom instruction.

- Chapter 6 provides preliminary information about R-Tech's effects on students' 2009 TAKS scores and how differences in districts' program configurations may affect outcomes.
- Chapter 7 presents preliminary information about how R-Tech districts allocate state grant funding and how different implementation strategies may influence the program's cost effectiveness.
- Chapter 8 presents a summary of findings relative to each of the evaluation's research questions, and discusses the policy implications suggested by the second interim report's findings. The chapter also includes a discussion of the ongoing evaluation.
- Appendix A provides a detailed discussion of survey administration processes as well as response rates for the evaluation's online surveys of principals on R-Tech campuses and program facilitators. The appendix also includes supplemental tables that provide additional information about results cited in report chapters and copies of the fall 2008 and spring 2009 surveys.
- Appendix B includes a discussion of survey administration procedures and response rates for the evaluation's online survey of teachers working on R-Tech campuses. The chapter includes a copy of the teacher survey and supplemental tables that provide additional information about findings included in report chapters.
- Appendix C presents survey administration procedures and response rates for the spring 2009 online survey of students who received R-Tech services during the program's first implementation year, as well as a copy of the survey.
- Appendix D describes how site visit districts were identified and provides information about site visit activities, as well as a brief description of the programs implemented in site visit districts.
- Appendix E presents evaluation findings for technology-based dual credit programs offered as part of R-Tech, including the characteristics of students participating in dual credit courses, the challenges districts experience in implementing such courses, how challenges may be overcome, and students' perceptions of dual credit offerings.
- Appendix F provides technical information about the HLM analyses presented in chapter 6, including supplementary tables that provide detailed information about regression variables and model results.

CHAPTER 2
THE CHARACTERISTICS OF R-TECH DISTRICTS AND CAMPUSES

In considering how R-Tech is implemented across districts and schools (Research Question 1), it is important to understand the characteristics of districts and schools that participate in the grant, as well as the characteristics of the students who attend them. In the competitive selection process for R-Tech grantees, TEA established that priority would be given to districts that (1) represented diverse geographical regions of the state, (2) demonstrated academic need in terms of state accountability ratings, (3) had sufficient infrastructure to implement R-Tech, and (4) had large proportions of middle school and high school students who would participate in the project (TEA, 2008a). Sixty-seven districts applied for R-Tech Cycle 1 grant funding, and TEA awarded grants to 64 districts in the spring of 2008. Of the 64 original R-Tech grantees, one district opted not to participate in the grant and a second indicated it had deferred implementation to the 2009-10 school year, which reduced the total number of Cycle 1 grantees to 62 districts and 115 campuses in 2008-09.

This chapter presents information about the 62 districts awarded R-Tech funding, and the 115 schools participating in R-Tech. The chapter considers the geographical distribution of grantee districts, the accountability ratings of participating districts and schools, the characteristics of students and teachers in R-Tech schools, as well as the academic performance of R-Tech schools relative to TEA-identified peer comparison campuses[1] included in AEIS files and statewide averages. The chapter relies on data collected through Texas' archival data sources PEIMS and AEIS for the 2007-08 school year.[2] As noted in chapter 1, PEIMS contains demographic and performance data on all students enrolled in Texas public schools, as well as information about schools' organizational, staffing, and financial characteristics. AEIS contains information about the academic performance and accountability ratings of each of the state's districts and schools.

CHARACTERISTICS OF R-TECH DISTRICTS

Of the 115 schools participating in R-Tech Cycle 1 grants, 59 were high schools, 46 were middle schools, 7 were elementary schools,[3] 2 campuses served PK through 12 students, and 1 campus served Grades 6 through 12. While all R-Tech districts enrolled fewer than 5,000 students during the 2007-08 school year, there was a substantial range in district size, with the smallest district enrolling 208 students and the largest enrolling 4,854 students. On average, R-Tech districts enrolled 1,614 students, and R-Tech campuses enrolled 408 students. Statewide these averages were 3,900 and 617, respectively.[4]

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[1]TEA-identified peer comparison campuses serve student populations that are similar to those served by R-Tech campuses.
[2]The 2007-08 PEIMS and AEIS data were the most current data available at the time of second interim report's writing.
[3]All seven elementary schools included Grade 6. In addition, one elementary school also included Grades 7 and 8.
[4]State district average excludes R-Tech districts; state campus average excludes R-Tech campuses and campuses characterized as elementary programs in 2007-08 AEIS data files.

Statewide Distribution of R-Tech Districts

Analysis of R-Tech districts by Education Service Center (ESC) region is a useful means by which to examine the distribution of the program within the state. The Texas Education Code (TEC § 8.001) provides for the establishment of 20 regional ESCs throughout the state to assist districts with educational and operational matters. ESC's regional boundaries are set by the Commissioner of Education and are designed such that each public school district has the opportunity to access ESC services. Figure 2.1 maps the regions served by each of Texas' 20 ESCs.

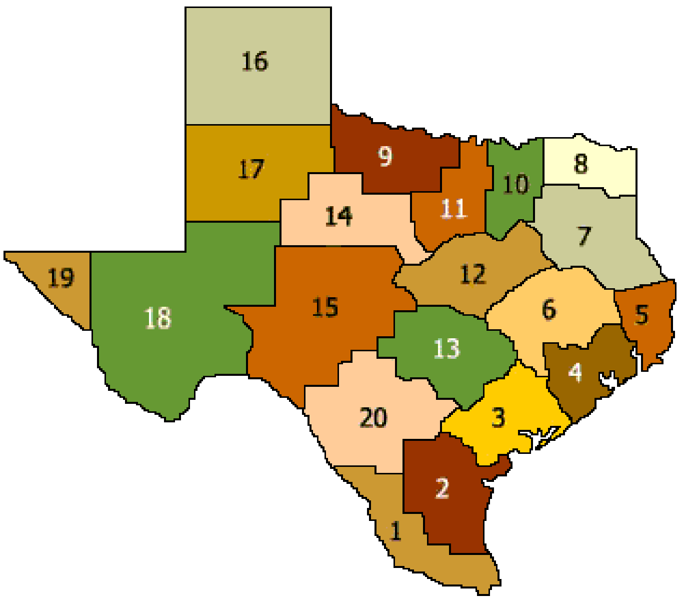

Figure 2.1. Texas' Education Service Center regions
Source: Texas Education Agency, 2008

As presented in Table 2.1, R-Tech districts were widely distributed across the state, with the largest proportion (9 districts or 15%) located in the area served by the ESC Region 10 (Richardson). The only regions of the state that did not include R-Tech districts were ESC Region 9 (Wichita Falls) and ESC Region 19 (El Paso).

Table 2.1
R-Tech Districts, by ESC Region: Fall 2008 and Spring 2009

ESC Region	Location	Number of R-Tech Districts	Percentage of R-Tech Districts
Region 1	Edinburg	2	3.2%
Region 2	Corpus Christi	3	4.8%
Region 3	Victoria	1	1.6%
Region 4	Houston	5	8.1%
Region 5	Beaumont	5	8.1%
Region 6	Huntsville	4	6.5%
Region 7	Kilgore	6	9.7%
Region 8	Mt. Pleasant	3	4.8%
Region 9	Wichita Falls	0	0.0%
Region 10	Richardson	9	14.5%
Region 11	Ft. Worth	2	3.2%
Region 12	Waco	2	3.2%
Region 13	Austin	4	6.5%
Region 14	Abilene	2	3.2%
Region 15	San Angelo	2	3.2%
Region 16	Amarillo	4	6.5%
Region 17	Lubbock	1	1.6%
Region 18	Midland	2	3.2%
Region 19	El Paso	0	0.0%
Region 20	San Antonio	5	8.1%
Total		**62**	**100.0%**

Source: 2007-08 Academic Excellence Indicator System Campus Reference file.

2008 Accountability Ratings of R-Tech Districts

In addition to geographic diversity, R-Tech districts were selected because their 2007 accountability ratings indicated a need for educational services designed to improve student achievement. Table 2.2 presents district level accountability ratings for R-Tech districts in 2008 as well as state averages. R-Tech districts lagged state averages in the proportions of districts rated Exemplary, Recognized, Academically Unacceptable, and in the proportion that were not rated. However, R-Tech districts exceeded the state average in terms of the proportion of districts rated Academically Acceptable. While about 6% of Texas districts received accountability ratings under the state's alternative education accountability (AEA) procedures designed for districts that serve large proportions of students at risk of failure, no R-Tech district was characterized as an AEA district in 2008.

Table 2.2
District Accountability Ratings, by R-Tech District and State Averages: Fall 2007 and Spring 2008

	R-Tech Districts		State
Rating Category	N	%	Average[a]
Standard Accountability Procedures			
Exemplary	0	0.0%	3.7%
Recognized	13	21.0%	27.1%
Academically Acceptable	49	79.0%	60.3%
Academically Unacceptable	0	0.0%	2.6%
Not Rated: Other	0	0.0%	0.3%
Alternative Education Accountability (AEA) Procedures			
AEA: Academically Acceptable	0	0.0%	5.6%
AEA: Academically Unacceptable	0	0.0%	0.2%
AEA: Not Rated-Other	0	0.0%	0.3%
Total	**62**	**100.0%**	**100.0%**

Source: 2007-08 Academic Excellence Indicator System District Reference file.
[a]State averages omit R-Tech districts.

CHARACTERISTICS OF R-TECH CAMPUSES

2008 Accountability Ratings of R-Tech Campuses

Table 2.3 presents the 2008 campus-level accountability ratings for R-Tech schools as well as schools statewide. R-Tech campuses lagged the state average in the proportion of schools rated Exemplary, but exceeded state averages in terms of the proportion of schools rated Recognized and the proportion rated Academically Acceptable. In contrast to district-level ratings, a larger percentage of R-Tech campuses than campuses statewide received Academically Unacceptable ratings. While no R-Tech *district* was characterized as an AEA program in 2008, two R-Tech *campuses* were designed to serve at-risk students and registered as AEA programs—both of which received the AEA Academically Acceptable rating.

Table 2.3
Campus Accountability Ratings, by R-Tech Campus and State Averages: Fall 2007 and Spring 2008

Rating Category	R-Tech Campuses[a]		State Average[b]
	N	%	
Standard Accountability Procedures			
Exemplary	3	2.6%	4.1%
Recognized	29	25.4%	17.4%
Academically Acceptable	70	61.4%	52.1%
Academically Unacceptable	10	8.8%	3.1%
Not Rated: Other	0	0.0%	12.4%
Alternative Education Accountability (AEA) Procedures			
AEA: Academically Acceptable	2	1.8%	10.2%
AEA: Academically Unacceptable	0	0.0%	0.4%
AEA: Not Rated: Other	0	0.0%	0.3%
Total	**114**	**100.0%**	**100.0%**

Source: 2007-08 Academic Excellence Indicator System (AEIS) Campus Reference file.
[a]There were no 2007-08 AEIS data for Mabank Intermediate School.
[b]State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

Student and Teacher Characteristics in R-Tech Districts

Student characteristics. National statistics indicate that students attending rural schools are more likely to be White and less likely to be characterized as limited English proficient (LEP) than students in other locales. Nationally, rural schools enroll roughly similar proportions of special education students as other areas, and with the exception of suburban schools, rural schools enroll smaller proportions of economically disadvantaged students than other areas (NCES, 2007). As presented in Table 2.4, R-Tech campuses reflect national trends in terms of the types of students they enroll. Relative to state averages, R-Tech campuses enrolled a notably larger percentage of White students and a notably smaller percentage of Hispanic students, a smaller proportion of LEP students, a somewhat larger proportion of special education students, and a somewhat smaller percentage of economically disadvantaged students.

Table 2.4
R-Tech Student Characteristics, by R-Tech Campus and Statewide Averages:[a] Fall 2007 and Spring 2008

Student Group	R-Tech Campuses[a]	Statewide Average[b]
African American	9.3%	14.8%
Hispanic	27.0%	44.0%
White	62.6%	37.3%
Other	1.0%	3.8%
Economic disadvantage	46.9%	49.0%
Special education	13.2%	11.4%
Limited English proficient	3.2%	8.2%

Source: The Academic Excellence Indicator System (AEIS) 2008 Campus Student Statistics data file.
[a]There are no 2007-08 AEIS data for Mabank Intermediate School.
[b]State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

Teacher characteristics. National statistics indicate that rural districts tend to employ fewer teachers from minority backgrounds, as well as more experienced teachers than districts in other locales (NCES, 2007). Table 2.5 presents the characteristics of teachers working on R-Tech campuses with state averages. Similar to rural schools nationally, teachers in R-Tech districts were less likely to be from an ethnic minority and tended to have more experience, on average, than teachers statewide. Relative to state averages, R-Tech districts employed a larger percentage of teachers with 11 or more years of experience and a smaller percentage of teachers with 5 or fewer years of experience. A somewhat smaller percentage of teachers in R-Tech districts had advanced degrees, and, on average, R-Tech teachers worked with slightly smaller class sizes than teachers statewide. R-Tech districts also enjoyed lower rates of teacher turnover than did districts statewide.

Table 2.5
Teacher Characteristics, by R-Tech Campus and Statewide Average: Fall 2007 and Spring 2008

Teacher Characteristic[a]	R-Tech Campuses Average[b]	Statewide Average[c]
African American	2.9%	10.8%
Hispanic	9.7%	17.4%
White	86.8%	70.3%
Teacher average years of experience[d]	12.8	11.5
Teacher tenure in years[d]	7.1	6.8
Beginning teachers[e]	7.9%	8.6%
1-5 years experience	23.4%	29.0%
6-10 years experience	18.2%	19.2%
11-20 years experience	26.7%	23.5%
More than 20 years experience	23.8%	19.7%
Teachers with no degree[f]	0.8%	0.8%
Teachers with advanced degrees[f]	17.4%	21.6%
Average beginning teacher salary[d]	$33,590	$37,666
Average teacher salary[d]	$42,280	$44,646
Teacher annual turnover rate[f]	19.1%	20.9%
Students per teacher (average) [d]	12.0	12.7

Sources: 2008 Academic Excellence Indicator System (AEIS) Campus Staff Statistics and District Staff Statistics data files.
[a]The percentages of teachers by ethnicity, level of experience, and degree status are based on actual counts of teachers. The average years of experience, tenure in years, average salaries, annual turnover rate, and students per teacher are averages across campuses or districts.
[b]There are no 2007-08 AEIS staff data for Mabank Intermediate School.
[c]State averages calculated at the district level omit R-Tech districts, and averages calculated at the campus level omit R-Tech campuses, campuses characterized as elementary programs in AEIS data files, and masked data values.
[d]2007 TEA AEIS campus staff statistics file.
[e]A beginning teacher is a teacher with 0 years of reported experience.
[f]2007 TEA AEIS district staff statistics file.

The Academic Performance of R-Tech Campuses

The following sections provide baseline data[5] on R-Tech campuses' academic performance. TAKS results are for the 2007-08 school year. Results for the other performance indicators are for the 2006-07 school year. Performance indicators include TAKS passing rates and commended performance rates, attendance, dropout, and mobility rates, advanced course completion rates, graduation rates, Recommended High School Program (RHSP)[6] completion rates, college entrance examination results, and college readiness indicators. Reported values are averages of campus-level measures for R-Tech campuses, the state (state average omitting R-Tech campuses and campuses characterized as elementary programs in AEIS data files), and TEA-identified peer campuses.

TAKS performance. Table 2.6 and Figure 2.2 provide 2007-08 campus-level TAKS performance comparisons for students enrolled in R-Tech campuses. In the tested subject areas, overall TAKS performance in R-Tech schools was slightly above state averages in science, all tests taken, reading/English language arts (ELA), and social studies, and equal to the state average in mathematics and writing. Compared to peer campuses, R-Tech overall TAKS performance was somewhat lower in all tested areas.

R-Tech 2007-08 commended performance rates tended to be lower than state and peer campus averages. Compared to state averages, R-Tech commended performance rates were from 2 to 4 percentage points lower. Compared to peer campus averages, R-Tech commended performance rates were from 2 to 5 percentage points lower. Finally, the percentages of African American, Hispanic, White, and economically disadvantaged students passing all TAKS tests at R-Tech campuses were from 1 to 5 percentage points lower than state averages.

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[5]Baseline indicators are measures of school characteristics and performance prior to program implementation. Such measures provide a "baseline" from which to assess program effects.

[6]See http://www.tea.state.tx.us/teks/handbook/gradreq.pdf for the Recommended High School Program graduation requirements.

Table 2.6
Average TAKS Performance, by R-Tech Campuses, Peer Comparison Campuses, and State Public School Campuses: Fall 2007and Spring 2008

Category	R-Tech Campus Average	Peer Campus Average	State Average	R-Tech - Peer Difference[a]	R-Tech - State Difference[a]
Students Passing TAKS					
All Tests Taken	67%	71%	66%	-4	+1
Reading/ELA	91%	93%	90%	-2	+1
Mathematics	75%	80%	75%	-5	0
Science	71%	75%	69%	-4	+2
Social Studies	90%	93%	89%	-3	+1
Writing	92%	95%	92%	-3	0
Students Attaining Commended Performance					
All Tests Taken	10%	12%	13%	-2	-3
Reading/ELA	31%	34%	33%	-3	-2
Mathematics	19%	24%	23%	-5	-4
Science	16%	18%	18%	-2	-2
Social Studies	29%	34%	33%	-5	-4
Writing	31%	36%	34%	-5	-3
Students Passing All Tests Taken					
African American	51%	NA	56%	NA	-5
Hispanic	59%	NA	61%	NA	-2
White	74%	NA	77%	NA	-3
Econ. disadvantage	58%	NA	59%	NA	-1

Sources: Data are from 2007-08 Academic Excellence Indicator System (AEIS) Campus Texas Assessment of Knowledge and Skills (TAKS) data files.
Notes. Data are averages across campuses. State averages omit R-Tech campuses characterized as elementary programs in AEIS data files.
NA=Not applicable. Data are not available from the AEIS campus TAKS files.
[a]The differences between R-Tech and peer campuses and R-Tech campuses and state averages are in percentage points.

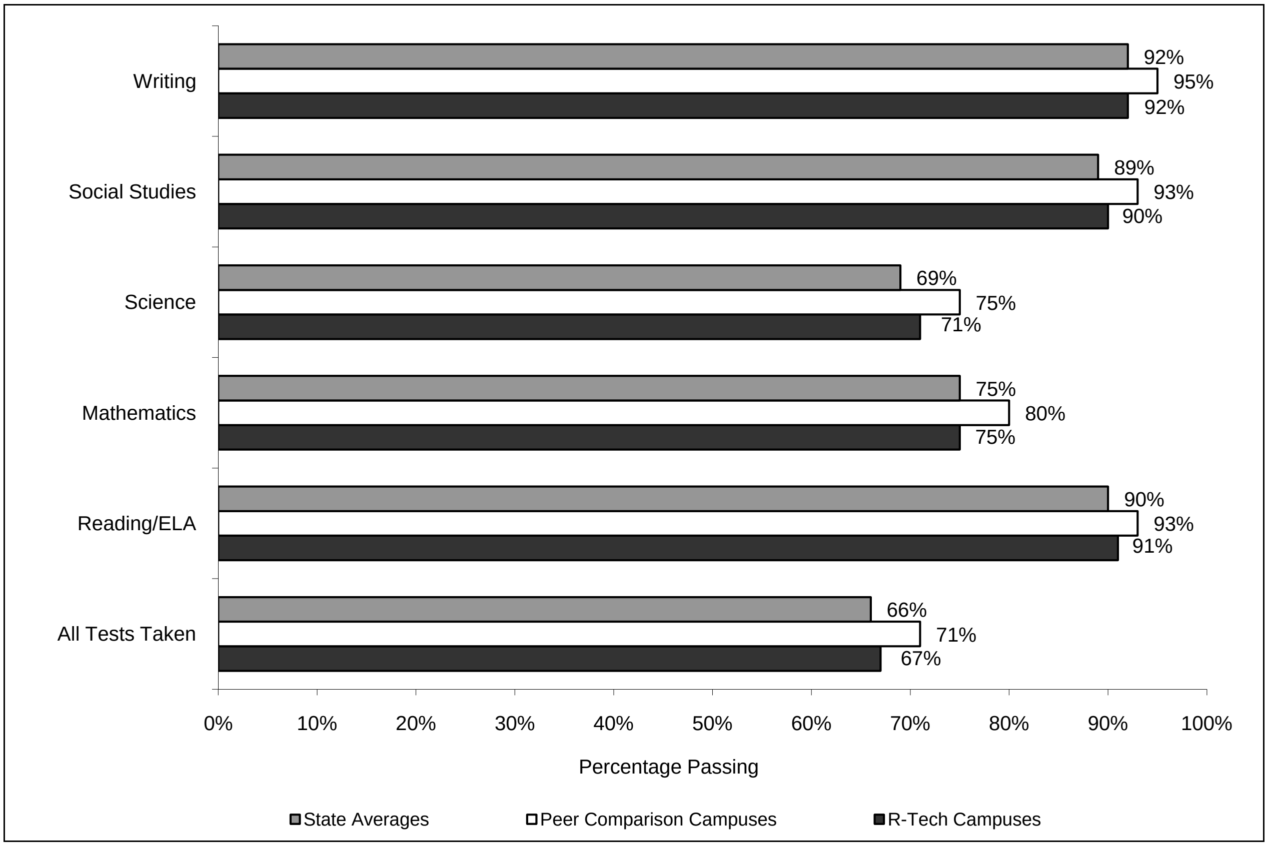

Figure 2.2. Average campus-level TAKS passing rates, by R-Tech campuses, peer comparison campuses, and state averages: fall 2007 and spring 2008
Sources: Data are from 2007-08 Academic Excellence Indicator System (AEIS) Campus Texas Assessment of Knowledge and Skills (TAKS) data files.
Notes. Data are averages across campuses. State averages omit R-Tech campuses characterized as elementary programs in AEIS data files.

Comparisons by grade provide a more detailed picture of TAKS performance. In Table 2.7, the 2007-08 TAKS passing rates for R-Tech campuses were compared by content area, grade level, and comparison group. Grade-level comparisons for R-Tech campuses and state averages show that high school R-Tech campuses (Grades 9-11) performed from 0 to 5 percentage points higher than state averages. However, middle school campuses (Grades 6-8) performed from 1 percentage point lower to 1 percentage point higher than state averages. Grade-level comparisons for R-Tech campuses and peer campuses show that R-Tech campuses were performing below their peers at all grade levels and in all tested areas. The largest deficits were in mathematics and “all tests taken.”

Table 2.7
Average TAKS Passing, by R-Tech Campuses, Peer Comparison Campuses, and State Public School Campuses and by Content Area and Grade Level: Fall 2007 and Spring 2008

Grade	R-Tech Campus Average	Peer Campus Average	State Average	R-Tech - Peer Difference[a]	R-Tech – State Difference[a]
Reading/ELA					
6	92	95	92	-3	0
7	87	91	87	-4	0
8	94	96	93	-2	+1
9	90	92	85	-2	+5
10	90	92	86	-2	+4
11	90	93	88	-3	+2
Mathematics					
6	80	86	80	-6	0
7	79	85	79	-6	0
8	77	84	78	-7	-1
9	63	69	63	-6	0
10	64	68	63	-4	+1
11	79	82	75	-3	+4
Science					
8	67	72	67	-5	0
10	65	67	62	-2	+3
11	82	83	77	-1	+5
Social Studies					
8	88	93	88	-5	0
10	88	90	85	-2	+3
11	95	97	92	-2	+3
Writing					
7	93	95	92	-2	+1
All Tests Taken					
6	77	84	78	-7	-1
7	73	79	74	-6	-1
8	60	67	61	-7	-1
9	63	68	62	-5	+1
10	52	55	51	-3	+1
11	72	74	68	-2	+4

Sources: Data are from 2007-08 Academic Excellence Indicator System (AEIS) Campus Texas Assessment of Knowledge and Skills data files.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.
[a]The R-Tech minus peer differences and the R-Tech minus state differences are in percentage points.

Attendance rates. Student attendance rates at R-Tech campuses were above the state average and slightly below the peer campus average (see Table 2.8). R-Tech campuses exceeded the state average by one and four-tenths percentage points and trailed the peer campus average by one half of a percentage point.

Table 2.8
Attendance Rates, by Comparison Group: Fall 2006 and Spring 2007

Group	Attendance Rate
R-Tech campuses	95.1%
Peer comparison campuses	95.6%
State average	93.7%

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus Non-Texas Assessment of Knowledge and Skills Performance Indicators data file and are for school year 2006-07.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

Dropout rates. The 2006-07 R-Tech campus dropout rates at Grades 7 and 8 and Grades 9 through 12[7] were lower than state averages but slightly higher than peer campus averages (See Table 2.9). The average R-Tech campus dropout rate for Grades 7 and 8 was lower than the state average by four-tenths of a percentage point, but higher than the peer campus rate by one-tenth of a percentage point. The Grades 9 through 12 dropout rate for R-Tech campuses was lower than the state average by one and seven-tenths percentage points but exceeded the peer campus average by four-tenths of a percentage point.

Table 2.9
Dropout Rates, by Comparison Group: Fall 2006 and Spring 2007

Group	Dropout Rate Grades 7 and 8	Dropout Rate Grades 9 Through 12
R-Tech campuses	0.1%	2.1%
Peer comparison campuses	0.0%	1.7%
State average	0.5%	3.8%

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus Non-Texas Assessment of Knowledge and Skills Performance Indicators data file and are for school year 2006-07.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

Student mobility. A student is considered to be mobile if he or she has missed 6 or more weeks at a particular school. Campus student mobility is determined by dividing the number of mobile students during the school year by the number of students who were in membership at any time during the school year (2006-07 AEIS Glossary, TEA). Figure 2.3 shows the average campus mobility rates of R-Tech schools, peer campuses, and the state average (with R-Tech and elementary campuses removed) from 2004 through 2007. Students were less mobile at R-Tech campuses compared with state averages, but slightly more mobile than students at peer campuses. The mobility rates at R-Tech campuses were about 15 to 16 percentage points lower than the state average, but about 1 to 2 percentage points higher than the mobility rates at peer campuses.

[7] TEA reports separate dropout rates for Grades 7 and 8 and for Grades 9 through12. Reports for secondary campuses evaluated under standard accountability procedures show both of these rates.

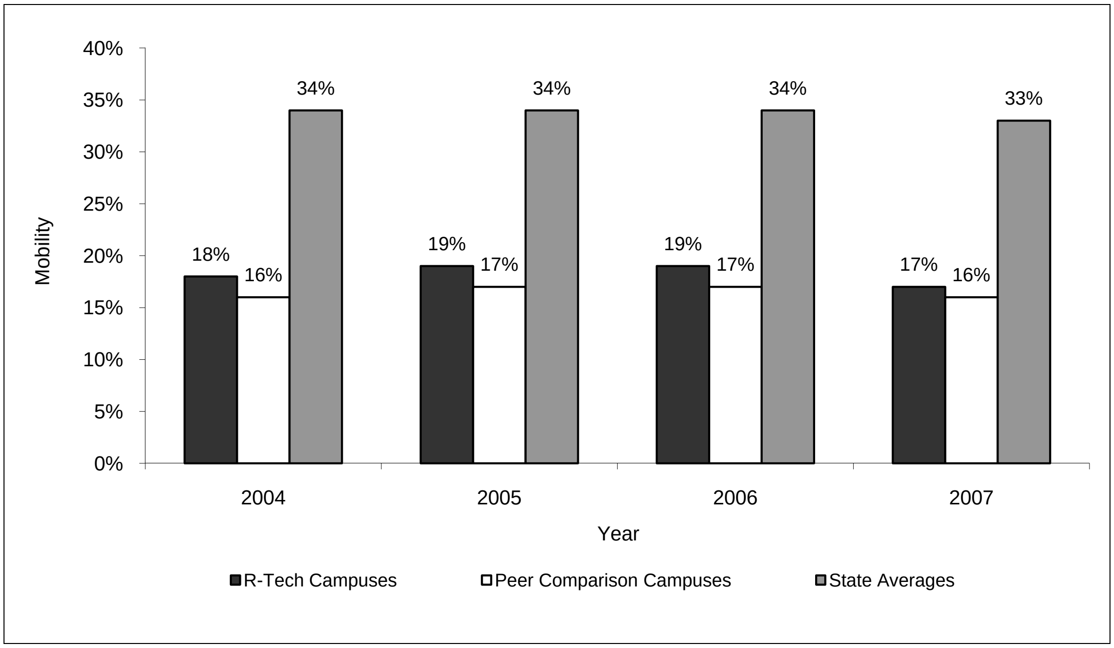

Figure 2.3. Campus-level mobility rates by R-Tech campuses, peer campuses, and state averages: fall 2007 and spring 2008.
Source: Data are from 2007-08 Academic Excellence Indicator System (AEIS) Campus Student Statistics data file.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

Advanced course performance. Table 2.10 presents information on the percentage of students who completed and received credit for at least one advanced course at R-Tech campuses that enrolled students in Grades 9 or higher. Advanced courses include Advanced Placement (AP) and International Baccalaureate courses along with higher-level core content area courses (e.g., pre-calculus, research/technical writing, economics advanced studies), advanced elective courses (e.g., French IV, Theatre Arts IV, Music IV Jazz Band), and dual credit courses for which a student may receive both high school and college credit. Advanced course completion is calculated by dividing the number of students who received credit for at least one advanced or dual credit academic course by the number of students who received credit for at least one course during the school year.

Table 2.10
Advanced Course Completion Rates, by Comparison Group: Fall 2006 and Spring 2007

Group	R-Tech Campuses	Peer Comparison Campuses	State Average
African American	11.3%	NA	12.1%
Hispanic	12.7%	NA	13.2%
White	21.3%	NA	19.5%
Economically disadvantaged	11.8%	NA	11.9%
All students	**17.7%**	**18.3%**	**15.8%**

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus Non-Texas Assessment of Knowledge and Skills (TAKS) Performance Indicators data file and are for school year 2006-07.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.
NA=Not applicable. Data are not available from the AEIS campus non-TAKS performance indicators data file.

Compared to peer campuses, R-Tech campuses had a slightly lower average of advanced course completions (less than 1 percentage point lower). However, compared to the state average, R-Tech campuses had a slightly higher percentage of advanced course completions (nearly 2 percentage points higher). R-Tech campuses also had a slightly higher percentage of advanced course completions for White students. However, Hispanic, economically disadvantaged, and African American students at R-Tech campuses completed advanced courses at slightly lower rates than the state average.

Graduation and Recommended High School Program completion rates. Outcome measures such as graduation rates and RHSP[8] completion rates also reflect student and campus performance. Findings for these measures by comparison group are presented in Table 2.11. The 2006-07 R-Tech high school graduation rate was higher than the state overall, and similar to the peer campus rate. Specifically, the R-Tech graduation rate was 88%, while the state rate was 75%, and the peer campus rate was 88%. Another measure of academic readiness is the RHSP completion rate. In 2006-07, the RHSP required 24 credits and more rigorous elective courses (e.g., fine arts, languages other than English) than the 22-credit minimum graduation plan.[9] Compared to the state average, a higher percentage of R-Tech students completed the RHSP in 2006-07. Compared to peer campuses, a lower percentage of R-Tech students completed the RHSP in 2006-07.

Table 2.11
Graduation Rates and Recommended High School Program Completion Rates, by Comparison Group: Fall 2006 and Spring 2007

Group	Graduation Rate	RHSP Completion Rate
R-Tech campuses	88.2%	73.3%
Peer comparison campuses	88.1%	77.1%
State average	75.3%	69.0%

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus Non-Texas Assessment of Knowledge and Skills Performance Indicators data file and are for school year 2006-07.
Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.
The graduation rate at a campus is calculated by dividing the number of students who received a high school diploma by the end of the cohort's graduation year by the number of students in the original cohort. The Recommended High School Program rate is calculated by dividing the number of graduates with graduation codes for *Recommended High School Program* or *Distinguished Achievement Program* by the number of graduates.

College entrance examinations. College entrance examination scores are reported to TEA; the Agency then reports the percentage of students taking examinations and average examination scores by campus. Data are reported when students are scheduled to be seniors, regardless of when examinations are taken. One factor that may influence college entrance examination results is the percentage of students taking the examinations. Lower percentages of students taking examinations may be associated with higher average scores. As presented in Table 2.12, the percentage of R-Tech seniors taking college entrance examinations was 63% in 2006-07. This was higher than the state average (56%) but lower than the peer campus average (67%). SAT average scores were lowest for R-Tech campuses (953 vs. 973 for peer campuses and 962 for the state). ACT average scores were highest for peer campuses (20.0), followed by R-Tech campuses (19.6) and the state (19.6).

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[8]See http://www.tea.state.tx.us/teks/handbook/gradreq.pdf for the Recommended High School Program graduation requirements.
[9]Texas expanded the RHSP to include 26 credits in 2007-08.

Table 2.12
SAT and ACT College Entrance Examination Scores, by Comparison Group: Fall 2006 and Spring 2007

Group	Percentage Taking SAT or ACT[a]	SAT Average	ACT Average
R-Tech campuses	62.9%	953	19.6
Peer comparison campuses	67.2%	973	20.0
State average	55.7%	962	19.6

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus College Admissions, College-ready Graduates data file and are for school year 2006-07.
Notes. Data are campus averages across students who took the Scholastic Aptitude Reasoning Test (SAT) or the ACT. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files
[a]The percentage is calculated by dividing the number of graduates who took either the SAT or ACT by the number of non-special education graduates.

College readiness. The 2006-07 AEIS data included a new indicator of college readiness—the percentage of college-ready graduates. This indicator is a measure of progress toward preparation for postsecondary success. To be considered college ready as defined by this indicator, a graduate must have met or exceeded specified criteria on the exit-level TAKS test, SAT, or ACT. These criteria are listed in Table 2.13.

Table 2.13
College-Readiness Indicators and Criteria, by Exam and Subject Area: Fall 2006 and Spring 2007

Subject	Exit-level TAKS		SAT		ACT
ELA	>= 2200 scale score on ELA test AND a “3” or higher on the essay	OR	>= 500 on Critical Reading AND >= 1070 Total	OR	>= 19 on English AND >= 23 Composite
Mathematics	>= 2200 scale score on mathematics test	OR	>= 500 on Math AND >= 1070 Total	OR	>= 19 on Math AND >= 23 Composite

Source: AEIS Glossary, p.10, November 2007.

As Table 2.14 indicates, the percentages of 2006-07 R-Tech graduates who were college ready were similar to state averages but lower than peer campus averages. For example, in mathematics, 49% of R-Tech graduates were college ready compared to 49% across the state and 54% at peer campuses. In reading, 42% of R-Tech graduates were college ready compared to 41% across the state and 46% at peer campuses.

Table 2.14
College Readiness Indicators, by Comparison Group: Fall 2006 and Spring 2007

Group	College Ready Mathematics	College Ready Reading	College Ready Both Subjects
R-Tech campuses	48.9%	41.6%	28.9%
Peer comparison campuses	54.3%	45.8%	33.0%
State average	48.6%	41.4%	29.4%

Source: Data are from the 2007-08 Academic Excellence Indicator System (AEIS) Campus College Admissions, College-Ready Graduates data file and are for school year 2006-07.

Notes. Data are averages across campuses. State averages omit R-Tech campuses and exclude campuses characterized as elementary programs in AEIS data files.

SUMMARY

Compared to state averages, R-Tech campuses enrolled a higher percentage of White students but lower percentages of African American, Hispanic, and LEP students. R-Tech campuses and state averages were similar for percentages of economically disadvantaged and special education students. Compared to state averages, R-Tech campuses employed higher percentages of White teachers and lower percentages of minority teachers. R-Tech teachers tended to have more experience, but proportionately fewer had advanced degrees. R-Tech teacher salaries and turnover rates and class sizes were lower than state averages.

R-Tech campuses performed better than state averages on most of the indicators of academic performance. For example, R-Tech campuses had generally higher TAKS passing rates and a higher attendance rate, a lower dropout rate, a lower mobility rate, a higher advanced course completion rate, a higher graduation rate, a higher RHSP completion rate, and a higher percentage of seniors taking college entrance exams. However, R-Tech campuses did not perform as well as peer campuses on any of these indicators. R-Tech campuses had TAKS passing rates that were below peer averages in all tested areas, lower SAT and ACT average scores, and lower percentages of college-ready graduates. It is important to note that the R-Tech selection process gave priority to campuses that demonstrated “an overall academic need.” With this as a mitigating factor, it is understandable why R-Tech campuses did not perform as well as demographically similar campuses.

CHAPTER 3
R-TECH IMPLEMENTATION

Considerable research has established that the manner in which schools implement programs designed to improve student achievement is closely associated with observed outcomes, and that commitment to program goals at the district and campus level, as well as teacher buy-in and support are critical to implementation quality (Berman & McLaughlin, 1978; Bifulco, Duncombe, & Yinger, 2005; Borman, 2005; Borman, Hewes, Overman, & Brown, 2003; Datnow, Borman, & Stringfield, 2000; Vernez, Karam, Mariano, & DeMartini, 2006; Yap, 1996). However, as discussed in chapter 1, supplemental instructional programs such as R-Tech are rarely implemented in a uniform manner. Differences in SES vendors, program goals, and implementation requirements make it difficult for researchers to identify whether supplemental programs are implemented effectively and whether implementation quality affects student outcomes.

This chapter provides information about how districts implement their R-Tech programs (Research Question 1), and considers the following questions:

- What types of programs do R-Tech grantees implement?
- What barriers limit the implementation of R-Tech programs in grantee schools?
- How are barriers to implementation overcome?

In addressing R-Tech implementation strategies, the chapter provides an overview of the implementation requirements included in R-Tech's enabling legislation and in TEA grant requirements. It defines the five types of programs identified by the evaluation and describes how districts structured their approaches to implementation, including stakeholder roles and responsibilities. The chapter further considers the barriers districts encounter in implementing R-Tech and how barriers may be overcome.

DATA SOURCES

To answer research questions, the chapter combines data collected through analysis of R-Tech documents, including grant applications and progress reports; surveys of principals, R-Tech facilitators, and teachers; as well as qualitative data collected through interviews with principals and program facilitators and focus group discussions with teachers conducted as part of site visits to eight R-Tech districts in spring 2009. The chapter also incorporates data provided by districts through TEA's R-Tech Student Upload data system.

OVERVIEW OF R-TECH PROGRAM REQUIREMENTS

In enacting R-Tech, legislators required that grantee districts provide technology-based supplemental instruction to students in Grades 6 through 12, and provide access to such instruction for at least 10 hours each week (TEC §29.919).[1] As noted in chapter 1, districts may use R-Tech funding to provide:

- Research based instructional support,
- Teacher training,
- Academic tutoring or counseling,
- Distance learning opportunities in the core content areas or in foreign languages, and
- Dual credit coursework in the core content areas or in foreign languages.

TEA grant application requirements further specify that R-Tech resources may "only" be used to support ELA, social studies, mathematics, science, or languages other than English (TEA, 2008b, p. 6). Application guidelines state that grantee districts provide students participating in R-Tech with a Personal Education Plan, or PEP, used to track students' progress, and require that districts employ program facilitators to support program implementation. R-Tech facilitators are expected to receive training in supplemental instruction products and support program implementation by monitoring student progress, managing reporting requirements, and ensuring student access to R-Tech resources (TEA, 2008b).

THE TYPES OF PROGRAMS IMPLEMENTED THROUGH R-TECH

As discussed in chapter 1, researchers analyzed R-Tech grant applications and progress reports submitted to TEA in order to classify R-Tech programs in terms of the types of instruction provided. This analysis produced the following categories of R-Tech programs:

1. Self-paced instruction focused on tutoring, remediation, or credit-recovery;
2. Dual credit and distance learning programs;
3. One-to-one tutoring with online instructional support;
4. School-wide technology immersion programs; and
5. Programs that provide students with iPods loaded with instructional content.

The identified categories are not discrete across districts. That is, districts may implement more than one type of program. R-Tech allows districts to implement different types of programs at the middle school and high school level, depending on student needs. For example, a district may implement a dual credit program for high school students and a self-paced tutoring program for middle school students.

Supplemental vs. Non-Supplemental Instruction

Although R-Tech was intended to provide *supplemental* instruction offered outside of regularly scheduled classes, the analysis of district grant applications and progress reports revealed that many districts chose to include R-Tech as part of regular instruction (i.e., non-supplemental instruction). For example, some districts used R-Tech funding to upgrade and expand computer labs, in which teachers scheduled class time to use R-Tech resources to support course content or to provide tutoring in preparation for TAKS testing. Some districts used R-Tech funding to purchase laptops that students used in class on a regular basis. Across the 63 Cycle 1 R-Tech districts, 34 districts (54%) implemented supplemental programs, and 25 districts (40%) implemented R-Tech as part of the regularly scheduled school day during the program's first year. Four districts (6%) had not fully implemented R-Tech in spring 2009, and it was unclear whether they would offer supplemental or non-supplemental programs.

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[1]Information on the number of hours students access R-Tech each week is included in chapter 4 (see Table 4.2)

The sections that follow provide more information about the types of programs districts implemented during R-Tech's first year, and whether R-Tech services were implemented as supplemental or non-supplemental programs. The categories of programs identified in this chapter are also incorporated in the preliminary analyses of R-Tech's effects on student TAKS outcomes (chapter 6) and the program's cost effectiveness (chapter 7).

Categories of R-Tech Programs

Table 3.1 provides information about the percentage of districts implementing each type of R-Tech program, and indicates that most districts designed self-paced programs using R-Tech funding (87%). A smaller percentage of districts implemented dual credit or distance learning programs (30%), and two districts (3%) implemented each of the remaining program types. The following sections describe the characteristics of R-Tech programs included in each category.

Table 3.1
The Percentage of R-Tech Districts by Program Type: Fall 2008 and Spring 2009

Types of R-Tech Programs	Districts (N=63)
Self-paced instruction	87.3%
Dual credit and/or distance learning	30.1%
One-to-one tutoring with online instructional support	3.2%
Technology immersion	3.2%
iPods with instructional content	3.2%

Sources: District grant applications and progress reports.
Note. Percentages will not total to 100; districts may implement more than one type of program.

Self-paced instructional programs. Self-paced instructional programs provide students with online lessons and tutorials that students work through at their own pace. Many programs provide diagnostic assessments in course content and route students to specific lessons that address areas of weakness. When students demonstrate competency in course content, generally through a test scored by the program, they move to subsequent lessons that address more advanced skills.

A range of R-Tech programs are included in the self-paced category in large part because the software packages that provide technology-based self-paced instruction are diverse in terms of the types of instruction offered and the subject areas addressed. For example, some self-paced programs provide technology-based tutoring, remediation, and credit-recovery programs for many subject areas (e.g., PLATO, OdysseyWare). Other programs focus on TAKS remediation across subject areas (e.g., A+nywhere Learning System), while others focus on specific subjects, such as ELA (e.g., MyStudyHall) or math (e.g., iSuceedMath). Still other programs provide self-paced instruction in social and behavioral issues (e.g., RippleEffects). Of the 55 districts that implemented self-paced instruction as part of R-Tech, most implemented supplemental programs (60% or 33 districts), providing instruction before or after school or at a time when students were not attending regular classes (e.g., study hall).

Dual credit and distance learning programs. Technology-based dual credit and distance learning programs enable high school students to take courses for which they earn both high school and college credit. Courses are generally taught by college faculty, and students participate in lessons online or through video conferencing arrangements. Such courses often require that students participate in online discussions through "chat rooms" and to submit coursework and complete exams electronically. High school students who participate in dual credit courses are not required to pay college tuition, and districts must cover the costs of college textbooks. Dual credit courses are increasingly seen as an effective means to increase the rigor of high school curricula and to enable high school students to accrue college credit. Such programs offset college costs by enabling students to earn credit without paying college tuition and fees, and may increase student interest in postsecondary education (Maloney, Lain, & Clark, 2009).

The districts that implemented dual credit and distance learning programs during R-Tech's first year partnered with a range of higher education institutions, including regional community colleges and state colleges and universities, as well as the Texas Rural Educational Development Consortium, or TxRED, to provide dual credit courses. Of the 18 districts offering dual credit instruction as part of R-Tech, 60% (12 districts) offered supplemental dual credit courses that students took in addition to their regularly scheduled classes. A comprehensive discussion of the implementation of technology-based dual credit offerings, including the characteristics of students who participate in coursework, the challenges to implementation and students' perceptions of courses is included in Appendix E.

One-to-one tutoring with online instructional support. Two R-Tech districts plan to offer R-Tech as tutoring programs in which tutors provide students with one-to-one instruction complemented by technology-based instructional support. Both districts have contracted services from TxRED, although neither district implemented its program for students during R-Tech's first year. At the time of this report's writing, it was not known whether one-to-one tutoring and support would be provided as supplemental programs or whether such support would be implemented as part of the regular school day; however, data collected for the evaluation's final report (fall 2010), should clarify whether such programs are implemented as part of regular instruction or as supplemental programs.

Technology immersion programs. Technology immersion programs generally provide all students and teachers with laptop computers loaded with instructional resources, as well as access to the Internet during the school day. Many such programs allow students to take computers home, extending access to instructional resources, and students with home Internet access may also use laptops for online instructional activities. Although challenging to implement effectively, research has shown that technology immersion programs have the potential to substantially improve students' academic outcomes, engagement in schooling, and proficiency using technology resources (Shapley, Sheehan, Maloney, & Caranikas-Walker, 2008). Both R-Tech districts offering technology immersion programs implemented non-supplemental programs, providing students with access to laptops and technology-based instructional resources as part of regularly scheduled classes.

iPods loaded with instructional content. Two Cycle 1 districts used R-Tech resources to provide students with iPods loaded with instructional programs. One district targeted its program to ELLs in an effort to improve students' language skills. The second district provided middle school students with iPods loaded with content in the core subject areas, as well as music and physical education content. Teachers provided students with assigned videos and followed up with activities to ensure students' understood the content they viewed. Both programs were implemented outside of the regular school day, and students were expected to view lessons at home. An ancillary effect of the ELL program was that students' parents also had access to lessons, which according to school administrators, has improved parents' language skills.

R-Tech Software Selections

The variety of software packages districts purchased using R-Tech funds also reveals the range of programs implemented through the grant. This section examines the software packages that districts indicated they would purchase in grant applications relative to their actual purchases reported in progress reports submitted to TEA in spring 2009. In implementing R-Tech, districts were permitted to select up to two software vendors—one vendor for the middle school and a second for the high school.

R-Tech districts initially selected a total of 28 separate software vendors to provide supplemental instruction; however, analysis of progress reports submitted to TEA showed that vendor selection expanded to include more than 40 software programs over the course of the first implementation year. Information included in district progress reports revealed that some districts changed vendors because of dissatisfaction with services or incompatible software programs. Table 3.2 presents information about the software programs that were initially selected by at least three R-Tech districts. Findings indicate that a small proportion of districts changed vendor selections, but that most districts implemented programs as planned.

The largest proportions of districts (15%) selected and implemented A+nywhere Learning System. A+nywhere Learning System is marketed as a TAKS- and Texas Essential Knowledge and Skills (TEKS)-aligned program that provides diagnostic assessments and self-paced tutorials across a broad range of subject areas. Five districts (8%) implemented PLATO Learning systems. PLATO Learning provides self-paced remediation and credit-recovery programming for students in Grades 6 through 12 through online and distance learning formats. Four districts purchased Achieve TeenBiz3000, which provides self-based tutoring in ELA. Four districts selected Apple's suite of programs, and four districts selected OdysseyWare, both of which provide self-paced programming across subject areas.

Table 3.2
Vendors Selected for R-Tech Implementation, as a Percentage of Districts by Districts' Plans and Implemented Programs: Fall 2008 and Spring 2009

Vendor	Districts' Plans (N=62)[a]	Districts' Programs (N=62)[a]
A+nyWhere Learning System	14.5%	14.5%
PLATO Learning	11.3%	8.1%
Achieve TeenBiz 3000	8.1%	6.5%
Apple	4.8%	6.5%
OdysseyWare	4.8%	6.5%
Agile Mind	4.8%	4.8%
Ascend	4.8%	4.8%
Compass Learning Odyssey	4.8%	4.8%
Epic Learning	4.8%	4.8%
NovaNET	6.5%	4.8%
Apangea	4.8%	3.2%
New Century	4.8%	3.2%
Successmaker	4.8%	1.6%

Source: Analysis of R-Tech district applications, fall 2008; Analysis of R-Tech District Progress Reports, spring 2009.
Note. Percentages will not total to 100. Districts may select up to two vendors and only the vendors which three or more districts planned to use or actually used are displayed.
[a]At the time of progress reports, one district was not implementing a program and could not be analyzed.

Site visit interviews with principals and R-Tech facilitators asked about the processes districts used to select technology vendors. Principal and facilitator comments indicated that districts prioritized the provision of strong technical support, as well as user-friendly content-oriented programs in selecting software. A facilitator in a district implementing a self-paced program explained that the selection of the R-Tech vendor was the shared responsibility of district administrators, technology coordinators, and teachers, noting "it was the technical support from the company that impressed us." Facilitators in several other districts commented that teachers tested products and selected programs that "cover[ed] different content areas" and were easy for students to use.

Subject Areas Addressed by R-Tech

Table 3.3 presents the percentage of districts providing R-Tech support across subject areas and the percentage of students receiving services by subject area during R-Tech's first implementation year (May 2008-May 2009). Results indicate that nearly all districts provided support in math (95%) and most students used R-Tech services to support their understanding of math concepts (70%). Districts also emphasized support in core subject areas such as ELA (86%), science (78%), and social studies (76%). While 28% of districts offered R-Tech services in languages other than English, a notably small proportion of students (3%) received instruction in this area.

Table 3.3
Subject Areas Addressed by R-Tech Programs, as a Percentage of Districts and Students: Summer 2008, Fall 2008, and Spring 2009

Subject Areas Addressed by R-Tech	Districts[a] (N=58)	Students[b] (N=14,849)
English Language Arts	86.2%	45.9%
Mathematics	94.8%	69.6%
Science	77.6%	31.2%
Social Studies	75.9%	13.4%
Language Other than English	27.6%	2.9%
Other Subject Area	1.7%	0.1%

Sources: Texas Education Agency R-Tech Student Upload data, summer 2008, fall 2008, and spring 2009.
Notes. Percentages sum to more than 100 because districts may have offered support in more than one subject area and students may have received instruction in more than one subject area.
[a]The number of districts providing upload data was 58. Overall, 62 districts participated in R-Tech during the program's first implementation year.
[b]Students included in the analysis received R-Tech services in *at least* one of the following periods: summer 2008, fall 2008, and spring 2009. Students receiving services across multiple periods are counted only once in the analysis.

HOW DISTRICTS IMPLEMENT R-TECH

Drawing on the surveys of R-Tech facilitators, and principals and teachers on R-Tech campuses, as well as information collected through site visit interviews and focus group discussions, this section considers how districts implemented R-Tech. The discussion examines how R-Tech facilitators were selected and trained; the roles of principals, R-Tech facilitators, and teachers in putting programs in place; how PEPs were developed; and how R-Tech goals aligned with those of implementing districts.

Selecting and Training R-Tech Facilitators

In interviews, facilitators said they were selected for the position because they had experience working in computer labs, had technology certifications, or had volunteered for the job. Survey results for facilitators, however, suggest that few had technology certifications. Table 3.4 presents the percentage of R-Tech facilitators who indicated they had technology certifications for the fall 2008 and spring 2009 survey administrations. Across both surveys, about 84% of facilitators indicated they had no certification. Although the percentages of facilitators with technology application certifications (Grades 8-12 or all levels) increased somewhat from fall to spring, the percentages of facilitators with master technology teacher or computer science certifications declined across administration periods. These shifts are likely a reflection of district turnover unrelated to R-Tech.

Table 3.4
R-Tech Facilitators' Technology Certification, as a Percentage of Respondents: Fall 2008 and Spring 2009

Type of Certification	Fall 2008 (N=71)	Spring 2009 (N=61)
Not certified	84.5%	83.6%
Technology applications, Grades 8-12	8.5%	11.5%
Technology applications, all levels	2.8%	4.9%
Master technology teacher	2.8%	0.0%
Computer science, Grades 8-12	1.4%	0.0%

Sources: R-Tech Principal/Facilitator Survey: fall 2008 and spring 2009.

The surveys also asked facilitators to indicate the amount of training they received to support R-Tech implementation. In response to the spring survey facilitators reported receiving an average of about 14 hours of training across R-Tech's first implementation year. Sixty-one facilitators provided written responses to an open-ended survey item asking about the content of their training. Of these, 49% indicated that they participated in training provided by R-Tech vendors, and about 11% reported receiving training from district technology coordinators. Facilitators wrote that vendor-provided training was program specific and focused on the introduction of software packages, approaches to monitoring students' progress, and solving implementation challenges. District training was generally provided by a technology coordinator and focused on the use of hardware and the development of technical support skills.

Implementation Roles

The spring 2009 survey of principals and R-Tech facilitators asked respondents to indicate the degree to which they were involved in implementing R-Tech. The survey provided a list of implementation tasks and asked respondents to rate their level of involvement using the following responses: *no involvement, minor involvement, moderate involvement*, or *substantial involvement*. Figure 3.1 presents the summed percentages of principals and facilitators who reported *moderate* or *substantial* involvement for each task. Summed percentages represent the percentage of respondents indicating *moderate* involvement *plus* the percentage of respondents indicating *substantial* involvement. (See supplemental Table A.4 in Appendix A for individual percentages by all response categories for each implementation task and respondent group.)

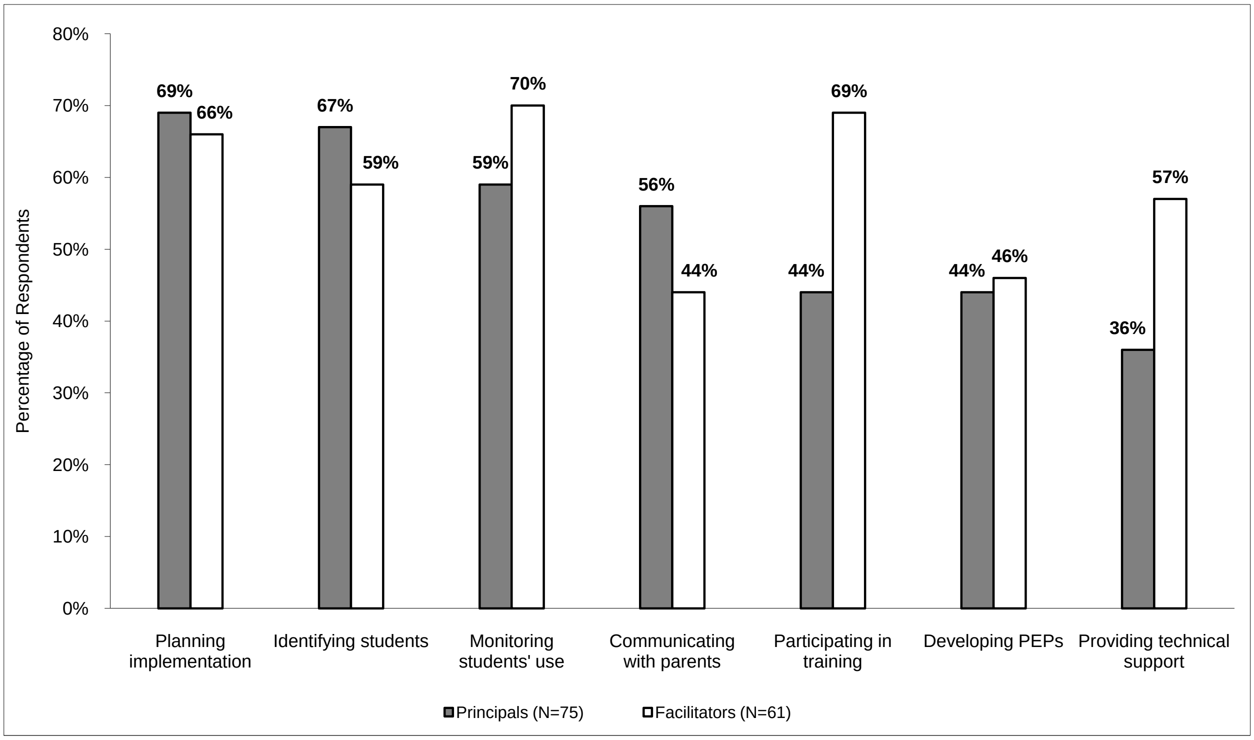

Figure 3.1. Percentage of principals and facilitators indicating moderate or substantial involvement in activities, as a percentage of respondents: spring 2009.
Source: R-Tech Principal and Facilitator Survey, spring 2009.
Note. Summed percentages represent total of two response categories: (1) the percentage of respondents who indicated *moderate* involvement, and (2) the percentage of respondents who indicated *substantial* involvement in activities.

Results indicate that principals tended to have a greater role in planning R-Tech, identifying students, and communicating with parents about R-Tech services, but that facilitators had a greater role in day-to-day implementation tasks, such as monitoring student use of technology resources, participating in training, and providing technical support for the grant.

Principals' roles in implementing R-Tech. As indicated in Figure 3.1, principals were less involved in R-Tech implementation than R-Tech facilitators, and their greatest involvement was with tasks that were necessary to get R-Tech started, but were not ongoing responsibilities (e.g., planning and communication). Principals' comments during site visit interviews support this understanding. When asked to describe his participation in the planning process, one principal said:

> I guess you could just call me a team member…. I think if you had [to select a] lead person, it would be either [name omitted] or [name omitted], and the rest of us were just on the team as we put the grant together.

Two principals said they assisted in identifying which student groups and subject areas to address through R-Tech, but they did not select individual student participants or R-Tech vendors. Several interviewed principals said they had "very little" involvement in R-Tech implementation and considered their role to be one of encouragement and support for those who actively implemented programs. "My only role is allowing [the program's] use," noted one principal.

Facilitators' roles in implementing R-Tech. Not surprisingly, R-Tech facilitators shouldered more responsibility for the ongoing implementation of districts' programs. During site visit interviews, facilitators provided greater detail about their roles. One facilitator noted:

> [My role is] to develop, write, and coordinate all of the grant activities…. I have done everything from ordering the materials, doing the budget, setting up summer school, monitoring the summer school (for free, I might add)….[I work] after hours, weekends, and summers…. I work with the principals, teachers, and students on any of their needs that involve the program.

Facilitators in districts implementing self-paced instructional programs were more likely to say they supervised student work. For example, one such facilitator said, "I walk around and monitor the students and help them if they need help." In contrast, facilitators working in schools implementing school-wide technology immersion programs were more likely to provide technical support, manage access to resources, and support teachers' classroom use of technology. Facilitators in districts using iPods said they researched and located lesson content and loaded it on iPods, met with students to assess learning, monitored student progress, and managed the care of equipment.

Teachers' roles in implementing R-Tech. The fall and spring surveys asked teachers to indicate their roles in R-Tech by selecting *no role,* a *minor role, a moderate role*, or a *substantial role* for a variety of activities related to planning and implementing the grant. Across survey administrations, more than 85% of respondents indicated that they had *no role* in planning R-Tech, and more than 50% indicated they had *no role* in implementing the grant (see supplemental Tables B.3 and B.4 in Appendix B). The percentages of teachers responding that they had *no role* in R-Tech decreased somewhat across the fall to spring survey administrations, which likely reflects an increased awareness of R-Tech in spring 2009.

Table 3.5 presents the summed percentages of teachers who indicated they had a *moderate* or *substantial* role in R-Tech activities for both survey administrations. Summed percentages represent percentage of teachers indicating a *moderate* role *plus* the percentage of teachers indicating a *substantial* role in activities. (Supplemental Tables B.3 and B.4 in Appendix B presents individual percentages by all response categories for each implementation activity across both survey administrations.) Results indicate that few surveyed teachers were involved in planning R-Tech (fewer than 5% of respondents across planning activities and survey administrations). Teachers also had limited roles in implementing R-Tech. A third (33%) had supervised students participating in R-Tech services by spring 2009, and about 30% had provided tutoring. Notably, less than 20% of surveyed teachers reported participating in the remaining implementation activities during R-Tech's first year.

Table 3.5
Summed Percentages of Teachers' Reporting Moderate or Substantial Involvement in Planning and Implementing R-Tech, as a Percentage of Respondents: Fall 2008 and Spring 2009

Teacher Roles	Fall 2008 (N=1,213)	Spring 2009 (N=568)
Planning Roles		
Decision to apply for grant	2.8%	4.2%
Selection of vendors	1.8%	3.7%
Drafting the grant application	0.9%	2.6%
Implementation Roles		
Supervise or monitor students	21.6%	33.4%
Provide tutoring to students	20.2%	29.5%
Monitor Personal Education Plans	15.1%	18.1%
Communication with parents	11.2%	15.0%
Develop Personal Education Plans	10.6%	13.5%
Identification of students	10.9%	13.4%
Identify R-Tech professional development topics	5.5%	10.4%
Provide technical support	5.2%	8.0%

Sources: R-Tech Teacher Survey, fall 2008 and spring 2009.
Note. Summed percentages represent total of two response categories: (1) the percentage of respondents who indicated *moderate* involvement, and (2) the percentage of respondents who indicated *substantial* involvement in activities.

In focus group discussions conducted during spring site visits, teachers spoke of their roles in R-Tech. Teachers in schools where R-Tech was implemented as part of the regular school day described notably greater involvement in R-Tech than teachers in schools implementing supplemental programs. In districts that used R-Tech funds to expand access to computer labs, teachers said they scheduled class time in labs to use R-Tech resources and used R-Tech data reports to monitor student progress. In addition, teachers sent individual students to the lab to get additional support during class time. "I see the teacher…in full control," explained one such teacher. "It's my responsibility to determine what the student needs and how to achieve it." A teacher in another district focus group expressed a similar view:

> I have had some students in my class that were not on [grade] level, so [the students and I] have gone and worked on [R-Tech in the lab] to try and fill in missing gaps, and used a different grade level than what the student is in.

A program facilitator noted that teachers used R-Tech services increasingly as TAKS test dates approached, explaining, "Sometimes [teachers] bring entire classes down [to the computer lab] just to do [remediation programs]; especially right before the TAKS test."

In contrast, teachers in focus groups in schools using R-Tech to provide a supplemental instruction outside of regularly scheduled classes were less likely to know about R-Tech resources or to report participation in the program. When asked about the challenges to teachers' use of R-Tech resources, a teacher in one such focus group said "I didn't even know there was a program, so no [I don't experience challenges]." A principal in another district implementing a supplemental program explained:

> I think if you talked to teachers they would be maybe unaware of what was available as far as [the R-Tech] programs that are available down there [computer lab] for them to use…I don't think everybody completely understands how it can be used.

Personal Education Plans

As part of participation in R-Tech, districts are required to develop PEPs that enable districts to track individual student progress and assess achievement gains (TEA, 2008b). Results from surveys and site visits suggest that PEPs were weakly implemented in many districts during R-Tech's first year. Less than half of the principals (44%) and program facilitators (46%) responding to the spring survey reported that they had a *moderate* or *substantial* role in developing PEPs (see Figure 3.1). Similarly, less than 14% of surveyed teachers indicated a *moderate* or *substantial* role in developing PEPs, and less than 20% had a *moderate* or *substantial* in monitoring PEPs on both the fall and spring surveys (see Table 3.5).

Further, most principals, program facilitators, and teachers who participated in site visit interviews and focus groups were unaware of PEPs and their objectives. Focus group participants could not identify how PEPs were developed or monitored. In one focus group, teachers thought PEPs were Individualized Education Plans (IEPs) used to guide the instruction of special education students.[2] In several districts, interview respondents reported that PEPs were developed by "someone else." For example, teachers in one district said the program facilitator developed PEPs. However, the facilitator said PEPs were the responsibility of school administrators, and school administrators said counselors developed PEPs.[3] Although PEPs may not have been widely used in first year implementation, interview respondents in most districts said that R-Tech student outcomes were monitored. Schools relied on vendor-provided assessments and student achievement data, as well as traditional forms of assessment, such as grades and TAKS scores.

R-Tech Goals

The survey of principals and R-Tech facilitators asked respondents to rate their levels of agreement with statements about R-Tech goals. Researchers coded responses to emphasize variation between levels of agreement, as (-10) *strongly disagreed*, (-5) *disagreed*, (0) *unsure*, (5) *agreed*, or (10) *strongly agreed*. Table 3.6 presents principals' and facilitators' average responses across the fall and spring survey administrations. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

On average, principals and facilitators agreed with every statement, indicating positive perceptions of R-Tech services. However, mean ratings decreased one point or more across semesters. The greatest variation between the fall (5.9) and spring (3.9) semesters was in response to the statement, "R-Tech is positively affecting student achievement." The decline in levels of agreement may reflect increased awareness of program outcomes, as well as experience with implementation challenges.

[2]IEPs are used to structure instructional goals and support for students receiving special education services. PEPs are used to plan instruction for students participating in R-Tech.
[3]Site visits did not include interviews with school counselors.

Table 3.6
Principals' and Facilitators' Perceptions of R-Tech Goals, as a Mean Rating: Fall 2008 and Spring 2009

Statement	Fall 2008 (N=153)	Spring 2009 (N=136)
Overall, I am pleased with R-Tech services	5.6	4.6
Vendor services align with TEKS/TAKS	5.7	4.5
Vendor services align with campus goals	5.2	4.1
R-Tech is positively affecting instruction on this campus	4.9	3.9
R-Tech is positively affecting student achievement	5.9	3.9
Goals are clear	5.0	3.8
Expectations are clear	4.7	3.5

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Note. Number of respondents (N) represents the number of principals and facilitators responding to the surveys. Mean ratings based on a 4-point scale: (-10) *strongly disagreed*, (-5) *disagreed*, (*0) unsure* (5) *agreed*, (10) *strongly agreed*, with higher ratings indicating greater agreement.

CHALLENGES TO R-TECH IMPLEMENTATION

Surveys and site visit interviews also sought to understand the challenges that districts may experience in implementing R-Tech. The principal and facilitator survey provided respondents with a list of common implementation challenges asking whether issues were *not a challenge, a minor challenge, a moderate challenge,* or *a substantial challenge.* Table 3.7 presents the summed percentages of survey respondents who indicated that challenges created *moderate* or *substantial* barriers to R-Tech implementation. Summed percentages represent the percentage of respondents indicating barriers created a *moderate* challenge to implementation *plus* the percentage of respondents indicating barriers created a *substantial* challenge. (Supplemental Table A.5 in Appendix A presents the full range of responses for each survey item across both survey administrations.) Results indicate that nearly half (49%) of survey respondents in spring 2009 felt that the communication of R-Tech goals to parents created challenges. More than a third of spring respondents indicated that project reporting requirements (40%), insufficient planning time (39%), communicating about R-Tech to staff (38%), and the development of PEPs (37%) were barriers to implementation. Notably, the percentage of survey respondents indicating implementation challenges increased from fall to spring. This finding likely results from greater implementation of R-Tech in spring 2009, as well as principals' and facilitators' increased experience with the program and its reporting requirements. In an open-ended response to the spring survey one principal explained, "We lacked adequate staff to fully implement [the] program as we envisioned....[I] pulled…staff members [from other content areas] to make up for the lack of staffing, but this adversely impacted other programs."

Table 3.7
Moderate and Substantial Challenges to R-Tech Implementation, as a Summed Percentage of Respondents: Fall 2008 and Spring 2009

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)
Communication of R-Tech goals to parents	32.7%	48.5%
Project reporting requirements	30.7%	39.7%
Insufficient planning time	NA	39.0%
Communication of R-Tech goals to staff	20.3%	38.2%
Development of students' PEPs	32.7%	36.7%
Monitoring students' progress	24.9%	33.1%
Coordinating training for staff	26.2%	31.7%
Level of technology resources	19.6%	27.3%
Conflicts with other programs	NA	24.3%
Level of technical support	15.7%	23.5%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Note. Summed percentages represent total of two response categories: (1) the percentage of respondents who indicated barriers presented a *moderate* challenge, and (2) the percentage of respondents who indicated barriers presented a *substantial* challenge. NA= Not applicable; this item was not included for fall 2008 survey administration.

Site visit interviews with principals and program facilitators, as well as focus group discussions with teachers provide more information about the challenges to implementing R-Tech during the program's first year.

Communication with Parents

In interviews, principals described how they communicated R-Tech goals to parents. Most principals said they sent letters home, posted information about the program on school Websites, and communicated about the program through e-mail. Two districts communicated information about R-Tech at parent orientations held at the beginning of the school year. In one district that sent e-mail requests for parent permission to include students in R-Tech, the principal reported that parent response was "low," noting "it's hard to get parents involved." In another district, a principal explained that some parents objected to R-Tech because it created transportation challenges when students were required to stay after school; however, other parents liked that "their kid[s] have to kind of face up and reflect on their day."

Insufficient Planning Time

Interviewed principals and program facilitators commented on the lack of planning time for R-Tech implementation. "Because [implementation is] so time consuming, I have had to spend a lot of time outside of the school day [addressing other responsibilities]," reported one facilitator. A principal in another district noted the lack of "upfront time" to implement R-Tech. In another district, a facilitator said, "This whole thing [R-Tech] has happened so very quickly that it's a wonder any of it works."

Technology Resources and Technical Support

Interview respondents in several districts commented on the lack of compatibility between R-Tech software and schools' "antiquated" hardware. One teacher said that the computers loaded software so slowly that by the time the program was accessible, the R-Tech tutorial period was nearly over. The teacher explained, "[My computers] are so old that by the time [the vendor software] loads and gets on, tutorials are over." Principals in several districts said they purchased new computers to accommodate R-Tech programs, but the number of machines was inadequate to serve all students identified for R-Tech services. Administrators reported that the high costs of replacing hardware dictated the number of computers purchased. However, schools that "completely revamp[ed]" their technology systems also experienced challenges resulting from weak infrastructure and unreliable Internet connections. As one principal explained:

> We have really had a hard time making the transition and getting everything in place…. I really believe that has been one of our greatest hurdles because teachers and students alike really had a difficult time with [the system] being so intermittently useable.

The principal continued, describing how service challenges affected R-Tech implementation and participation. "It is difficult for me, as an administrator, to really hold them accountable [for implementing R-Tech], with all the issues we've been having." Despite challenges, most interview respondents remained positive about the potential of R-Tech, noting that most programs encounter implementation challenges, particularly in their first year. One principal explained:

> [The challenge] is just learning how [R-Tech] fits in to what we do here. It's kind of a trial and error deal, since this is our first year to be able to do this…This summer is going to be the first time that we implement our credit recovery [component]. We don't know how it's going to work. It may be a catastrophe, but I know that without this program, there's no way it could have been done.

Overcoming Challenges

The spring 2009 survey also included a list of strategies districts may have used to overcome implementation barriers and asked respondents to mark all the approaches they incorporated during R-Tech's first year. Table 3.8 presents the percentage of respondents who indicated that each strategy was implemented and shows that most respondents worked in districts that purchased additional computer hardware (62%) and software (52%) to support R-Tech implementation. More than half of respondents (53%) also reported holding information sessions to communicate R-Tech goals to school staff.

Table 3.8
Methods to Overcome Challenges to Implementation, as a Percentage of Respondents: Spring 2009

Method	Spring 2009 (N=136)
Purchased additional computer hardware	61.8%
Held information sessions for teachers and staff	52.9%
Purchased additional computer software	51.5%
Upgraded technology infrastructure	40.4%
Purchased additional furnishings (e.g., computer tables and chairs)	23.5%
Added staff to manage implementation tasks	24.3%
Held information sessions for parents and students	19.9%

Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. Percentages will not total to 100 because respondents could select more than one method.

The spring survey also included an open-ended item in which respondents could enter other strategies used to overcome implementation challenges. Few respondents (14) entered other strategies. One noted that coordination of R-Tech with an after school program facilitated implementation, and several wrote that they increased communication efforts with parents and provided incentives for student participation.

FACTORS THAT CONTRIBUTE TO SUCCESSFUL IMPLEMENTATION

The spring 2009 survey of principals and program facilitators contained an open-ended item asking what contributed most to their schools' ability to implement R-Tech, and 66% of respondents (90 individuals) entered written comments. Researchers reviewed written comments, categorizing responses by common themes. Table 3.9 presents the percentage of respondents indicating factors cited in five or more comments.

Table 3.9
Factors That Contributed to R-Tech Implementation, as a Percentage of Respondents: Spring 2009

Factor	Spring 2009 (N=90)
Strong administrative support	20.0%
Additional funding	20.0%
Staff buy-in and support	16.6%
Added computer hardware and software	13.3%
Designated R-Tech facilitator	7.7%
Existing technology resources	7.7%

Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. N is the percentage of survey respondents who entered written comments. Responses will not total to 100. Factors cited by fewer than five respondents are not included in the analysis. Some responses may be included in multiple categories (e.g., "strong administrative support and grant funding").

In addition, site visit interviews with principals and program facilitators also asked about the factors that contributed to successful implementation. The sections that follow combine interview responses with the survey's written comments to provide more information about the factors contributing to R-Tech implementation.

Strong Administrative Support

Many survey respondents wrote that strong support from district-level administrators was central to their ability to implement R-Tech. A respondent in one district cited "the commitment of central administrators to [R-Tech]" as the factor that most supported implementation. In another district, "A forward thinking superintendent," was credited as an important support. "A willing campus and a supportive central office," wrote a respondent in another district, "with these two things, much can be achieved."

Funding

Survey comments also indicated that grant funding was essential to implementation, as one respondent wrote:

> The main thing that allowed us to implement the R-Tech pilot program was the grant funding from TEA. Without these funds our project would not exist today. The funding allowed our small rural district to put together to [sic] high quality computer labs that are utilized by the entire school community.

Most principals interviewed during site visits said additional funding provided by R-Tech was critical to implementation. Principals said that R-Tech funding enabled districts to implement programs that they could not have afforded otherwise. Principals also noted the strain of providing matching funds for the grant. A high school principal said the district used high school allotment funding (HSA)[4] to provide transportation for students who missed regularly scheduled bus routes in order to participate in R-Tech after school. Another principal noted that the district would discontinue R-Tech when state funding expired.

Staff Buy-in

Survey respondents also pointed to the importance of staff buy-in for successful implementation of R-Tech. One respondent wrote of "the willingness of the counselors and technology teachers on campus to go above and beyond their normal responsibilities to help students in this program." A respondent in another district cited "A strong desire to offer students opportunities that were not available to them before in our small school. Our teachers want the best for our students and will work hard to see that this [R-Tech] happens."

Additional Computer Hardware and Software

Survey respondents also reported that the additional computer hardware and software that districts purchased using R-Tech funding were important factors in implementation. In one district:

> R-Tech provided a solution to a problem that [school staff] had been struggling to address. Through the grant we were able to acquire the necessary hardware and software programs and instructors to implement our credit recovery and credit preservation program. We were able to provide students struggling with TAKS more resources to improve their performance.

A survey respondent in another district wrote, "The purchase of computers helped a lot. Our computers were getting old and failing on us. With the new computers we gained reliability to work the program [R-Tech]."

Designated Program Facilitators

Survey respondents and interviewed principals also noted the importance of having a designated R-Tech facilitator to support implementation. Principals said facilitators understood R-Tech software, and provided training and support for staff. A facilitator noted that previous experience and familiarity "with all aspects of grant programming" made R-Tech grant coordination easier.

Existing Technology Resources

Several survey comments indicated that technology resources that existed prior to receiving R-Tech funding were important to their schools' ability to implement the program. Survey respondents cited pre-existing computer labs, laptops purchased before applying for R-Tech funding, and established infrastructure for technology as strong supports to implementation.

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[4]Texas districts receive HSA funding ($275 per student) for students in Grades 6 through 12. HSA funds may be used to support efforts to increase the rigor of instruction and to encourage students to pursue postsecondary educational opportunities (TEC § 39.114).

SUMMARY

Most R-Tech districts implemented technology-based self-paced programs designed to provide tutoring, remediation, and credit recovery to struggling students. Program facilitators had the greatest responsibility for implementing R-Tech, and most facilitators received training from software vendors and district technology coordinators. Most principals were involved in planning the grant, but had little role in R-Tech once programs were in place. Teachers had a notably small role in implementing R-Tech; however, differences emerged in site visit discussions with teachers in districts implementing supplemental and non-supplemental programs. Teachers who worked in districts that offered R-Tech as a supplemental program implemented outside of students' regularly scheduled classes said they had little knowledge of the program or its resources. In contrast, teachers working in programs implemented as part of the school day (i.e., non-supplemental programs) were more likely to report using R-Tech resources to support classroom instruction and to prepare students for TAKS testing.

Most surveyed principals and R-Tech facilitators did not experience challenges in implementing the program, but those who did noted that communication of program goals to parents, project reporting requirements, and insufficient planning time were the most substantial implementation barriers. In site visit interviews, principals and facilitators also described the implementation challenges caused by outdated computer equipment and poor technology infrastructure. In some districts, challenges were offset by strong administrative support for R-Tech, as well as teacher and staff buy-in to the program.

CHAPTER 4
R-TECH AND STUDENTS

R-Tech is designed to provide rural students with access to "educational opportunities that are not commonly found…in rural school districts" (TEA, 2008a, p. 3). Such opportunities may include technology-based academic tutoring, remediation, and credit recovery programs designed to improve academic achievement, as well as technology-based dual credit courses and distance learning opportunities that enable rural districts to expand their course offerings. This chapter addresses the level of student participation in R-Tech provided educational opportunities (Research Question 2) during the program's first year (May 2008-May 2009), and considers the following questions:

- How are students identified for R-Tech services?
- What are the characteristics of students who participate in R-Tech?
- How many hours per week do eligible students participate in the R-Tech program?

In addition, the chapter discusses how students access R-Tech services, the subjects they study using R-Tech resources, how districts facilitate access to R-Tech services, as well as the benefits and challenges students experience as a result of participating in the program. Chapter 6 addresses how participation in R-Tech may have affected students' 2009 TAKS outcomes.

DATA SOURCES

The chapter relies on a range of data sources to address the level of students' participation in R-Tech and to explore the benefits and challenges students experience in accessing services. Quantitative data are drawn from TEA's Student Upload data system for the summer 2008, fall 2008, and spring 2009 reporting periods, as well as from PEIMS. The chapter incorporates findings from the fall 2008 and spring 2009 surveys of R-Tech facilitators and principals, teachers on R-Tech campuses, and a spring 2009 survey of students who received R-Tech services during the program's first implementation year.

More information on the survey administration processes, response rates, the characteristics of survey respondents, and supplemental tables may be found in the appendices of this report.[1] The chapter also includes qualitative data collected during site visits to a sample of eight R-Tech districts in April 2009. Site visits included interviews with principals and program facilitators on R-Tech campuses, as well as focus group discussions with teachers and students who participated in R-Tech during the 2008-09 school year. More detailed information about the identification of districts for site visits, site visit activities, and the characteristics of districts' R-Tech programs is presented in Appendix D.

STUDENT PARTICIPATION IN R-TECH: SUMMER 2008, FALL 2008, AND SPRING 2009

Across R-Tech's first implementation year (May 2008-May 2009), 115 campuses from 62 Cycle 1 districts participated in the pilot program.[2] As discussed in chapter 1, R-Tech districts are required to

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[1]Appendix A contains information about the online survey of R-Tech principals and program facilitators, Appendix B contains information about the teacher survey, and Appendix C contains information about the student survey.
[2]In March 2009, TEA developed a "final campus list" of 140 participating R-Tech campuses from 64 districts. In early May 2009, it was determined that 23 campuses from the "final campus list" were alternative campuses or juvenile detention centers, kindergarten, elementary, or intermediate campuses, not in TEA's AskTED directory, or campuses that said they were not participating in R-Tech. TEA agreed to exclude 20 of the 23 campuses from the "final campus list." At the end of May, TEA reported that Groesbeck ISD had dropped out of the grant and that Barber's Hill ISD had delayed implementation until the 2009-10 school year and should be excluded from analyses

track student participation in grant services and to provide reports to TEA through a data upload system hosted by the Agency. Across R-Tech's first year, Student Upload data were submitted to TEA for the summer 2008, fall 2008, and spring 2009 grant reporting periods. The summer 2008 student upload contains information about students who participated in R-Tech services during the 2008 summer school session, the fall 2008 upload contains information about students participating in R-Tech during the fall 2008 semester, and the spring 2009 upload contains information about students participating in services during the spring 2009 semester.

Table 4.1 presents information about the number and percentage of campuses and districts submitting Student Upload data to TEA for each reporting period, as well as campus-level statistics describing the level of student participation for each reporting period. Results indicate that less than half of R-Tech Cycle 1 districts (47%) and about one-third of campuses (32%) reported students participating in R-Tech during summer 2008. However, 90% of districts and 80% of campuses reported serving students in fall 2008, and 92% of districts and 86% of campuses served students in spring 2009. The number of students receiving R-Tech services also increased across reporting periods. In summer 2008, campuses reported serving an average of 37 students, in the fall of 2009 the average number of students served increased to 97, and in spring 2009 campuses served an average of 129 students in R-Tech. Across campuses, the range of students served by R-Tech varied from 3 to 258 in summer 2008, from 1 to 716 in fall 2008, and from 1 to 687 in spring 2009. As one might expect, the total number of students participating in R-Tech by reporting period[3] increased from 1,370 in summer 2008, to 8,795 in fall 2008, to 12,736 in spring 2009.

Table 4.1
R-Tech District, Campus, and Student Participation: Summer 2008, Fall 2008, and Spring 2009

Data Upload Characteristic	Summer 2008	Fall 2008	Spring 2009
Number (percentage) of districts reporting (N=62)	29 (47%)	56 (90%)	57 (92%)
Number (percentage) of campuses reporting (N=115)	37 (32%)	92 (80%)	99 (86%)
Average number of participants per reporting campus	37.0	95.6	128.7
Median number of participants per reporting campus	26.0	50.0	80.0
Minimum number of reported participants per campus	3.0	1.0	1.0
Maximum number of reported participants per campus	258.0	716.0	687.0
Total Number of Participants	**1,370**	**8,795**	**12,736**

Source: Texas Education Agency (TEA) R-Tech Student Upload data: summer 2008, fall 2008, and spring 2009.

of student outcomes included in the second interim report. This excluded five more campuses and two districts, resulting in a revised set of 115 campuses from 62 districts.

[3]Students were considered to be participating if they attended one of the 115 campuses in the 62 districts that participated in the R-Tech program during the summer 2008, fall 2008, or spring 2009 reporting periods, and their reported number of primary instructional hours in R-Tech activities was greater than 0. In addition, in spring 2009, students were considered to be participating if their reported primary instructional hours in R-Tech activities was greater than 0, or they were from Kirbyville High School, Rusk Junior High School, or Rusk High School. Because of technical difficulties at these campuses, a number of students were reported as having 0 instructional hours in R-Tech activities. TEA confirmed that these students took part in R-Tech activities.

Figure 4.1 presents the percentage of students receiving R-Tech services across the 115 campuses that participated in R-Tech during the program's first implementation year. The figure incorporates information on total campus enrollments for students in Grades 6 through 12 included in PEIMS, as well as district reports of R-Tech student participation for each reporting period. As indicated in the figure, 3% of students in Grade 6 through 12 participated in R-Tech in summer 2008, 21% participated in fall 2008, and 30% participated in spring 2009. Seventeen percent of students participated in R-Tech in both the fall 2008 and spring 2009, and 1% of students received services across all three periods (i.e., summer 2008, fall 2008, and spring 2009).

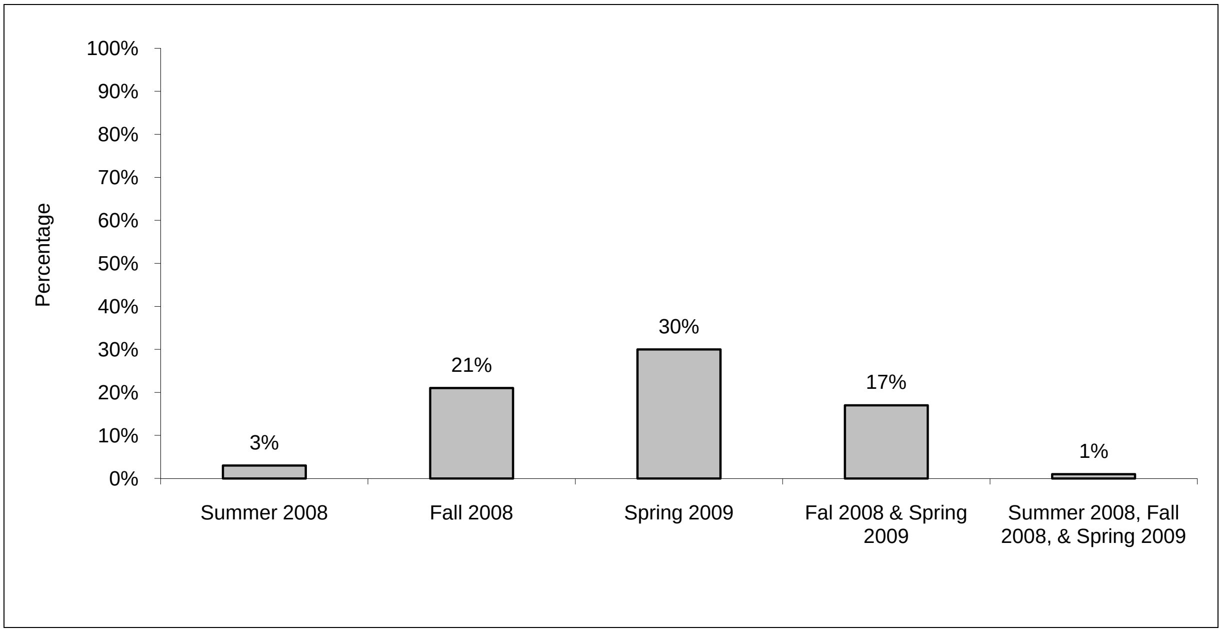

Figure 4.1. Percentages of students participating in R-Tech services by reporting period.
Sources: Public Education Information Management System (PEIMS), fall 2007 and fall 2008 snapshot data for the students attending the 115 participating campuses; Texas Education Agency (TEA) R-Tech Student Upload data: summer 2008, fall 2008, and spring 2009.
Note. The summer 2008 percentage was based on the number of students in Grades 6 through 12 in the 115 R-Tech campuses as of the fall 2007 snapshot. Fall 2008 and spring 2009 percentages were based on the number of students in Grades 6 through 12 in the 115 R-Tech campuses as of the fall 2008 snapshot.

Student Participation in R-Tech: Average Reported Weekly Hours

R-Tech requires that districts provide students with access to grant-funded services for a minimum of 10 hours per week, although there are no minimum requirements for student participation in services. Table 4.2 presents statistics about the extent of student participation in R-Tech services across implementation periods, including the average and median[4] number of hours students received services each week, as well as the minimum and maximum number of weekly hours reported in TEA's data uploads for each reporting period. Results indicate that R-Tech participation was most intense during summer school, with students receiving services for 8.5 hours on average each week, relative to 3.7 and 3.8 average weekly hours in fall 2008 and spring 2009, respectively. In summer, 50% of participants reported 7.5 or fewer instructional hours per week, while in both fall and spring, 50% of participants reported 2 or fewer instructional hours per week.

Table 4.2
The Extent of Student Participation[a] in R-Tech Activities: Summer 2008, Fall 2008, and Spring 2009

Participation Characteristic	Summer 2008 (N=1,370[b])	Fall 2008 (N=8,795[b])	Spring 2009 (N=12,736[c])
Average Number of Primary Instructional Hours	8.50	3.70	3.81
Median Number of Primary Instructional Hours	7.50	2.00	2.00
Minimum Number of Primary Instructional Hours	0.25	0.01	0.01
Maximum Number of Primary Instructional Hours[d]	> 20	> 20	> 20

Source: Texas Education Agency (TEA) R-Tech Student Upload data: summer 2008, fall 2008, and spring 2009.
[a]Extent of participation was based on the primary instructional hours reported in the summer 2008, fall 2008, and spring 2009 student uploads.
[b]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[c]Students were considered to be participating if their reported primary instructional hours were greater than 0. In addition, all students in the spring 2009 student upload from Kirbyville High School, Rusk Junior High School, and Rusk High School were considered to be participating in R-Tech activities.
[d]The number of reported instructional hours per week for some students exceeded 20 (1.1% of students in summer, 0.6% in fall and 2.3% in spring). These cases were likely reporting errors. In analyses of the effect of participation hours on student outcomes presented in chapter 6, researchers omit students with average weekly usage hours above 20. Chapter 6 provides more information about the omission of outliers in the student upload data.

[4]The median represents the midpoint in a distribution. In the case of R-Tech, the median is the point at which half of reported hours fall below and half of reported hours lie above this value.

STUDENT IDENTIFICATION FOR R-TECH SERVICES

The fall 2008 and spring 2009 surveys of principals and R-Tech facilitators asked respondents how students were identified for R-Tech services. Results for both fall and spring survey administrations indicate that weak academic performance was the primary reason students participated in R-Tech.

As presented in Table 4.3, more than half of spring 2009 survey respondents indicated that students were identified for R-Tech because of poor TAKS performance (68%), poor grades (58%), and teacher referrals (56%). While percentage values across response categories were somewhat higher for fall 2008 survey respondents, the pattern of responses suggests that students were consistently identified for R-Tech because of poor academic performance.

Table 4.3
Methods of Student Identification for R-Tech Services, as a Percentage of Respondents: Fall 2008 and Spring 2009

Identifier	Fall 2008 (N=153)	Spring 2009 (N=136)
Poor TAKS performance	82.4%	68.4%
Poor grades	73.2%	58.1%
Teacher referral	63.4%	55.9%
Performance on other tests	46.4%	42.6%
Parent/student interest	54.9%	33.1%
Curricular need	26.1%	20.6%
Other	15.7%	16.2%
First-generation college student	5.2%	6.6%

Source: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Note. Percentages will not total to 100 because principals and facilitators were able to select more than one method of student identification.

Consistent with survey findings, many participants in site visit interviews (i.e., principals, R-Tech facilitators, and focus group teachers) said that poor TAKS scores were the primary means of identifying students for R-Tech services. "We meet at the beginning of school and look at the TAKS results [from the previous years]," explained one set of focus group teachers. "We identify [students for R-Tech] before school even begins." A principal in another district underscored the role of TAKS in identifying students, noting "TAKS are *huge*!" Interview respondents also said that students were referred to R-Tech because of weak grades, poor attendance, prior failures, or disciplinary referrals.

Several site visit districts, however, had school-wide implementations, in which all students participated in R-Tech. "The whole school goes [to the R-Tech lab]—sixth, seventh, and eighth grade go each week," explained one teacher focus group. "Some [students] use it extra and are exposed a little more, but everyone goes." In another district, all students had access to R-Tech, but some students were required to receive services. "We allow all of the students," said the campus R-Tech facilitator, "Everyone is invited to participate. Some are nudged…and some are forced."

THE CHARACTERISTICS OF STUDENTS PARTICIPATING IN R-TECH

The sections that follow provide information about the students who participated in R-Tech during the program's first year. Results are presented separately for the 2008 summer session, and for the fall 2008 and spring 2009 semesters. Analyses consider the demographic characteristics of students who received R-Tech services, as well as participation by grade level.

Summer 2008

Table 4.4 presents information about the characteristics of students who participated in R-Tech services, relative to students who did not, during summer 2008.[5] Relative to students who did not participate in R-Tech, summer 2008 R-Tech participants were more likely to be minority students (50% vs. 36%), from economically disadvantaged backgrounds (55% vs. 46%), and characterized as special education students (17% vs. 13%). Notably, the proportion of African American students receiving R-Tech services was double the proportion of African American students on R-Tech campuses who did not participate in services in summer school (18% vs. 9%). The proportion of Hispanic students who received R-Tech services in summer school was somewhat higher than students who did not (32% vs. 27%).

Table 4.4
Characteristics of R-Tech Participants and Non-Participants: Summer 2008

Student Group	Participants[a,c] (N=1,370)	Non-Participants[b] (N=42,535)
African American	17.8%	9.3%
Hispanic	32.4%	27.0%
White	48.7%	62.7%
Other	1.2%	1.0%
Female	46.6%	48.3%
Male	53.4%	51.7%
Economically disadvantaged	55.0%	45.7%
Special education	16.7%	13.2%
Limited English proficient	2.9%	2.8%

Sources: Public Education Information Management System (PEIMS) fall 2007 snapshot data for the students attending the 115 participating campuses; Texas Education Agency (TEA) R-Tech Student Upload data: summer 2008.
[a]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[b]Non-participants attended Grades 6 through 12 in the 115 campuses in the 62 districts that participated in the R-Tech program in 2007-08, but were not identified as actually participating in R-Tech activities in the summer 2008 data upload.
[c]There were 217 of the 1,370 summer 2008 participants who had missing demographic information. The percentages in the table were based on the 1,153 participants who had demographic information.

[5]Percentages of participants and non-participants were based on 2007-08 Grades 6 through 12 enrollments in the 115 participating campuses.

Fall 2008 and Spring 2009

Table 4.5 presents the characteristics of students who received R-Tech services, relative to those who did not, for fall 2008 and spring 2009 reporting periods.[6] In contrast to students receiving R-Tech services during the 2008 summer school, the characteristics of students participating in R-Tech during the regular school year were largely the same as non-participants.

Table 4.5
The Characteristics of R-Tech Participants and Non-Participants: Fall 2008 and Spring 2009

Student Group	Fall 2008		Spring 2009	
	Participants[a,d] (N=8,795)	Non-Participants[b] (N=34,380)	Participants[a,c,e] (N=12,736)	Non-Participants[b] (N=30,874)
African American	8.9%	9.8%	8.8%	9.9%
Hispanic	30.5%	27.3%	27.1%	28.2%
White	59.5%	61.9%	62.9%	60.9%
Other	1.1%	1.0%	1.2%	1.0%
Female	47.2%	48.5%	47.5%	48.5%
Male	52.8%	51.5%	52.5%	51.5%
Economically disadvantaged	51.1%	47.5%	52.2%	46.7%
Special education	14.5%	12.1%	13.7%	12.1%
Limited English proficient	3.3%	2.3%	3.3%	2.3%

Sources: Public Education Information Management System (PEIMS) fall 2008 snapshot data for the students attending the 115 participating campuses; Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009.
[a]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[b]Non-participants attended Grades 6 to 12 in the 115 campuses in the 62 districts that participated in the R-Tech program in 2008-09, but were not identified as actually participating in R-Tech activities in the data uploads.
[c]Students were considered to be participating if their reported primary instructional hours were greater than 0. In addition, all students in the spring 2009 student upload from Kirbyville High School, Rusk Junior High School, and Rusk High School were considered to be participating in R-Tech activities.
[d]There were 244 of the 8,795 fall 2008 participants who had missing demographic information. The percentages in the table were based on the 8,551 participants who had demographic information.
[e]There were 676 of the 12,736 spring 2009 participants who had missing demographic information. The percentages in the table were based on the 12,060 participants who had demographic information.

[6]Percentages of participants and non-participants were based on 2008-09 Grades 6 through 12 enrollments in the 115 participating campuses.

Grade Levels Served by R-Tech

Table 4.6 presents information about the percentages of students participating in R-Tech by grade level and implementation period (i.e., summer 2008, fall 2008, and spring 2009). For the most part, variations in the percentage of student participants by grade were minor across R-Tech's first year. Proportionately more middle school than high school students (65% vs. 35%) participated in the program as a part of the 2008 summer session, and a notably large proportion of 8th-grade students participated in services during summer school (29%). The proportion of 8th-grade students receiving services in summer school is likely a function of districts' efforts to provide remediation and support to students transitioning to high school and to reduce middle school retention rates.

Table 4.6
The Percentage of Students Participating in R-Tech by Grade: Summer 2008, Fall 2008, and Spring 2009

Grade Level	Summer 2008 (N=1,370[a])	Fall 2008 (N=8,795[a])	Spring 2009 (N=12,736[b])
6	19.4%	10.8%	14.0%
7	16.6%	14.5%	16.0%
8	29.3%	16.4%	14.7%
9	9.2%	15.3%	17.6%
10	9.9%	16.8%	15.3%
11	10.7%	15.2%	13.3%
12	4.8%	10.9%	9.2%
Total	**100.0%**	**100.0%**	**100.0%**

Sources: Public Education Information Management System (PEIMS) fall 2008 snapshot data for the students attending the 115 participating campuses; Texas Education Agency(TEA) R-Tech Student Upload data: summer 2008, fall 2008, and spring 2009.
[a]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[b]Students were considered to be participating if their reported primary instructional hours were greater than 0. In addition, all students in the spring 2009 student upload from Kirbyville High School, Rusk Junior High School, and Rusk High School were considered to be participating in R-Tech activities.

HOW STUDENTS ACCESS R-TECH AND WHAT THEY STUDY USING R-TECH RESOURCES

The sections that follow provide information about how districts provide students with access to R-Tech services and the subject areas that students study using R-Tech resources. Findings are drawn from a range of data sources, including the spring 2009 survey of students, the fall 2008 and spring 2009 survey of principals and R-Tech facilitators, as well as from information collected during spring 2009 site visit interviews with principals and R-Tech facilitators, and focus group discussions with teachers and students participating in R-Tech services.

Student Access to R-Tech Services

The spring 2009 survey of students participating in R-Tech asked about the places and times students participated in R-Tech, as well as how often they accessed services. Figure 4.2 presents students' responses. Although the frequencies of access vary, results indicate that most respondents participated in R-Tech during regular class time (91%—the sum of respondents indicating that they accessed resources *rarely*, *sometimes*, *often* or *almost daily*), at home using a home computer (79%), at school during a free period (62%), and before (60%) or after (56%) school.

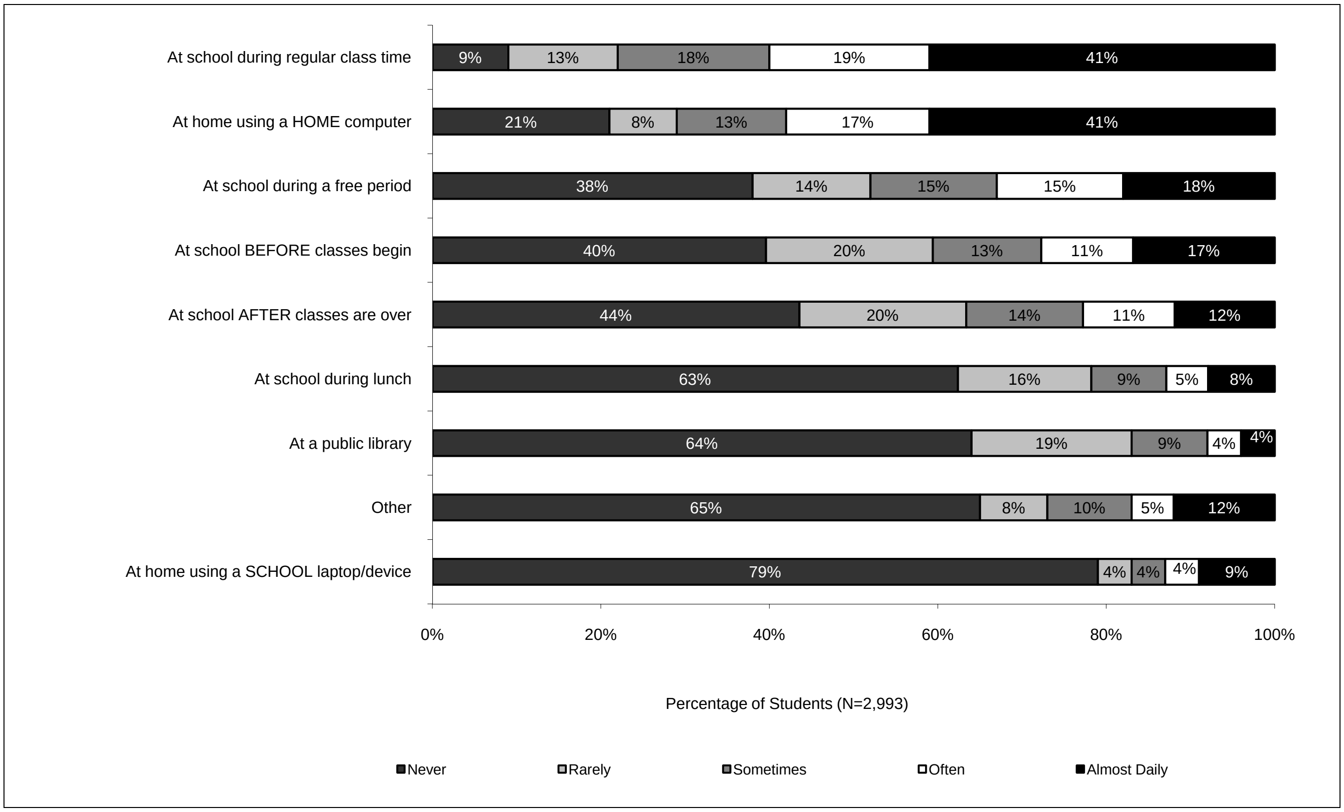

Figure 4.2. Students' access to R-Tech services, as a percentage of respondents: spring 2009.
Source: R-Tech Student Survey, spring 2009.
Note. The R-Tech Student Survey included an open-ended item allowing respondents to define the "other" times in which they accessed R-Tech services. However, no student provided a written response.

Information collected during interviews and focus groups conducted as part of the spring 2009 site visits to R-Tech districts provide more information about how students participated in R-Tech. The sections that follow address the most common ways for students to access R-Tech services.

Accessing R-Tech during class time. Although R-Tech was intended to provide supplemental instruction services, about 40% of R-Tech districts incorporated R-Tech services into regular instruction, and 60% of surveyed students reported using R-Tech resources during class time *often* or *almost daily*. A focus group teacher in a district implementing a self-paced instructional program reported scheduling 2 days a week in the computer lab to use R-Tech resources because students preferred using computers to traditional classroom resources. In another district, teachers took students to the computer lab to use R-Tech software at least once a week and incorporated software-reported scores into class grades. "We're the ones that have to boost the students and [let] them know that this is something we're going to use," explained a focus group teacher. "I think taking grades is very important." Focus group students in a school implementing a school-wide technology immersion program reported using R-Tech resources every day in at least one class. They noted that ELA made the most extensive use of technology resources, and that students also used laptops to take notes in other classes.

Accessing R-Tech from a home computer. More than half of surveyed students (58%) reported that they accessed R-Tech resources at home using a home computer *often* or *almost daily*. A focus group high school student in a district offering a supplemental self-paced tutoring program explained, “I found out I could do it at home, and we can do tutoring even after school and before school, but most of the time I do it at home because that’s when I have more time.” However, another student in the same focus group said, “I mainly use it here [at school] …I don’t have Internet access at home.” Teachers said that home access enabled students who had “missed a lot” to catch up.

Accessing R-Tech at school during a free period. A third (33%) of surveyed students reported using R-Tech resources during a free period *often* or *almost daily*. In focus groups, some teachers said they assigned students to use R-Tech resources during study hall or during in-school suspension. A principal in a district that had used R-Tech resources to employ a full-time computer lab facilitator said staffing was key to providing student access throughout the school day because prior to R-Tech, the lab was closed to students outside of class. “It all has to do with the staffing of it,” explained the principal. “We had the computer lab before, but [students] could only go in there if [their] class was going in there.”

Accessing R-Tech before or after school. Smaller percentages of surveyed students indicated that they accessed R-Tech services *often* or *almost daily* before (28%) or after (23%) school. In interviews, R-Tech facilitators noted the challenges of providing services outside of the regular school day. One facilitator explained, “From the kids’ side, I think there were a lot of activities that kept them from participating… They [students] would even express that they needed more time in their lives.” In several districts, interview respondents noted the challenge of providing services before or after school for rural students who must take buses to get home. “Transportation is a big issue here,” explained one set of focus group teachers, “because our students can’t walk home. They get here on the bus at quarter till [time school begins] and there’s no time for extra help in the mornings.” Some districts adjusted bus schedules and permitted students to eat breakfast in R-Tech labs in order to offset transportation and time limitations.

What Students Study Using R-Tech Resources

The student survey also asked what subject areas students addressed using R-Tech resources, and Figure 4.3 presents the percentage of students who responded to each subject area for each level of schooling and for all students. As indicated by the figure, middle school students were more likely to focus on math and science, while high school students were more likely to focus on reading /ELA, languages other than English, and other subject areas. Of the students who entered written responses clarifying “other” subject areas, high school students were most likely to report using R-Tech to focus on Business Computers and Information Systems (BCIS) coursework (55 responses) or career and technical education fields, such as auto mechanics (11 responses), agriculture (5 responses), or industrial technology (5 responses). Middle school students were more likely to indicate that they studied all subjects (13 responses), as well as keyboarding and computer skills (10 responses).

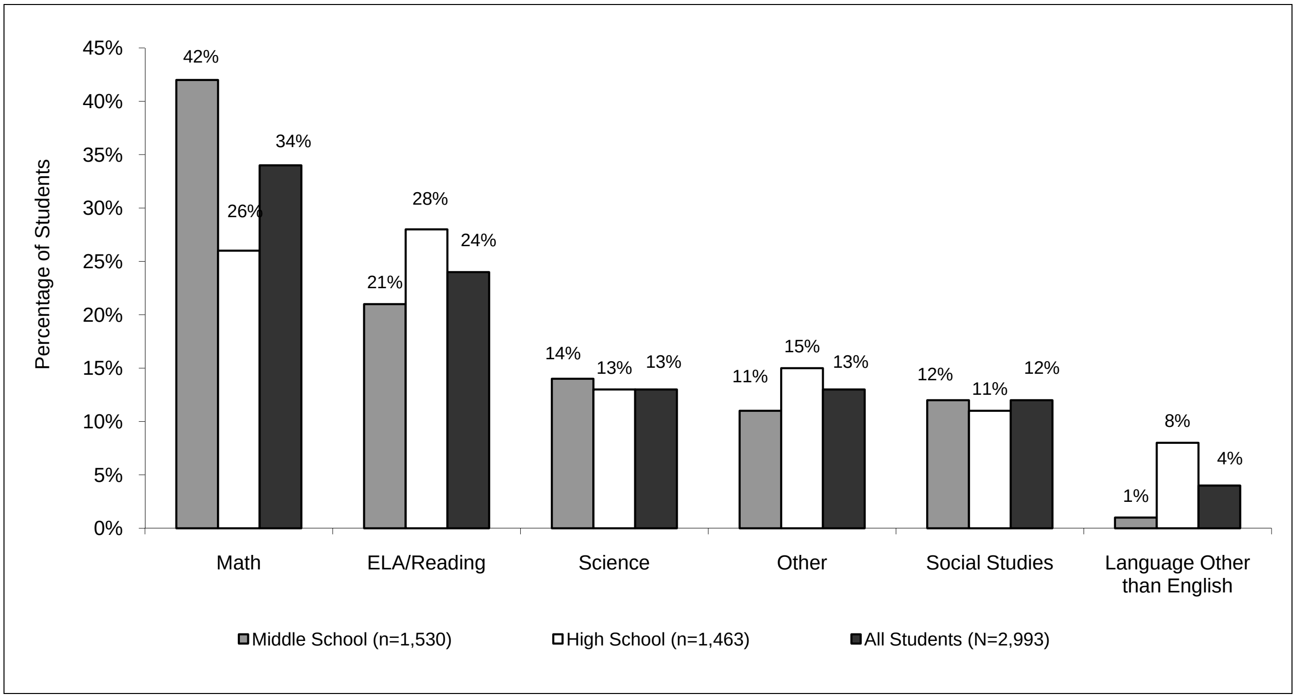

Figure 4.3. The subject areas students study using R-Tech resources, as a percentage of survey respondents: spring 2009.
Source: R-Tech Student Survey, spring 2009.

In focus group discussions, many students commented that R-Tech content was focused on TAKS preparation in core subject areas. As one student explained, R-Tech "address[es] the objectives that you didn't get on TAKS." Focus group students also said that R-Tech programs focused on review, rather than introducing new content. One focus group student explained, "[R-Tech] helps you review what you already know or get you ready for what you are going to learn." A student in another district explained that R-Tech addresses "stuff you already know but need help with."

FACILITATING STUDENT PARTICIPATION IN R-TECH

As noted in the previous section, some students experienced challenges in participating in R-Tech because of conflicts with other activities and transportation issues. This section addresses the barriers that may limit students' ability to participate in R-Tech services, as well as the strategies districts implemented to overcome barriers. Findings are drawn from the fall 2008 and spring 2009 survey of principals and R-Tech facilitators, site visit interviews with principals and facilitators, as well as focus group discussions with teachers and R-Tech students.

Barriers to Student Participation

The fall 2008 and spring 2009 surveys of principals and R-Tech facilitators presented a list of potential barriers to student participation in R-Tech and asked survey respondents whether issues created a *minor*, *moderate*, or *substantial barrier to* students' participation or whether issues were *not a barrier*. Across both survey administrations, most principals and facilitators (more than 60% of respondents) indicated that each issue was either *not a barrier* or a *minor barrier*. Table 4.8 presents the summed percentages of survey respondents who indicated each issue presented a *moderate* or *substantial* barrier to student participation in R-Tech for each survey administration. Summed percentages represent the percentage of respondents indicating barriers created a *moderate* challenge to students' participation *plus* the percentage of respondents indicating barriers created a *substantial* challenge. (See supplemental Table A.6 in

Appendix A for individual percentages by survey item, barrier rating, and survey administration.) The sections that follow provide more information about barriers drawn from site visit interviews and focus groups.

Table 4.8
Moderate and Substantial Barriers to Student Participation in R-Tech Services, as a Summed Percentage of Respondents: Fall 2008 and Spring 2009

Moderate/Substantial Barriers (summed percentages)	Fall 2008 (N=153)	Spring 2009 (N=136)
Student resistance	30.7%	35.3%
Conflicts with athletic programs	24.2%	30.9%
Transportation	31.4%	27.2%
Conflicts with school-sponsored extra-curricular activities	23.6%	26.5%
Conflicts with non-school extra-curricular activities	12.4%	20.6%
Conflicts with student employment	24.2%	20.6%
Parent resistance	11.2%	8.0%
Other	24.0%	36.3%

Source: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Note. Summed percentages represent total of two response categories: (1) the percentage of respondents who indicated barriers created *moderate* challenges, and (2) the percentage of respondents who indicated barriers created *substantial* challenges.

Student resistance. Principals and facilitators considered "student resistance" to be the most common barrier to participation in spring 2009, and the increase in the percentage of respondents indicating that resistance created a *moderate* or *substantial* barrier from fall to spring (31% to 35%) suggests that student resistance may have increased over the program's first year. During site visit interviews, teachers and R-Tech facilitators explained the challenges created by student resistance. "Sometimes kids just flat refuse to come," noted one focus group teacher in a high school implementing a supplemental tutoring program. Teachers in another district offering self-paced tutoring said students felt there was a negative social stigma to staying after school. "I think some of it [resistance] too, is it's not cool [to stay after school for tutoring]," explained one teacher. In another district, teachers said that students were bored with the program.

Conflicts with athletic programs. Similar to results for student resistance, the percentage of principals and R-Tech facilitators indicating that conflicts with athletic programs created barriers to also increased from fall to spring (24% to 31%), which may reflect increased awareness of challenges as more students participated in seasonal sports programs. In site visit interviews, however, only one R-Tech facilitator noted that sports programs "get in their [students] way" of participating in the program. "From the kids' side," explained a principal, "I think there [are] a lot of activities that [keep] them from participating."

Transportation. As noted in a previous section, bus schedules and transportation issues created challenges for students in arriving early or staying after school to use R-Tech resources. However, unlike student resistance and conflicts with athletic programs, the percentage of principals and facilitators indicating that transportation created *moderate* or *substantial* barriers decreased from the fall to the spring survey administration (31% to 27%), which suggests that districts were able to resolve transportation issues to some extent. Transportation challenges were a common theme across site visit districts and interview and focus group respondents. A facilitator explained "We have kids say 'If I don't go home right now, I don't have a ride home.'" A principal in another district said that parents were unwilling to provide transportation for students assigned to R-Tech, noting "Parent support isn't there, so it's [R-Tech] not a priority at the family level, and if it's not a priority there, it's not a priority for the child." To offset transportation challenges, several districts added late bus routes for R-Tech students.

Other challenges. Survey responses also indicated that "other" challenges to student participation increased over the program's first implementation year (24% to 36%). Site visit interviews and focus group discussions provided more information about the range of challenges students encountered. Teachers in several districts spoke of students' family responsibilities as barriers to program participation. "Home life," said one teacher. "Some [students] have to get home to take care of their brother, sister, or their parents in the afternoon." Teachers in another district noted, "Absenteeism is always a problem [for R-Tech]—jobs, rides sometimes, family responsibilities when [students] are taking care of [their] siblings." To accommodate student responsibilities, one school shifted after school tutoring to the morning, but the change created conflicts for students receiving free- and reduced-price breakfasts. As a compromise, the school permitted students to bring their breakfasts into the computer lab. Teachers in several districts said that students' lack of proficiency using technology and poor school infrastructure also created barriers to students' participation.

Overcoming Barriers

The spring 2009 principal and R-Tech facilitator survey also asked respondents about the strategies they implemented to overcome barriers to student participation. Figure 4.4 presents the percentage of respondents indicating that their schools implemented strategies designed to improve student participation. Results indicate that about half of respondents worked in districts that expanded access times and locations (51%) or required participation for some students (49%). Smaller percentages of respondents indicated that their districts implemented incentives for participation (24%), developed R-Tech promotional materials (18%), or added transportation (18%). Survey respondents who entered written responses describing "other" strategies for overcoming barriers described implementing R-Tech as part of Saturday school, enabling access to R-Tech resources at a public library, and publishing a monthly newsletter describing the R-Tech program and including photos of students who experienced success as a result of program participation.

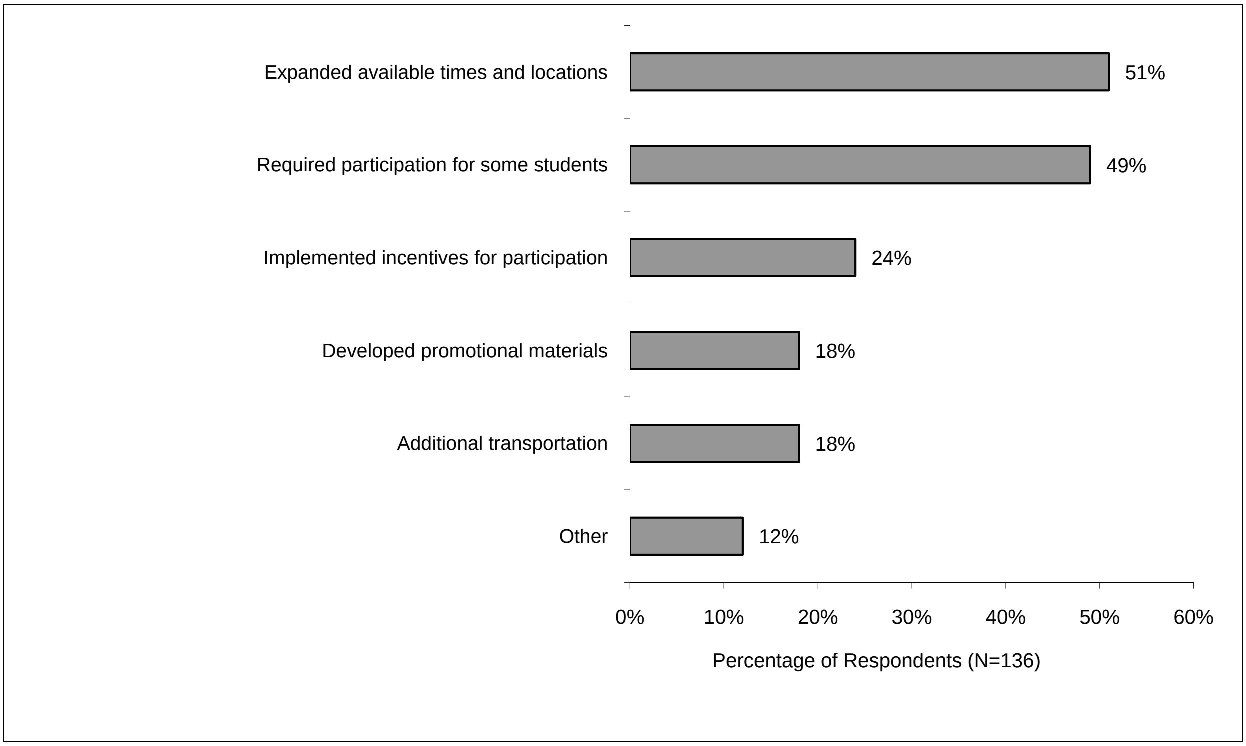

Figure 4.4. Strategies for overcoming barriers to student participation: spring 2009.
Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. Percentages will not total to 100; respondents were able to indicate multiple strategies.

Site visit interviews and focus group discussions provided more detailed information about how districts overcame participation barriers. In an attempt to overcome the negative social stigma attached to R-Tech, one school allowed students to bring friends to the lab. "If they can recruit a friend to come [with them to the lab], that helps," explained the principal. The school also provided snacks to "entice" students to participate. One principal reported using "propaganda," to encourage student participation, "I tell them it's filling up so they have to hurry if they want to get in." Teachers in another district said they pushed students to participate. "We are dedicated to the kids," explained one focus group teacher, "and we stay after them to make sure [they participate]."

To offset students' lack of proficiency using technology resources, one R-Tech facilitator labeled computer lab equipment and posted instructions detailing how to use each resource. Schools that experienced infrastructure challenges worked closely with district technology specialists to address system barriers, such as unreliable Internet connections and compatibility issues between old and new hardware and software. Teachers in one focus group described infrastructure challenges as "growing pains" that will be "worked out with time."

THE BENEFITS OF STUDENT PARTICIPATION IN R-TECH

Students participating in the spring 2009 survey responded to a list of statements describing the benefits they may have enjoyed as a result of participation in R-Tech, indicating their level of agreement with each statement. Researchers coded their responses: *strongly disagreed* (-10), *disagreed* (-5), *unsure* (0), *agreed* (5), and *strongly agreed* (10) as a means to clearly illustrate variations in students' levels of agreement. Table 4.9 presents students' mean responses, sorted in terms of the "All Respondents" column. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Table 4.9
Students' Level of Agreement with Statements about the Benefits of R-Tech Participation, as a Mean of Respondents: Spring 2009

Statement	Middle School (n=1,530)	High School (n=1,463)	All Respondents (N=2,993)
Technology resources allow me to work at my own pace.	3.9	4.6	4.2
Technology resources make learning more interesting.	3.8	3.3	3.5
I learn more when I use technology resources.	3.3	3.4	3.4
Technology resources allow me to focus on the areas where I need extra help.	3.2	2.8	3.0
I feel more confident about my school work since I started using technology resources to help me learn.	2.2	2.0	2.1
When I use computers to learn, I know right away whether I got a question right or wrong.	1.6	1.8	1.7
My grades have improved since I began using technology resources for learning.	1.5	1.2	1.4
Technology resources have allowed me to make up coursework I have missed.	0.0	1.5	0.7
Technology resources allow me to take classes taught by teachers who are NOT at my school.	-2.4	0.3	-1.1

Source: R-Tech Student Survey, spring 2009.
Note. Items have been coded: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), *strongly agree* (10). Items closer to 10 indicate higher levels of agreement.

The student survey also included an open-ended item in which students could write about the aspects of the program that they valued most. In addition, site visit interviews and focus group discussions also addressed the benefits students may receive from participating in R-Tech. The sections that follow combine sources to discuss the range of benefits students experienced from program participation.

Self-Paced Programs

Students agreed most strongly that technology resources allowed them to work at their own pace. In open-ended survey comments a student explained, "You don't have to wait on other people to catch up to you or work slower for the sake of other students." Other students appreciated that there was "less pressure" to work quickly with technology than in the traditional classroom. "I can go at my own pace," said a focus group student. "It feels like one-on-one tutoring, so nobody can bother me." In another focus group students said they learned more when they were able to work at their own pace. "It helps me learn at a pace [that is] best for me," noted a middle school student. "I can concentrate more and I am able to understand." Another student agreed, "If you learn at your own pace, it stays in your brain longer."

Interesting Programs

Students also agreed with the statement indicating that technology-based instruction is more entertaining than traditional classroom instruction. In focus groups discussions, many students said they enjoyed games and other “fun” ways to learn concepts included in R-Tech software programs. However, many students were excited simply to have access to technology, including computers, laptops, and iPods. “You actually want to be on [the computer],” said one focus group student, “instead of just doing a packet [of worksheets].”

Improved Learning

Students also said they learned more when they used technology. “When you listen to a teacher sometimes they go too fast, or too slow” wrote one student in an open-ended comment. “I won’t have to raise my hand and disrupt the class to learn something simple,” wrote another. “It’s like my own personal teacher.” Teachers and facilitators said that the individualized instruction provided by R-Tech accommodated different learning styles. In a district implementing iPods with content targeted to ELL students a facilitator reported that one student benefited from the auditory component of iPods. “He can’t just see it [lesson content], he has to hear it,” explained the facilitator. In one focus group, students felt that R-Tech required them to be “held more responsible” and “learn to think on [their] own.” In addition to the responsibility of self-directed learning, some students said that R-Tech instruction was “more demanding” than learning in a traditional classroom setting.

Focus on Areas of Instructional Need

Focus group students said that R-Tech allowed them to focus on the specific areas in which they needed remediation and support. “I usually use it for math for TAKS preparation because I am doing very poorly in math,” said a focus group student. “[R-Tech software] gives you a quiz and then gives you a whole list of what you struggled on and what you need help with the most,” explained a student in another district, “and then you click on that [skill] and work on it.” In another district, students appreciated that R-Tech resources facilitated review. “You can go back over it [the lesson], and if you need help you can ask the teacher,” a student explained.

Increased Confidence

Students’ survey responses also indicated that R-Tech has increased their confidence, and teachers agreed. One teacher explained that students who participated in R-Tech were “feeling better about themselves and feeling more confident.” High school teachers in another district told of a student who was able to bring up failing grades and pass the exit-level TAKS as a result of participation in R-Tech. Focus group teachers noted, “[R-Tech] increased his confidence level to the point that he is now planning on attending college …and he wasn’t.” In an open-ended survey comment, one student wrote, “I feel that I am part of the learning process and my opinion matters. I have a voice.”

Immediate Feedback

Students also agreed that technology resources supported learning by providing immediate feedback. “When I get something wrong, the computer explains what the correct answer is and tells me exactly what I did wrong and how to correct it,” said a focus group student. “Teachers don’t usually know that.” Another student in another district said, “I know if I get things right or wrong when I answer them…with explanations, instead of waiting on a teacher to grade it and *maybe* explain why the incorrect answers were [incorrect].”

Improved Grades

While surveyed students were less likely to agree that participation in R-Tech had improved their grades, teachers and program facilitators on R-Tech campuses attributed improved grades to the program. "[Students] are doing better in their class work because it [R-Tech] reinforces what they have learned in class and gives them more confidence," noted one facilitator. Some focus group students also credited improvements in grades to participation in R-Tech. "I brought my grades up," explained one student. "I thought my grades would never be this good, until they put me in this system [R-Tech]."

Missing Coursework

Although surveyed high school students were more likely to agree that R-Tech had enabled them to recover course credits than middle school students (1.5 vs. 0.0), respondents from both middle and high schools cited the benefit of recovered credits during site visit interviews. For example, a high school teacher told of a student who graduated because of participation in R-Tech:

> We had a senior this year that would not have passed math without it [R-Tech]. Being here [computer lab] with just the computer, he did not feel the intimidation factor that he felt in a classroom situation and he would still bring things to ask me, but nobody else knew that he was asking. I really think without that [support] he wouldn't have [graduated].

A facilitator in another district that implemented a middle school summer school program described how R-Tech participation helped students who had failed courses:

> It [R-Tech] allowed us to have a summer program that we would not have had otherwise… which [enabled] some middle school students who would not have passed—they would not have been able to go on to high school—but they were able to go to high school because they attended the summer program.

Other Benefits of R-Tech Participation

Convenience. In open-ended survey comments, students expressed appreciation for the convenience technology provides, indicating it "makes work quicker and easier." For example, students who had laptops no longer had to carry books and materials to class because their work was saved on the computers. Many students said that using computers enabled them to better organize their work. Several surveyed students wrote that they preferred using the Internet to reference books. "[The Internet] allows me to find answers to questions faster," explained one focus group student. "It is much faster than looking things up in a book." Another student reported that writing essays on the computer "is much easier than writing with a pencil or pen and [Spell Check] also helps you with your spelling."

Expanded access to information. The Internet enables students to connect with communities around the world and expands access to information to students in remote settings, and these benefits were not lost on R-Tech students. One surveyed student wrote, "I learned to do new things I [had] never heard of." A focus group student agreed, noting "[Internet access] helps you to get more experienced in different fields of learning" and provides information about new topics "when other people can't." In another focus group a student explained, "[The Internet] provides…information that the teacher…may not be able to give you."

Increased proficiency using technology. Participants in site visit interviews and focus groups also pointed to students' improved proficiency using computer resources as a benefit of R-Tech participation. "Students who didn't know how to use computers before now have been exposed richly," noted one principal. Several students commented that participation in R-Tech had increased their skills in using technology, as one student wrote, "[the program enabled students to] get better at using computers and other equipment." Focus group students also cited benefits from increased exposure to technology. Students in a technology immersion program said that daily use of a laptop to take notes and complete assignments was "good practice" for college. In another district, students said that increased proficiency using technology might lead to "promotions" in future employment.

THE CHALLENGES STUDENTS EXPERIENCE PARTICIPATING IN R-TECH

The student survey also asked about the challenges students experienced in participating in R-Tech. The survey contained a list of common program challenges and an open-ended item for students to enter written responses addressing what they disliked about the program. Researchers used the same approach to illustrating students' level of agreement, coding responses: *strongly disagreed* (-10), *disagreed* (-5), *unsure* (0), *agreed* (5), and *strongly agreed* (10). Table 4.10 presents students' average responses, sorted in terms of the "All Respondents" column. Again, values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Table 4.10
Students' Level of Agreement with Statements about the Challenges of R-Tech Participation, as a Mean of Respondents: Spring 2009

Challenges	Middle School (n=1,530)	High School (n=1,463)	All Respondents (N=2,993)
Computer and other technology resources at my school are often slow or broken.	-0.6	0.5	-0.1
My school's Internet connections are too slow or are often not working.	-0.6	-0.3	-0.5
I have difficulty arranging to come to school early or to stay after school to use technology resources.	-1.3	0.0	-0.7
My teacher can't fix things when something is wrong with the technology resources I use for learning.	-1.7	-1.1	-1.4
I am bored by the school work I do using technology resources.	-1.5	-1.2	-1.4
Using my school's technology resources sometimes interferes with my extra-curricular activities.	-2.1	-1.9	-2.0
The programs I need are not on the computer.	-3.4	-2.1	-2.8
I have trouble getting my questions answered when I use technology resources.	-3.4	-2.5	-3.0

Source: R-Tech Student Survey, spring 2009.
Note. Items have been coded: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), *strongly agree* (10). Items closer to 10 indicate higher levels of agreement with each statement.

Across survey items, averaged responses indicate that most students did not experience challenges participating in R-Tech; however, many of these themes emerged in site visit discussions and in students' written responses to the open-ended survey item asking what they "like least about learning with technology resources." The sections follow provide more information about the challenges students described.

System Challenges

While surveyed students expressed mild levels of disagreement, on average, with survey items stating school technology resources (-0.1) and Internet connections (-0.5) "are often slow or broken," some students entered written comments describing the challenges they experienced in working with unreliable

Internet connections and outdated computer hardware. "You never know when the technology isn't going to work and you have something important you need to get done," wrote one such student. Several surveyed students wrote comments noting teachers often assigned R-Tech assignments as homework when school Internet connections failed, which created challenges for students who did not have home computers or home Internet access. Students also commented that they were unable to "lock" work they saved on school computers, and sometimes other students would tamper with their files. Some students complained of lost work when software or school networks failed. "Sometimes my computer quits, or an application quits, unexpectedly and my [information] is lost," wrote one surveyed student. Unreliable school technology resources also created challenges for students enrolled in dual credit courses. Students wrote that video images often froze during live lectures, which caused them to miss important information and affected their course grades.

During focus group discussions conducted as part of site visits, students provided more information about the challenges created by technology failures. Students in several focus groups described frustration accessing R-Tech resources. In addition to Internet failures and unreliable school networks, students explained that many school computers were outdated and took a long time to load R-Tech programs. Students in a district implementing a school-wide immersion program reported frequent system crashes that resulted because the district lacked sufficient infrastructure to support many students accessing the Internet at the same time.

Lack of Technical Experience

Students entering written comments on the spring survey also reported that teachers' inexperience using technology, as well as their own inexperience with resources created challenges to R-Tech participation. "I hate computers," wrote one survey respondent. "They are hard to work on." One student who lacked experience using technology wrote "it takes longer using technology resources to get the task done." Another student was frustrated by "the lack of [explanations] of some terms and buttons."

Students also wrote that teachers lacked expertise using computers. Focus group students in one district explained "it's frustrating" for students with technical questions about computers "because the teachers don't know what to do, so they just send [students] to another computer." A focus group student in the district implementing a technology immersion program said, "I hate when teachers want us to do things on our laptops that aren't possible since they do not know a whole lot about some of the programs."

Challenges Using R-Tech Software

Students also reported that R-Tech software programs did not meet their needs. One survey respondent wrote, "[The programs] do not help me at all." Focus group students in a district implementing a TAKS remediation program said that software was not aligned with the format of the TAKS test; that the software required fill-in-the-blank responses while TAKS was a multiple choice test. "I don't like that it gives you more than one guess," said a focus group student in the same program, "You don't get that many guesses on the real test."

In another district, focus group students said R-Tech software did not provide sufficient instruction in key concepts or clear information about incorrect answers. One student explained:

> [At the end of the program], it will say [the question number] you got wrong, but it won't tell you what the question was or what was [the] right [answer]. So you don't know what the answer is. So you just have to keep doing it over and over again.

Focus group students in another district experienced similar challenges. One student said that R-Tech lessons "aren't clear enough…and don't give you enough resources to figure it out, so you still have questions on it." District teachers who participated in a focus group agreed. "Sometimes the explanation it [the software] gives is not quite as clear as it could be," noted one teacher. "Sometimes the lessons are not complete enough for them [students] to do independent [work]." Focus group students in another district that implemented R-Tech as a reading remediation program said that while the software adjusted content for students' reading levels, the vocabulary was often too challenging. The program highlighted new vocabulary and provided definitions for highlighted words, but a focus group student explained, "Not all the hard words are highlighted, so you can't get the definition…You're just guessing."

General Disinterest

As discussed earlier in this chapter, R-Tech facilitators and principals who responded to surveys indicated that student disinterest was a key challenge for R-Tech, and many students who participated in site visit focus groups confirmed this understanding. One focus group student who participated in a reading remediation program noted, "All you are reading is fact articles and a lot of kids read better with fiction." Students in another district focus group described R-Tech as "real boring" and "real dull." To overcome boredom, some focus group students reported using R-Tech resources to browse the Internet and listen to music online, and some focus group students said, if given the choice, they would not participate in R-Tech again.

To overcome student resistance, some districts required students to receive R-Tech services. A student responding to the online survey noted, "I dislike when teachers make [services] mandatory instead of optional." Another district assigned struggling students to receive R-Tech services during the regular school day, and scheduled R-Tech during students' elective periods, which frustrated some students. "I want to go to art class," explained one focus group student, "not just sit around and do [the R-Tech program] all day."

SUMMARY

The analyses presented in this chapter indicate that most students were identified for R-Tech services because of weak academic performance (e.g., low TAKS scores and poor grades). Students who responded to the evaluation's spring 2009 survey reported that they were most likely to participate in R-Tech during regular instructional time, at home using a home computer, at school, or during a free period. Staff on R-Tech campuses reported that many students experienced barriers to participating in R-Tech resulting from students' general disinterest, involvement in extracurricular activities, and transportation limitations that made it difficult for students to stay after school or participate in morning programs. To address barriers, districts made participation mandatory for some students and offered incentives, such as snacks, to encourage participation in R-Tech, and some districts adjusted bus schedules to enable students to stay after school for services.

R-Tech students and school staff reported a range of benefits from participation in the program, including increased academic outcomes, greater confidence, and improved proficiency using technology resources. Students appreciated self-paced programs that focused on their particular academic needs, and students liked the immediate and constructive feedback provided by some R-Tech software. Students and school staff noted that participation in R-Tech had increased students' confidence, which led to greater participation in class activities and prompted some students to consider postsecondary educational opportunities.

In addition to academic benefits, students enjoyed the convenience technology provides, such as carrying fewer books and typing instead of hand writing notes and essays. Students noted that access to online resources expanded their ability to gain information and facilitated research projects. Several students felt they benefited from increased proficiency using technology and that the skills they learned through R-Tech would assist them in college and in future employment.

Students’ dissatisfaction with R-Tech services generally resulted from school infrastructure issues rather than the program itself. For example, students described system challenges such as incompatibility between old computers and new software, slow Internet connections, and limited school bandwidth that prevented students from accessing the Internet at the same time. Several students also expressed complaints about districts’ software selections, noting R-Tech programs did not meet their instructional needs and provided insufficient instruction on key concepts.

CHAPTER 5
R-TECH AND TEACHERS

Teachers in rural districts often experience reduced professional development opportunities because of their geographic isolation and the need to travel substantial distances in order to participate in out-of-district workshops or conferences. Technology has the potential to offset these limitations by providing access to online professional development and distance learning opportunities. Several states (e.g., Tennessee, Florida, Georgia, Kentucky) have implemented statewide programs designed to provide rural teachers with timely and relevant training through the use of technology-based training methods (Southern Regional Education Board [SREB], 2005). A 2004 survey of teachers in rural schools found that an increasing number of teachers used technology to access online professional development, meet recertification requirements, participate in professional enrichment activities, obtain advanced degrees, and learn new instructional strategies (SREB, p. 9).

Recognizing the potential of technology to improve teacher performance in rural areas, R-Tech funding may be used to provide teacher professional development designed to guide the implementation of research-based instructional programs and support effective instruction in rigorous and diverse courses (TEA, 2008a, p. 4). In grant applications, all Cycle 1 grantee districts indicated that R-Tech programs would include professional development and training for teachers. This chapter presents findings about how R-Tech professional development was implemented in the pilot's first year and how training may have affected teachers (Research Question 3). The chapter considers the following questions:

- How do grantee districts and schools implement the teacher training component of the R-Tech program?
- What types of training do teachers participate in as part of the R-Tech program?
- What is the effect of R-Tech teacher training on teacher effectiveness?

In addition, the chapter addresses principals' expectations for R-Tech's effects on teachers and the opportunities beyond access to professional development that teachers may recognize from districts' participation in the R-Tech grant.

DATA SOURCES

The chapter relies on data collected through fall 2008 and spring 2009 online surveys of teachers and principals in R-Tech districts, document analysis of district grant applications, as well as information gathered through site visit interviews with principals and focus group discussions with teachers. Additional information about the teacher and principal surveys, including administration procedures, response rates, respondent characteristics, supplemental data tables, and copies of respective surveys are included in Appendix A (principal survey) and Appendix B (teacher survey). More information on the districts identified for site visits and the types of R-Tech programs they implemented is included in Appendix D.

As discussed in chapter 1, larger proportions of teachers and principals responded to fall 2008 surveys than surveys administered in spring 2009. However, information provided through fall surveys indicated that many R-Tech programs were not in place during the fall semester, and many survey respondents lacked basic information about the program. In light of this trend, this chapter's discussion focuses more heavily on results from spring surveys because spring respondents had greater awareness of the R-Tech program and its professional development component.

PRINCIPALS' EXPECTATIONS FOR R-TECH'S EFFECTS ON TEACHERS

The fall 2008 and spring 2009 surveys of principals on R-Tech campuses contained two open-ended items addressing principals' expectations for R-Tech's effects on teachers. The first question asked principals about their goals for R-Tech's effects on teachers and the second asked how they would know if goals had been met. Twenty principals entered responses to the open-ended items in fall 2008, and 40 entered responses for the spring 2009 survey. The sections that follow summarize principals' responses.

Fall 2008

There were few common themes in principals' responses to the fall survey. Six principals (30% of respondents) wrote that they hoped R-Tech would improve student-teacher interactions, and another six (30%) wrote that R-Tech would provide additional resources that would enhance classroom instruction. Two principals (10%) indicated that they wished teachers would become more aware of R-Tech, and two others expressed a desire to see teachers improve TAKS scores through the use of R-Tech resources. Principals wrote that they would know goals had been met if student achievement improved (65%) and through classroom observations of teachers (40%).

Spring 2009

Relative to principals' written responses to the fall 2008, responses to the spring survey reflected an increased understanding of the R-Tech program and an increased focus on student outcomes. A third of principals responding in spring (33%) wrote that improving student outcomes was their central goal for teachers, and 20% wished teachers would become more aware of R-Tech. Several principals responded that they expected to see teachers increase their use of technology in the classroom (15%). One principal wrote, "I want our teachers to receive training and utilize technology equipment in class. I want integrated lessons and technology almost daily as part of the lesson."

Principals' responses to the open-ended item asking how they would know goals had been met also suggest that principals had increased their awareness of the R-Tech program in spring 2009. While no principals responding to the fall survey referenced using teacher participation data as a source of information, 20% of principals responding in the spring cited documentation of teacher software use and participation in training as a means to measure whether goals had been met.[1] Principals also cited improved student achievement outcomes (55%) and classroom observations (18%) as indicators that goals had been achieved.

[1] As discussed in chapter 1, R-Tech districts are required to collect information about student and teacher participation in R-Tech services through a system of data uploads provided to TEA for summer 2008, fall 2008, and spring 2009.

Teacher Awareness of the R-Tech Program and Its Goals

Increasing teachers' awareness of the R-Tech program was a common theme in principals' goals for teachers, as indicated in their responses to the fall and spring surveys. The R-Tech teacher surveys (fall 2008 and spring 2009) included items that gauged teachers' awareness of the R-Tech program and its goals, and results indicate that few teachers were aware of R-Tech during the pilot's first year. Both surveys included a set of statements about R-Tech, and asked teachers to indicate their level of agreement with each statement or whether they *didn't know* how to respond to the statement. Researchers coded their responses: *strongly disagreed* (-10), *disagreed* (-5), *unsure* (0), *agreed* (5), and *strongly agreed* (10) as a means to clearly illustrate variations in teachers' levels of agreement. Table 5.1 presents teachers' mean responses, sorted in terms of the "Spring 2009" column. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Table 5.1
Teachers' Levels of Agreement: R-Tech Goals and Outcomes, as a Mean of Respondents: Fall 2008 and Spring 2009

Statements about Goals	Fall 2008 (N=1,213)	Spring 2009 (N=568)
Overall, I am pleased with the services provided by R-Tech.	2.1	2.8
R-Tech is positively affecting student achievement on campus.	2.1	2.8
Vender services are aligned with the TEKS/TAKS.	2.1	2.6
Vender services are aligned with our campus goals.	1.9	2.2
Goals are clearly communicated.	1.0	1.4
I use information from student's Personal Education Plans when I plan classroom instruction.	0.1	0.2

Sources: R-Tech Teacher Survey, fall 2008, spring 2009.
Note. Items have been coded: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), *strongly agree* (10). Items closer to 10 indicate higher levels of agreement with each statement.

Across all statements, teachers' average levels of agreement increased from fall to spring. In addition the percentages of teachers responding that they *didn't know* to each item decreased from fall to spring (see Table B.5 in Appendix B). This pattern suggests that teacher awareness of R-Tech improved somewhat over the course of first year implementation. Although many teachers were still unfamiliar with R-Tech in spring 2009, spring survey responses indicate that they were pleased with R-Tech services (2.8) and that the program was positively affecting student achievement (2.8). Statements receiving the lowest ratings addressed the clear communication of R-Tech goals (1.4) and teachers' use of PEPs to plan instruction (0.2). These findings underscore principals' concerns about teacher awareness of R-Tech and raise questions as to whether the program had a meaningful effect on teachers in its first year.

R-TECH PROFESSIONAL DEVELOPMENT

In grant applications, all R-Tech districts indicated plans to offer vendor-provided training designed to introduce teachers to software purchased with R-Tech funds, and many districts planned to offer additional professional development activities in support of R-Tech. Table 5.2 presents the additional training areas that were common across at least five district applications, and indicates that the largest proportions of districts planned additional training in vertical alignment (28%), instructional technology (27%), and pedagogical best practices (23%).

Table 5.2
R-Tech Professional Development Opportunities for Teachers, District Grant Applications: 2008

Professional Development Topic	Number of Districts	Percentage of Districts (N=63)
Vertical alignment, collaboration, mentoring	18	28.1%
Instructional technology	17	26.5%
Best practices/pedagogy	15	23.4%
Distance learning	11	17.4%
Training in computer hardware	11	17.0%
R-Tech pilot program	9	14.0%
TEKS/TAKS preparation	9	14.0%
Educating at-risk student groups	7	10.9%
Dual credit opportunities	6	9.4%
Multimedia training	5	7.8%

Source: Analysis of R-Tech district applications.
Note. Percentages will not total to 100%. Districts indicated multiple training topics.

The fall 2008 and spring 2009 surveys asked teachers whether they participated in training related to R-Tech, the number of hours spent in R-Tech training, and the total number of hours spent in any type of professional development activity since May 2008 (i.e., across R-Tech's first implementation year). However, fewer than 5% of respondents to the fall survey were aware of training related to R-Tech. Given the small percentage of fall survey respondents with knowledge of R-Tech professional development activities, the following discussion is limited to results from the spring survey administration when teachers had greater awareness of R-Tech training opportunities.

In spring 2009, teachers indicated that had participated in an average of 21 hours of professional development, and 38% of teachers (215 individuals) knew that they had participated in R-Tech training. These teachers estimated they spent 13 hours, on average, in professional development activities related to R-Tech. However, not all teachers were clear that they received R-Tech training. Thirty-seven percent of respondents reported that they did not know if they had participated in R-Tech training over the course of the program's first year. In response to an open-ended item asking about the most useful aspects of R-Tech training, one teacher explained, "I don't know, exactly, what all [of the professional development] was considered R-Tech."

Types of R-Tech Professional Development Offered

Spring 2009 survey respondents who knew they participated in R-Tech professional development indicated the content of the training they received through the grant. Figure 5.1 presents the percentage of teachers who responded to each type of professional development. Most respondents reported they participated in training related to TEKS/TAKS preparation (83%), integrating technology into instruction (77%), working with at-risk students (76%), using instructional hardware (67%), using vendor software (66%), and curricular alignment (60%).

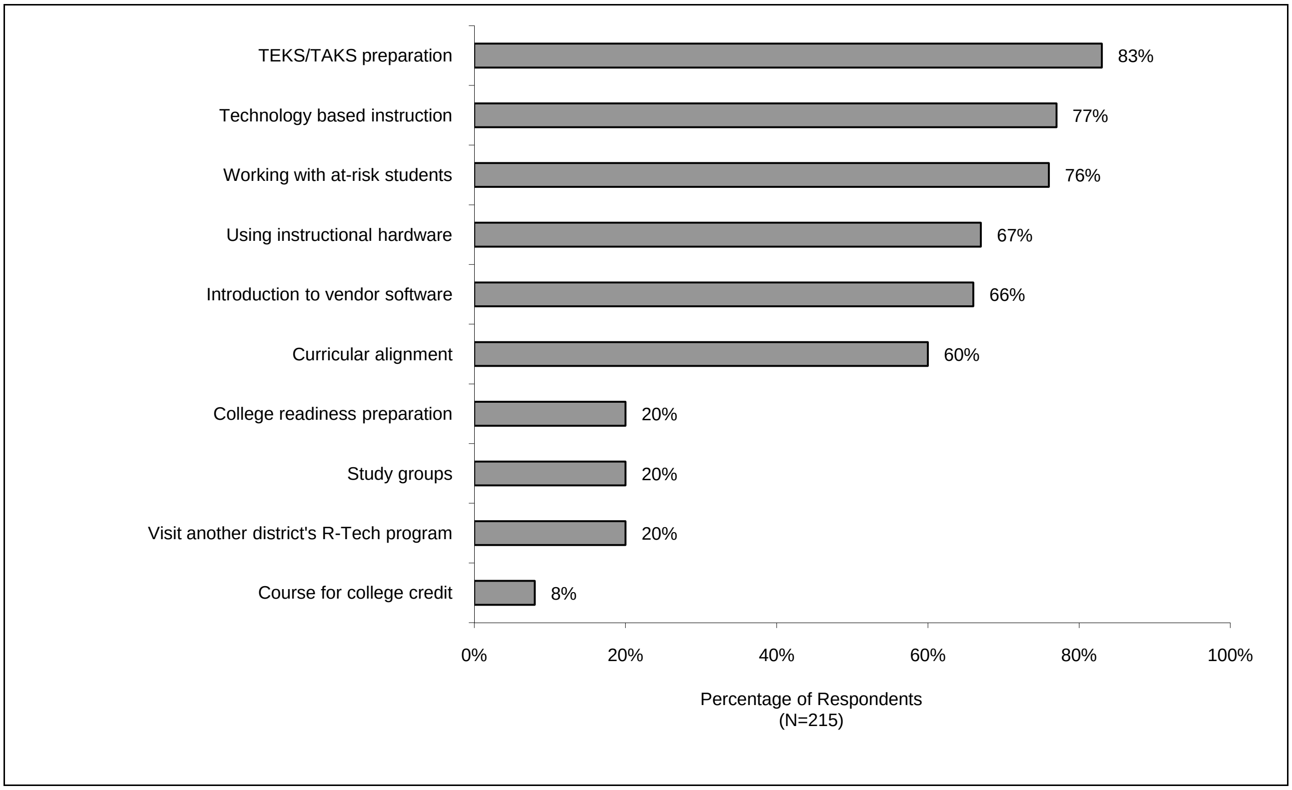

Figure 5.1. Content of R-Tech professional development: spring 2009.
Source: R-Tech Teacher Survey, spring 2009.
Notes. Percentages will not total to 100. Teachers indicated multiple topics for R-Tech professional development.

Format of Training

Teachers who participated in R-Tech training also described the format of professional development opportunities, indicating whether the trainings were conducted *online*, *face-to-face*, or presented using *other* formats. As presented in Figure 5.2, across all training topics, a majority of teachers participated in *face-to-face* training. With the exception of "College readiness preparation" (21%), fewer than 20% of teachers reported participating in online professional development.

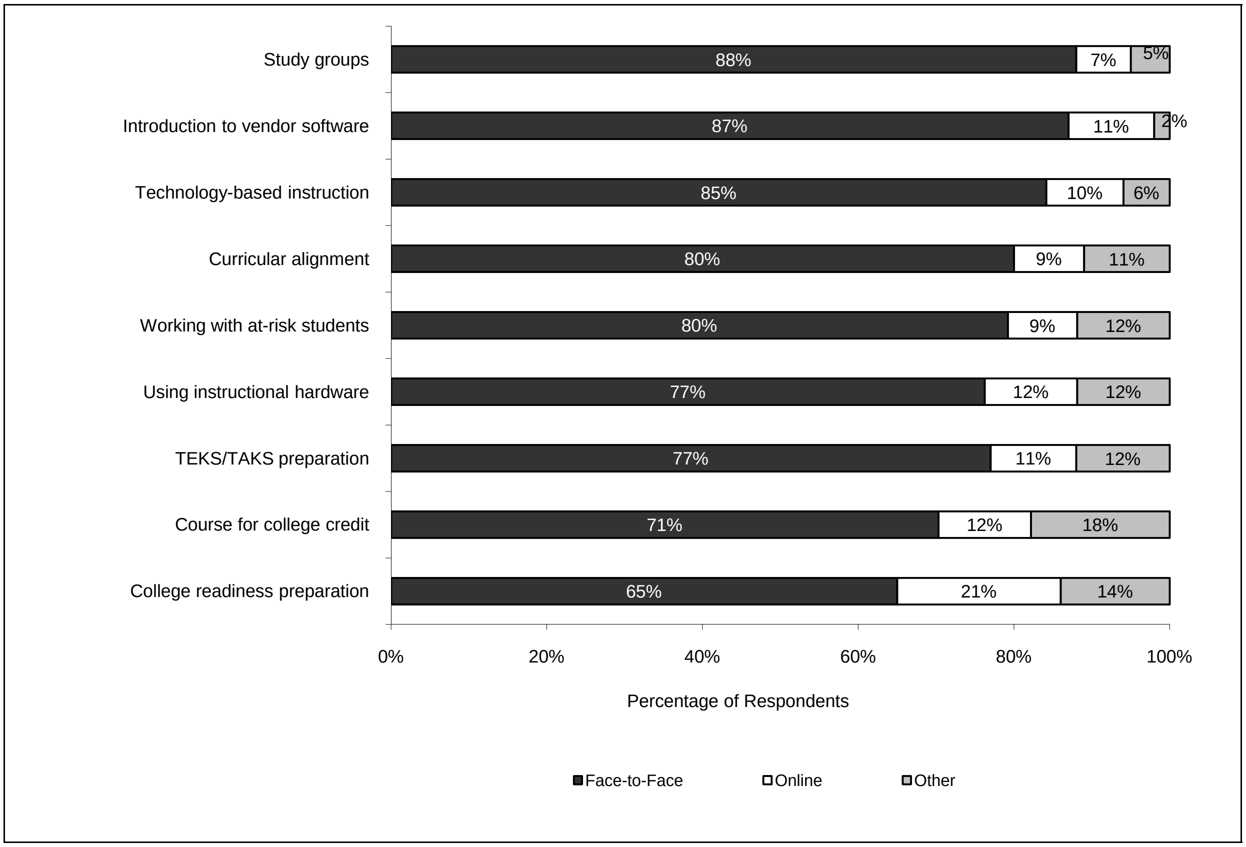

Figure 5.2. Format of R-Tech professional development, as a percentage of respondents: spring 2009.
Source: R-Tech Teacher Survey, spring 2009.
Note. The number of respondents to each item ranges from 17 to 179 because only teachers indicating they received each type of training selected the format of the training. No space was provided for teachers to indicate what "other" formats may have been.

Online training. Although few surveyed teachers participated in online professional development activities provided through R-Tech, district-provided data reported to TEA for the grant's first implementation year indicates that more than 800 teachers (about 22% of all teachers on R-Tech campuses) received R-Tech funded online training during the 2008-09 school year. Similar to the student use data districts report to TEA, districts also report information about teachers' use of online training resources for the summer 2008, fall 2008, and spring 2009 reporting periods. Table 5.3 presents the average number of hours teachers used online resources for the fall 2008 and spring 2009 reporting periods. District reports indicated that no teachers accessed R-Tech online professional development resources in summer 2008.

Table 5.3
Average Hours Teachers Spent in R-Tech Online Professional Development Activities: Fall 2008 and Spring 2009

Reporting Period	Elementary School Teachers[a] (n=28)	Middle School Teachers (n=281)	High School Teachers (n=449)	Combined Middle and High School Teachers (n=44)	All Teachers (N=802)
Fall 2008	8.3	10.2	9.6	4.7	9.5
Spring 2009	1.5	8.7	6.0	7.2	6.9
Year Total	**9.7**	**18.8**	**15.6**	**11.9**	**16.3**

Source: Texas Education Agency (TEA) R-Tech Teacher Upload data, fall 2008, spring 2009.
[a]Seven R-Tech campuses are elementary schools that enroll students in Grade 6.

Results indicate that most teachers spent more time, on average, with R-Tech's online professional development resources in the fall than in the spring (10 hours vs. 7 hours for "All Teachers"), and middle school teachers spent the most time using R-Tech (19 hours). Notably, the average hours elementary school teachers spent using R-Tech online professional development activities dropped from 8 hours in fall 2008 to about 2 hours in spring 2009. The reduced use may suggest that online training activities were not well matched to elementary school teachers' needs.

Teachers' Perceptions of R-Tech Professional Development

The spring 2009 teacher survey also contained open-ended items asking teachers about the most and least useful aspects of the training they received through R-Tech. In addition, teachers participating in focus group discussions conducted as part of site visits to R-Tech districts discussed their perceptions of R-Tech training. The following sections summarize teachers' responses.

The most useful aspects of R-Tech professional development. Of the 215 teachers who knew they participated in R-Tech training across the pilot's first year, 68% (147 teachers) entered written responses describing the aspects of the training that they felt were most useful. Researchers coded written entries to identify common themes across responses and calculated the percentage of responses by theme. Table 5.4 presents the percentages of teachers indicating useful aspects of training. The largest proportion of teachers (29%) indicated that learning how to integrate technology into instruction was the most useful aspect of training. Teachers noted the value of learning to integrate technology resources such as laptops, digital whiteboards (i.e., Smart Boards), and document cameras into classroom instruction. A somewhat smaller proportion of teachers (26%) wrote that the introductions to vendor programs and software were valuable. Teachers appreciated time spent with product vendors and learning software capabilities. Other teachers were pleased to learn how to use new technology resources (17%) and to have the opportunity for hands-on practice with R-Tech resources (12%).

Table 5.4
Teachers' Perceptions of the Most Useful Aspects of R-Tech Professional Development, as a Percentage of Respondents: Spring 2009

Most Useful Aspect	All Respondents (N=147)
Learning how to integrate technology into instruction	28.6%
Becoming acquainted with the program/software	25.9%
Learning to use new hardware	17.0%
Hands-on practice	12.2%
Recognizing the benefits for students	11.6%
Face-to-face assistance with trainers and other teachers	10.2%
How to use reports and data to monitor students' progress	4.8%
How to relate programs to TAKS	4.1%
Learning about the R-Tech pilot	3.4%

Source: R-Tech Teacher Survey, spring 2009.
Notes. The number of respondents (N) represents teachers responding to an open-ended item. Percentages will not total to 100 because some teachers' responses included information counted in multiple categories.

During focus group discussions conducted as part of site visits, teachers provided more information about what they found useful about training. At one high school implementing a technology immersion project in which all teachers and students received laptops, teachers were enthusiastic about the potential for laptops to transform teaching. One focus group teacher explained, "I was amazed…[laptops are] so much different than our desktops." Another teacher added "I think the whole thing [R-Tech] is overwhelming because [there's] just *so* much you can do [using laptops]." A middle school teacher on a campus implementing a self-paced tutoring program appreciated learning how to use the software to differentiate instruction. "The training [addressed] how to give individualized assignments…so you know they're [students] doing what you want them to do." Focus group teachers also said that interactive, hands-on training increased their retention of newly learned skills.

The least useful aspects of R-Tech professional development. Only 31% of teachers (67 respondents) who participated in R-Tech professional development entered written comments addressing the least useful aspect of training. Similar to findings for the most useful aspects of training, researchers coded teachers' responses across common themes, and calculated the percentage of responses by theme. As presented in Table 5.5, the largest proportion of teachers objected to training that was not relevant to the courses they taught (27%). For example, one science teacher found the training "worthless" because the campus' R-Tech vendor provides remediation in reading comprehension. The teacher indicated the science team is "not going to use the [the program]…because [they] *can't* use [the program]." Another teacher noted that unless access to computers was expanded, it would be difficult to incorporate training into classroom instruction. "I could not see how to use the material in my classroom," wrote the teacher, "unless I had an opportunity to use computers much more often than they are available."

Nineteen percent of teachers planned to use R-Tech resources but reported that the training did not provide enough in-depth information to implement resources effectively. One teacher wrote, "[The training] only went over the basics." In contrast, 12% of teachers felt overwhelmed because training addressed "too much information in a short period of time." One survey respondent wrote, "The training was very compressed. I would have learned more from a longer in-service." Several survey respondents expressed an interest in continuing training. One teacher reported it would be beneficial for teachers "to get a refresher course later on." Another teacher agreed additional training would be valuable, writing "I need more professional development."

Table 5.5
Teachers' Perceptions of the Least Useful Aspects of R-Tech Professional Development, as a Percentage of Respondents: Spring 2009

Least Useful Aspect	All Respondents (N=67)
Content not relevant to field of instruction	26.9%
Not enough in-depth information	19.4%
Too much material in a short period of time	11.9%
Program glitches	7.4%
Too early in the year-need refreshers	6.0%
Already familiar with the program	6.0%
Hardware problems hindered practicing with program	4.5%
Not enough practice/hands-on opportunities	4.5%

Source: R-Tech Teacher Survey, spring 2009.
Notes. The number of respondents (N) represents teachers responding to an open-ended item. Percentages will not total to 100 because some teachers' responses included information counted in multiple categories.

Teachers participating in site visit focus groups expressed similar concerns about training. In a district that implemented a self-paced tutorial program for reading/ELA, math and science teachers felt they did not need to participate in training in software that did not support their subject areas. Teachers in a technology immersion program felt that they should have been provided with laptops and training prior to students receiving laptops. "I would much rather have the teachers get their computers and use them for a year and *then* give them to the kids," explained one teacher. A principal in the immersion district felt that the vendor-provided training in the use of resources was ineffective. "The [vendor] training, in my opinion, did no real service for them [teachers]," explained the principal, "I would have much rather had them have more time for content area integration [training]."

ADDITIONAL OPPORTUNITES PROVIDED BY R-TECH

During spring 2009 site visits to R-Tech districts, researchers asked teachers participating in focus groups about the additional opportunities the grant may have created for teachers. Responses indicate that R-Tech increased teachers' ability to access technology, diversify and individualize instruction, and increase student engagement in learning. In some districts, however, principals and teachers said that teachers had not made full use of the opportunities provided by R-Tech during the program's first year.

Increased Access to Technology

In focus group discussions, many teachers cited increased access to technology as a primary benefit to R-Tech participation. Teachers in a district that used R-Tech funding to add a computer lab that was open and staffed throughout the school day and before and after school said that they were now able to assign homework that required students to use technology. "It's nice to be able to actually assign something with technology and know it's not going to take a week," explained a teacher. "They [students] can't use 'not having a computer' as an excuse." Another teacher in the focus group appreciated that the district had hired a full time facilitator for the lab, noting "the biggest thing is we know someone is in there [the lab], so we can send our kids before, during, and after school." Teachers in a district implementing a technology immersion program said that they used laptops and Internet-based activities in their classrooms, but assigning homework was difficult because many students did not have Internet access at home.

Increased Ability to Differentiate Instruction

Focus group teachers said that increased access to technology enabled differentiated and individualized instruction. Teachers in one district sent groups of students to computer labs to access R-Tech resources while other students remained in the classroom and received direct instruction. Teachers in another district explained:

> I like the aspect of the individuality of it. There is no way to teach one-on-one in the classroom…. [But with the program], students can work on the areas that they need and the student sitting next to them can be working on the area that he/she needs… and it's not a big strain on us to do that.

Teachers in several districts said that the detailed reports provided by R-Tech software programs enabled greater differentiation in classroom instruction. One such teacher explained that the reports provided a "different perspective of students' successes and struggles" relative to more traditional forms of assessment.

Increased Student Engagement

Across site visit districts, teachers said that students were more engaged when instruction included technology. One teacher explained, "[Technology] makes it [instruction] more interesting when they're [students] hands on and using computers, which they love." In another district, teachers reported, "Our kids seem to really get excited about technology and just being on the computer and doing something different than a textbook." Another teacher added that students were engaged by the instructional games included in R-Tech software, which made instruction easier. "You're not fighting them [when they use the software]," explained the teacher.

Missed Opportunities

Although many teachers said that R-Tech increased opportunities, some interview respondents felt that R-Tech resources were underused in the program's first year. One principal noted that increased access to technology only *provides* opportunities and teachers must *take advantage* of opportunities to realize benefits. The principal explained, "I would say [R-Tech] has created opportunities. I don't know if anything is being done with [the opportunity], but the opportunity is there." A principal on another campus expressed a similar view:

> I don't think we've done a good job of making the whole staff aware of the possibilities….I don't think [teachers] see that it [R-Tech] could be a really powerful component.…I wished we used it more effectively [during the first year]—it's a work in progress.

A teacher focus group participant agreed, noting "As far as opportunities go, some [teachers] are taking greater advantage than others." A principal in another district planned to encourage greater teacher participation in the grant's second year, explaining "With increased technology comes an increased expectation [that it will be used]."

R-TECH'S FIRST YEAR EFFECTS ON TEACHERS

The fall 2008 and spring 2009 teacher surveys contained items that asked teachers about how R-Tech may be affecting their professional growth, knowledge, and instruction. Teachers were provided with a list of statements about R-Tech's effects and were asked to indicate their level of agreement with each statement or whether they *didn't know* if they had experienced the effect. Researchers coded their responses: *strongly disagreed* (-10), *disagreed* (-5), *unsure* (0), *agreed* (5), and *strongly agreed* (10) as a means to illustrate variations in teachers' levels of agreement. Table 5.6 presents teachers' mean responses for the fall and spring survey administrations. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement. Results again indicate that teachers gained greater awareness of R-Tech over the pilot's first year. Across all statements, teachers' average levels of agreement increased from fall to spring. In addition, the percentage of teachers who responded that they *didn't know* to each statement decreased across survey administrations (see Table B.6 in Appendix B). In spring, most survey respondents expressed a greater awareness of technology-based learning (3.3), increased opportunities for technology-based professional development (2.8), and improved technical skills (2.7). However, smaller percentages of teachers agreed that growth has translated into improved instruction (2.2) or improved lesson plans (1.8).

Table 5.6
Effects of R-Tech Implementation on Teachers, as a Mean of Respondents, by Semester: Fall 2008 and Spring 2009

Positive Effects	Fall 2008 (N=1,213)	Spring 2009 (N=568)
I have a greater awareness of technology-based learning opportunities for students.	2.6	3.3
I have the opportunity to participate in technology-based professional development.	2.6	2.8
My technical skills and abilities have improved.	2.1	2.7
I have a better understanding of the needs of at-risk students.	1.8	2.3
My teaching has improved.	1.7	2.2
My lesson plans have improved.	1.4	1.8

Source: R-Tech Teacher Survey, fall 2008, spring 2009.
Note. Items have been coded: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), *strongly agree* (10). Items closer to 10 indicate higher levels of agreement with each statement.

In site visit interviews, several principals provided explanations for R-Tech's relatively weak effects on teachers over its first year. One principal said, "When you first get a program it's hard to have that buy-in with teachers, and it does take some time…and proven success with the kids." A principal in another district felt that weak communication about R-Tech had affected teacher outcomes. "It [communication] could have been better. I can tell you that," said the principal. "I think those [teachers] that use it [R-Tech resources] on a regular basis know more about it, but there are some that probably don't know what it is."

SUMMARY

Results presented in this chapter indicate that while principals expect R-Tech to affect teachers in ways that lead to improved student outcomes, R-Tech has had a relatively weak effect on teachers' instruction during its first implementation year. Few surveyed teachers were aware of R-Tech in fall 2008, and while awareness of the program improved from fall to spring, less than half of teachers responding to the spring 2009 survey indicated that R-Tech had improved teaching or lesson plans, and less than a third used students' PEPs to guide instruction. Teachers were more likely to report R-Tech's effects in terms of access to technology resources, training in the use of resources, and greater awareness of opportunities for students to participate in technology-based learning.

Although all Cycle 1 grantee districts indicated plans to offer professional development opportunities as part of R-Tech, relatively few surveyed teachers had participated in training related to R-Tech during the pilot's first year. Teachers who received R-Tech training appreciated learning how to integrate technology into classroom instruction and learning about vendor-provided resources. Most training provided through R-Tech was delivered in face-to-face formats, and few teachers reported participating in online professional development activities. District-provided data on teachers' access to online training indicate that middle school teachers spent about 19 hours, on average, using online resources relative to 16 hours for high school teachers, but the amount of time high school and middle school teachers spent using resources decreased from fall to spring.

To some extent, R-Tech’s weak effects on teachers during its first year of implementation may have resulted from poor communication of grant goals and opportunities. Surveyed teachers indicated that R-Tech’s goals had not been clearly communicated, and interviewed principals suggested that lack of communication about the pilot limited teacher awareness. Principals also explained that more time was needed to establish R-Tech programs and to encourage teacher buy-in.

CHAPTER 6
R-TECH STUDENT OUTCOMES

A central focus of the evaluation is whether R-Tech services affect students' academic outcomes, including TAKS scores (Research Question 4). However, as discussed in chapter 1, standardized tests may lack the sensitivity to detect the effects of supplemental programs in which students spend a relatively small proportion of their instructional time. Further, it is difficult for researchers to isolate the effects of supplemental instruction from the many other factors that affect students' performance on standardized tests. To offset the limitations of standardized tests, the evaluation considers a variety of student outcomes, including graduation outcomes, course completion rates, and indicators of college readiness. While the broader range of outcomes will be included in the final evaluation report (fall 2010), the only 2009 outcome data available at the time of the second interim report's writing were students' spring 2009 TAKS scores. Therefore, the analyses presented in this chapter are limited to students' testing outcomes and consider the following questions:

- What is the effect of R-Tech on students' TAKS outcomes?
- Is there a relationship between students' access times and TAKS outcomes?
- Is there a relationship between R-Tech program configurations and students' TAKS outcomes?

The chapter begins with a discussion of data sources included in analyses and an overview Texas' system of standardized testing. Subsequent sections present analyses of students' progress toward meeting TAKS standards and the results of HLM analyses of the effects of access time and program type on students' TAKS outcomes.

DATA SOURCES

The chapter incorporates a range of quantitative data sources. Analyses draw on students' testing outcomes and demographic data included in PEIMS, as well as information included in district-provided student usage data. As discussed in chapter 1, R-Tech districts submitted information on students' program participation for the summer 2008, fall 2008, and spring 2009 reporting periods through a system of data uploads hosted by TEA. District reports included the average number of hours per week individual students accessed R-Tech resources, as well as the subjects they studied.

In addition, analyses consider the program configurations implemented during R-Tech's first year. As discussed in chapter 3, researchers used R-Tech grant applications and progress reports to identify five non-discrete categories of R-Tech programs: (1) self-paced instructional programs, (2) dual credit/distance learning programs, (3) one-to-one tutoring with online instructional support, (4) school-wide technology immersion programs, and (5) iPods loaded with instructional content. The categories are non-discrete because districts may implement R-Tech differently at the high school and middle school levels. For example, a district may choose to implement self-paced tutoring for its middle school students but offer dual credit coursework for high school students. Researchers further identified whether R-Tech was implemented as a supplemental program in which instruction was provided outside of students' regularly scheduled classes or whether R-Tech services were incorporated into regular classroom instruction (i.e., non-supplemental programs).

OVERVIEW OF THE TEXAS ASSESSMENT OF KNOWLEDGE AND SKILLS (TAKS)

The TAKS is Texas' criterion-referenced assessment that measures students' mastery of the state's content standards, the TEKS. At the middle school level, TAKS assesses reading and mathematics at Grades 6, 7, and 8, writing at Grade 7, and science and social studies at Grade 8. At the high school level, TAKS assesses reading/ELA and mathematics at Grades 9, 10, and 11, and science and social studies at Grades 10 and 11. This evaluation incorporates several types of TAKS scores.

- **Met the standard.** This score represents satisfactory academic achievement. Students who meet this standard performed at a level that was at or somewhat above the state passing standard. Thus, students demonstrated a sufficient understanding of the knowledge and skills measured at the grade level.
- **Commended performance.** This score represents high academic achievement. Students who meet this standard performed at a level that was considerably above the state passing standard. Therefore, students demonstrated a thorough understanding of the knowledge and skills measured at the grade level.
- **TAKS scale score**. The scale score is a statistic that provides a comparison of scores with a standard set at 2100 for each grade level. The scale score can be used to determine whether a student met the minimum standard (a scale score of 2100) or achieved commended performance (a scale score of 2400 or above), but it cannot be used to evaluate a student's progress across grades or subject areas. TAKS scale scores are used to calculate standardized scores for this evaluation.

Texas has phased in increasingly rigorous passing standards on the TAKS. In 2004-05, passing standards recommended for reading, mathematics, writing, social studies, and Grade 5 science by the State Board of Education panel were fully implemented. For the newer Grade 8 science test, the panel-recommended standard had to be met in 2007-08. For this evaluation, all TAKS scores reported are based on panel-recommended standards.

PROGRESS IN MEETING TAKS STANDARDS

TAKS Reading

One measure of student academic outcomes is their progress toward meeting TAKS passing and commended performance standards. The data in Table 6.1 represent two cohorts of students in R-Tech schools—those who participate in R-Tech services and those who do not (i.e., non-participants)—who took the TAKS reading test in both spring 2008 and spring 2009. [1] Using these data, one can compare the absolute TAKS reading performance of students who participated in R-Tech activities and students who did not participate in R-Tech activities.

[1] A cohort is a group of students who experience certain events in a specified period of time. For example, the cohort of participating students attended R-Tech campuses in 2008-09, took part in R-Tech instructional activities at those campuses, and took the TAKS reading test in both spring 2008 and spring 2009. The cohort of non-participating students attended R-Tech campus in 2008-09, did not take part in R-Tech instructional activities, and took the TAKS reading test in both spring 2008 and spring 2009.

Table 6.1
Cohort Longitudinal TAKS Passing and Commended Performance Rates for Reading: R-Tech Participants and Non-Participants

TAKS Test	Group	N	2007-08 Percent	2008-09 Percent	2008 to 2009 Percentage Change
Met Standard					
Grade 5 to 6	Participants	403	82.9	91.8	8.9
	Non-Participants	683	85.8	94.1	8.3
Grade 6 to 7	Participants	1,505	90.4	82.5	-7.9
	Non-Participants	2,117	94.6	90.4	-4.2
Grade 7 to 8	Participants	1,537	77.4	90.5	13.1
	Non-Participants	3,020	93.7	96.6	2.9
Grade 8 to 9	Participants	1,715	91.4	90.9	-0.5
	Non-Participants	2,745	94.1	93.5	-0.6
Grade 9 to 10	Participants	1,723	89.7	88.2	-1.5
	Non-Participants	3,566	93.0	91.8	-1.2
Grade 10 to 11	Participants	1,475	91.2	93.3	2.1
	Non-Participants	3,360	91.9	95.4	3.5
Total	Participants	8,358	87.9	89.2	1.3
	Non-Participants	15,491	93.0	93.7	0.7
Commended Performance					
Grade 5 to 6	Participants	403	27.5	33.5	6.0
	Non-Participants	683	29.4	50.5	21.1
Grade 6 to 7	Participants	1,505	38.9	22.5	-16.4
	Non-Participants	2,117	51.5	33.4	-18.1
Grade 7 to 8	Participants	1,537	20.9	36.4	15.5
	Non-Participants	3,020	35.6	54.4	18.8
Grade 8 to 9	Participants	1,715	42.0	18.3	-23.7
	Non-Participants	2,745	54.2	23.5	-30.7
Grade 9 to 10	Participants	1,723	29.8	12.8	-17.0
	Non-Participants	3,566	37.2	19.0	-18.2
Grade 10 to 11	Participants	1,475	16.7	26.5	9.8
	Non-Participants	3,360	17.4	29.6	12.2
Total	Participants	8,358	29.9	23.4	-6.5
	Non-Participants	15,491	37.2	32.4	-4.8

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Notes. Students attended a campus participating in the R-Tech program in 2008-09. Participants took part in R-Tech instructional activities at one of the participating campuses. Non-participants attended an R-Tech participating campus but did not take part in R-Tech instructional activities. The grade level is the student's grade in 2008-09.

Results show that students participating in R-Tech had lower TAKS passing rates in both spring 2008 and spring 2009 than students who were not participating in R-Tech. The overall passing rate gain of 1.3 percentage points for participants was slightly larger than the overall gain of 0.7 percentage points for non-participants. Participants had larger gains (or smaller losses) than non-participants at Grades 6, 8, and 9, but smaller gains (or larger losses) at Grades 7, 10, and 11. The largest gain by participants was 13.1 percentage points at Grade 8. R-Tech participants also had lower commended performance rates than non-participants in both spring 2008 and spring 2009. The overall commended performance rate changes favored non-participants (a loss of -6.5 percentage points for participants and a loss of -4.8 percentage points for non-participants). Participants had smaller commended performance losses than non-participants at Grades 7, 9, and 10, but smaller gains at Grades 6, 8, and 11.

TAKS Mathematics

Table 6.2 compares the TAKS mathematics performance of participating and non-participating students in R-Tech schools. Similar to TAKS reading, these data represent cohorts of students who have taken the TAKS mathematics test in both spring 2008 and spring 2009. The table shows that students participating in R-Tech had considerably lower mathematics passing rates in both spring 2008 and spring 2009 than non-participants. However, passing rate gains favored participating students. The overall gains were 1.8 percentage points for participants and 0.2 percentage points for non-participants. Participants had larger gains (or smaller losses) than non-participants at Grades 7, 8, 10, and 11, but larger losses at Grades 6 and 9.

Overall, students had greater difficulty meeting commended performance standards for mathematics compared to reading. As with TAKS reading, participants had lower commended performance scores than non-participants. The overall commended performance changes favored non-participating students. The overall changes were -1.4 percentage points for participants and -0.1 percentage points for non-participants. At Grades 7 and 10, participants had smaller losses, while at Grades 6, 8, 9, and 11, non-participants had larger gains.

Table 6.2
Cohort Longitudinal TAKS Passing and Commended Performance Rates for Mathematics: R-Tech Participants and Non-Participants

TAKS Test	Group	N	2008 Percent	2009 Percent	2008 to 2009 Percentage Change
Met Standard					
Grade 5 to 6	Participants	400	83.8	78.3	-5.5
	Non-Participants	684	85.1	83.0	-2.1
Grade 6 to 7	Participants	1,506	77.4	75.6	-1.8
	Non-Participants	2,122	86.4	82.9	-3.5
Grade 7 to 8	Participants	1,539	66.7	71.7	5.0
	Non-Participants	2,990	87.0	87.0	0.0
Grade 8 to 9	Participants	1,685	70.3	63.3	-7.0
	Non-Participants	2,724	80.5	75.5	-5.0
Grade 9 to 10	Participants	1,723	58.0	57.5	-0.5
	Non-Participants	3,539	74.1	68.3	-5.8
Grade 10 to 11	Participants	1,454	62.2	79.5	17.3
	Non-Participants	3,326	71.0	84.5	13.5
Total	Participants	8,307	67.6	69.4	1.8
	Non-Participants	15,385	79.2	79.4	0.2
Commended Performance					
Grade 5 to 6	Participants	400	32.0	22.0	-10.0
	Non-Participants	684	34.4	40.4	6.0
Grade 6 to 7	Participants	1,506	27.0	11.4	-15.6
	Non-Participants	2,122	40.6	22.7	-17.9
Grade 7 to 8	Participants	1,539	11.4	14.7	3.3
	Non-Participants	2,990	20.0	25.8	5.8
Grade 8 to 9	Participants	1,685	13.2	17.4	4.2
	Non-Participants	2,724	19.6	25.0	5.4
Grade 9 to 10	Participants	1,723	14.3	8.5	-5.8
	Non-Participants	3,539	23.7	14.2	-9.5
Grade 10 to 11	Participants	1,454	13.5	22.8	9.3
	Non-Participants	3,326	15.9	26.4	10.5
Total	Participants	8,307	16.5	15.1	-1.4
	Non-Participants	15,385	23.4	23.3	-0.1

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Notes. Students attended a campus participating in the R-Tech program in 2008-09. Participants took part in R-Tech instructional activities at one of the participating campuses. Non-participants attended an R-Tech participating campus but did not take part in R-Tech instructional activities. The grade level is the student's grade in 2008-09.

TAKS Social Studies, Science, and Writing

While the TAKS reading and mathematics tests are administered annually, TAKS science, social studies, and writing tests are administered periodically. Because of this, cross-sectional, rather than cohort data, are presented in the tables that follow. Instead of reporting TAKS scores for the same group of students at two points in time (spring 2008 and spring 2009), researchers reported TAKS scores for two different groups of students at two points in time. For example, in Table 6.3, science scores are reported for students who were in Grade 8 in spring 2008 (baseline measure) and for students who were in Grade 8 in spring 2009. For both years, scores are reported for students who participated and did not participate in R-Tech in 2008-09.

TAKS Science. In Table 6.3, the results for TAKS science show that, similar to reading and mathematics, students participating in R-Tech had lower passing rates and commended performance rates than non-participants. The 2008 to 2009 change in passing rates was similar for participant groups and non-participant groups (0.6 percentage points for participant groups and 0.2 percentage points for non-participant groups). The 2008 to 2009 change in commended performance rates was slightly higher for the non-participant groups (2.5 percentage points for non-participant groups and 0.4 percentage points for participant groups).

Table 6.3
Cross-Sectional Longitudinal TAKS Passing and Commended Performance Rates for Science: R-Tech Participants and Non-Participants

TAKS Test	Group	2008		2009		2008 to 2009
		N	Percent	N	Percent	Difference
Met Standard						
Grade 8	Participants	1,717	59.6	1,923	61.8	2.2
	Non-Participants	3,427	74.7	3,617	77.0	2.2
Grade 10	Participants	1,640	62.6	2,081	58.0	-4.6
	Non-Participants	4,110	68.3	4,260	68.1	-1.1
Grade 11	Participants	1,196	77.1	1,637	80.6	3.5
	Non-Participants	4,039	85.5	3,784	86.3	0.4
All Grades	Participants	4,553	65.3	5,641	65.9	0.6
	Non-Participants	11,576	76.2	11,661	76.8	0.6
Commended Performance						
Grade 8	Participants	1,717	13.3	1,923	14.5	1.2
	Non-Participants	3,427	22.1	3,617	25.2	3.1
Grade 10	Participants	1,640	12.0	2,081	7.7	-4.3
	Non-Participants	4,110	11.7	4,260	11.5	-0.2
Grade 11	Participants	1,196	9.3	1,638	15.2	5.9
	Non-Participants	4,049	11.8	3,784	16.2	4.4
All Grades	Participants	4,553	11.8	5,642	12.2	0.4
	Non-Participants	11,586	14.8	11,661	17.3	2.5

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Note. Students attended a campus participating in the R-Tech program in 2008-09. Participants took part in R-Tech instructional activities at one of the participating campuses. Non-participants attended an R-Tech participating campus but did not take part in R-Tech instructional activities.

TAKS Social Studies. Results for TAKS social studies in Table 6.4 show that, once again, participants had lower passing rates and commended performance rates than non-participants. The 2008 to 2009 change in passing rates and commended performance rates were more positive for non-participants groups. The passing rate change was -1.2 percentage points for participant groups and -0.3 percentage points for non-participant groups. Likewise, the commended performance rate change was 3.9 percentage points for participant groups and 8.2 percentage points for non-participant groups.

Table 6.4
Cross-Sectional Longitudinal TAKS Passing and Commended Performance Rates for Social Studies: R-Tech Participants and Non-Participants

TAKS Test	Group	2008		2009		2008 to 2009
		N	Percent	N	Percent	Difference
Met Standard						
Grade 8	Participants	1,710	87.7	1,758	84.2	-3.5
	Non-Participants	3,411	93.1	3,448	92.6	-0.5
Grade 10	Participants	1,641	88.2	1,972	87.5	-0.7
	Non-Participants	4,108	90.9	4,033	91.0	0.1
Grade 11	Participants	1,200	96.3	1,661	95.8	-0.5
	Non-Participants	4,073	97.0	3,798	96.9	-0.1
All Grades	Participants	4,551	90.2	5,391	89.0	-1.2
	Non-Participants	11,592	93.7	11,279	93.4	-0.3
Commended Performance						
Grade 8	Participants	1,710	26.5	1,758	26.5	0.0
	Non-Participants	3,411	34.6	3,448	40.5	5.9
Grade 10	Participants	1,641	26.4	1,972	29.3	2.9
	Non-Participants	4,108	30.1	4,033	38.2	8.1
Grade 11	Participants	1,201	29.7	1,662	38.5	8.8
	Non-Participants	4,074	32.3	3,798	42.7	10.4
All Grades	Participants	4,552	27.3	5,392	31.2	3.9
	Non-Participants	11,593	32.2	11,279	40.4	8.2

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Note. Students attended a campus participating in the R-Tech program in 2008-09. Participants took part in R-Tech instructional activities at one of the participating campuses. Non-participants attended an R-Tech participating campus but did not take part in R-Tech instructional activities.

TAKS Writing. Table 6.5 shows that R-Tech participant groups had lower TAKS writing passing rates and commended performance rates than non-participant groups for each testing period. Changes between 2008 and 2009 were more positive for the participating student groups. Their passing rate change was 1.6 percentage points, while their commended performance rate change was 2.4 percentage points. Corresponding changes for non-participating groups were -1.4 percentage points and -0.7 percentage points, respectively.

Table 6.5
Cross-Sectional Longitudinal TAKS Passing and Commended Performance Rates for Writing: R-Tech Participants and Non-Participants

TAKS Test	Group	2008		2009		2008 to 2009
		N	Percent	N	Percent	Difference
Met Standard						
Grade 7	Participants	1,567	88.7	1,950	90.3	1.6
	Non-Participants	3,474	94.4	3,211	93.0	-1.4
Commended Performance						
Grade 7	Participants	1,567	23.6	1,950	26.0	2.4
	Non-Participants	3,474	36.9	3,211	36.2	-0.7

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Note. Students attended a campus participating in the R-Tech program in 2008-09. Participants took part in R-Tech instructional activities at one of the participating campuses. Non-participants attended an R-Tech participating campus but did not take part in R-Tech instructional activities.

Summary of TAKS Achievement

These data show that R-Tech participants had mostly lower TAKS passing rates and commended performance rates than non-participants. Passing and commended performance rate changes showed mixed results. In some cases, participants had larger gains (cohort longitudinal TAKS reading and mathematics passing rates). In other cases, non-participants had smaller losses (cohort longitudinal TAKS reading and mathematics commended performance rates). However, these changes are difficult to interpret because participants and non-participants differed on initial levels of achievement (and may also have differed on socioeconomic background variables related to achievement). Because participants scored lower than non-participants, one would expect participants to have larger gains just because they had lower baseline scores.[2] Yet, participants did not consistently have larger gains than non-participants.

[2]Because of imperfect (less than 1.0) TAKS score correlations across years, regression to the mean occurs. Thus, relatively low baseline scores tend to be associated with relatively high gains, irrespective of any improvement in student learning. Simply put, one would expect participants to have larger gains than non-participants just because they had lower baseline scores.

THE EFFECT OF INSTRUCTIONAL TIME, PROGRAM TYPE, AND SUPPLEMENTAL STATUS ON STUDENTS' ACADEMIC ACHIEVEMENT

The analysis of R-Tech's effects on student achievement examines three aspects of the R-Tech program: (1) the effect of hours spent receiving R-Tech services on students' TAKS scores, (2) whether R-Tech's effects on students' TAKS scores differed for supplemental programs and programs implemented as part of regular instruction, and (3) the effect of program type on students' TAKS scores. The two major types of R-Tech programs implemented during the 2008-09 school year were self-paced computer software and dual credit or distance learning.[3, 4] The remaining three program types[5] were implemented in only two districts each. These programs are not included in analyses because of methodological limitations that arise when programs are implemented in so few districts

Methodology

While TAKS measures mathematics, reading/ ELA, writing, science, and social studies, only mathematics and reading/ELA are tested at each grade level for Grades 6 through 11. Writing is only tested at Grade 7 and science and social studies at Grades 8, 10, and 11. In order to incorporate a prior year TAKS test in the analyses, analyses were limited to Grades 6 through 11 in mathematics and reading/ELA and to Grade 11 in both science and social studies.

TAKS Scale Scores

To measure students' yearly progress, measurement specialists develop scales that may be used from one year to the next. These scales may be used to compare students' performance across grade levels. Tests having these scales are called vertically equated tests.[6] The TAKS, however, is not a vertically equated test.[7] Both scale scores and percentages of items answered correctly vary across grades, and cannot be used to compare the performance of students at different grade levels. Because of this, researchers generated relative standard scores that were used to compare student progress on TAKS across grade levels. A standardized score—or z score—was calculated for each student and for every testing occasion and subject. The z score is calculated by subtracting the statewide mean grade-level scale score from each student's scale score and dividing by the statewide scale score standard deviation. The z score, which has a mean of zero and a standard deviation of 1.0, indicates how many standard deviations from the mean a score lies. One characteristic of z scores is that about half of the scores are negative, and negative scores may be difficult to fully understand. To overcome this limitation, we have transformed students' z scores into normalized scores, or T scores. T scores are scores with a mean of 50 and a standard deviation of 10. Thus, a student who scores at the state average will have a TAKS T score of 50. A student who has a score of 60 will be one standard deviation above the state average, and a student who has a score of 40 will be one standard deviation below the state average.

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[3]Initial categories of implementation (research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, distance learning to earn college credit, and web-based program) did not sufficiently describe districts' programs or distinguish between programs. See the chapter 3 for a discussion of the shortcomings of these categories.

[4]Program types were identified from an analysis of student upload information, district grant applications, and progress reports. Chapter 3 provides a detailed discussion of each program type.

[5]These program types were (1) live, person-to-person tutoring and online instructional support, (2) school-wide technology immersion, and (3) use of iPods to deliver content.

[6]When a test is vertically equated, a given score at one grade level of the test represents the same level of performance as that score on another grade level of the test. For example, with a vertically equated test, if the scale score is the same for a student in Grade 7 as it is for the student in Grade 8, one could conclude that the student did not make any progress in Grade 8.

[7]TEA is currently working on vertically equating TAKS.

Results

Researchers formulated two sets of models. One set of models examined whether offering R-Tech services during regular school hours or outside of regular school hours (supplemental status) had an effect on students' TAKS scores. The second set of models examined whether program type had an effect on students' TAKS scores. The details of these analyses are reported in Appendix F, Tables F.1 through F.12. In the supplemental status models, supplemental status was a significant negative predictor of social studies TAKS *T* scores. Supplemental status was also a non-significant negative predictor of students' reading/ELA, mathematics, and science TAKS *T* scores. Thus, there is some evidence that offering R-Tech services during regular instructional hours or during elective periods may be more beneficial than offering services outside regular instructional hours. These supplemental status models also showed that the number of hours spent in R-Tech activities was not significantly related students' TAKS scores. This means that time spent each week participating in R-Tech activities neither increased nor decreased TAKS *T* scores.

In the program type models, R-Tech programs that utilized self-paced computer software were not significantly related to students' TAKS mathematics, science, and social studies *T* scores. However, there was a significant negative relationship between self-paced computer software programs and students' TAKS reading/ELA *T* scores. For example, the model predicted that students who used self-paced computer software programs scored 1.4 TAKS *T* score points lower in reading/ELA than students in other types of R-Tech programs. There was no significant relationship between dual credit or distance learning programs and students' TAKS reading/ELA or mathematics *T* scores. As in the supplemental status models, the number of hours per week spent in R-Tech activities was not related to students' TAKS scores.

Several other interesting results were found across both sets of models. For example, school achievement[8] was a significant positive predictor of TAKS mathematics *T* scores. Other factors being equal, R-Tech students performed better in mathematics when they were in schools with higher levels of achievement. These students benefitted from higher achieving peers. Other researchers have also shown that a schools' achievement environment affects students' academic achievement (Betts, Zau, & Rice, 2003; Chang, Wu, & Chen, 2007; Marks, McMillan, & Hillman, 2001). Results also indicate that female R-Tech students had higher spring 2009 TAKS reading/ELA *T* scores than males, after controlling for other predictors. However, males had higher spring 2009 TAKS social studies TAKS *T* scores than females, again, after controlling for other predictors. Net of the other predictor variables, African American students had lower spring 2009 TAKS reading/ELA *T* scores than non-minority students, economically disadvantaged students had lower spring 2009 TAKS reading/ELA and mathematics *T* scores than economically advantaged students, and LEP students had lower spring 2009 TAKS reading/ELA and mathematics *T* scores than non-LEP students.

Limitations

The goal of these analyses was not to generalize the results to all students who participated in R-Tech activities in all school districts. Rather, the purpose was to generalize to the target population of students who took part in R-Tech activities in the 115 participating campuses from the 62 participating school districts. Despite this rather modest aim, there were several potential limitations to the generalizability of findings. These limitations are discussed in the sections that follow.

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[8]School achievement was the percentage of students passing all 2009 TAKS tests at a campus. The percentages ranged 0.0% to 89.0%, with a grand mean of 64.8%. The 2009 school achievement data were preliminary results provided by TEA.

Missing data. Students were omitted from the analyses because of missing data. For example, varying numbers of students were missing demographic information (e.g., gender, ethnicity, economic status, and LEP status), reported R-Tech instructional hours in fall 2008 or spring 2009, TAKS scores in spring 2008 or spring 2009, and campus supplemental status and program type data. (See Appendix F for a detailed description of the missing data issue.) As a result of missing data, original samples were reduced by 42.5% for reading/ELA, 41.8% for mathematics, 32.3% for science, and by 30.9% for social studies.

The characteristics of students having complete data (restricted samples) were compared to the characteristics of the original samples. Gender differences between the two samples were slight as were ethnic differences for the reading/ELA and mathematics samples. The restricted science and social studies samples had lower percentages of minority students. The restricted reading/ELA, mathematics, and science samples had lower percentages of LEP students. All of the restricted samples had lower percentages of economically disadvantaged students and especially special education students. Thus, the restricted samples were different than the original samples. They were less likely to be economically disadvantaged, LEP, and special education students.

TAKS as the measure of student achievement. Because the TAKS is not a vertically equated test (i.e., the skills measured and the scoring from one grade to the next is along a continuum), results are not comparable from grade to grade and from year to year. Thus, researchers used standard scores (*T* scores) to compare students from one year to the next. These scores allow for normative comparisons (where students fall in the distribution of test scores from one year to the next), but not for criterion-referenced comparisons (where students fall on a proficiency scale from one year to the next). In addition, TAKS does not measure science and social studies at each of the tested grade levels. Thus, to include a prior year test, science and social studies samples included only Grade 11 students. This resulted in relatively small numbers of students in the science and social studies analyses.

SUMMARY

This chapter compared the scores of cohorts of participating and non-participating students who took the TAKS test in both spring 2008 and spring 2009. For all tested areas, R-Tech participants had lower TAKS passing rates and commended performance rates than non-participants. Because participants scored lower than non-participants, one would expect participants to have larger gains because of lower baseline scores. However, participants in R-Tech did not consistently have larger gains than non-participants.

This chapter also investigated the effects of three aspects of R-Tech program implementation on students' TAKS scores. These aspects were student access time, supplemental status, and program type. Researchers found that there was not a significant relationship between student access time or reported R-Tech instructional hours per week and students' TAKS scores. Supplemental status, or offering programs outside regular school hours, had a significant negative relationship to students TAKS social studies scores, and a non-significant negative relationship to students' TAKS reading/ELA, mathematics, and science *T* scores. Self-paced computer software programs had a significant negative relationship to students' TAKS reading/ELA scores, but no significant relationship to students' TAKS mathematics, science, and social studies *T* scores. There was no significant relationship between dual credit or distance learning programs and students' TAKS reading/ELA and mathematics scores.

These results may not generalize to R-Tech students who did not maintain continuous enrollment or to students for whom the TAKS test is not an appropriate measure of performance (i.e., special education students). Construction of data files used in the achievement analyses resulted in reduced numbers of students. These restricted samples differed from the overall population of R-Tech students, as they were less likely to be economically disadvantaged, LEP, and special education students.

CHAPTER 7
THE COST EFFECTIVENESS OF R-TECH

Given the need to use educational resources efficiently, policymakers are increasingly requiring cost-effectiveness analyses of educational interventions to inform their decision making and to ensure that greatest "bang for the buck" in terms of spending on public education (Levin & McEwan, 2001). As a means to ensure Texas' educational resources are spent in an efficient manner, state legislators required that R-Tech be evaluated in terms of its cost effectiveness, as well as its effect on academic outcomes.

Generally speaking, cost-effectiveness analysis seeks to evaluate policy alternatives relative to their costs in producing a given outcome (Levin & McEwan, 2001). However, in the case of this evaluation, the only program under consideration is R-Tech. Understanding that the measurement of R-Tech's cost effectiveness would not include comparable programs, the evaluation frames its analysis in terms of how different approaches to implementing R-Tech affect the program's cost effectiveness. In assessing R-Tech's cost effectiveness the evaluation seeks to answer the following questions:

- How are R-Tech funds allocated in districts?
- Which R-Tech program configurations make the most effective use of funding?
- Will the R-Tech program be sustained after grant funds expire?

To answer these questions, this chapter draws on data collected through TEA's ER system, which includes information about how districts spend state-provided R-Tech funds, project budgets included in grant applications, and TEA data documenting individual district grant awards. The chapter also uses information about the number of students served by R-Tech reported in district upload data provided to TEA for summer 2008, fall 2008, and spring 2009. In addition, the chapter incorporates information drawn from document analysis of R-Tech grant applications and progress reports, interviews with principals in eight R-Tech districts, as well as the spring 2009 survey of principals in all grantee districts.[1]

The findings presented in this chapter provide preliminary information about R-Tech's cost effectiveness and sustainability. The chapter addresses how R-Tech districts have used program funding through spring 2009, provides preliminary estimates of the per-student cost of R-Tech services for all R-Tech districts and for districts implementing particular types of programs, and considers principals' views of program sustainability. The chapter does not examine R-Tech's cost effectiveness in relation to student achievement outcomes.[2]

OVERVIEW OF R-TECH FUNDING

The Texas Legislature provided for $8 million in funding for R-Tech. TEA awarded about $6.3 million in Cycle 1 grants, and an additional $1.5 million in Cycle 2 grants. Grantee districts receive $200 per school year in state grant funding for each student receiving R-Tech services and are required to provide at least $100 per participating student per school year in matching funds. Matching funds may consist of local or private funding or from state funds other than those provided by the R-Tech grant, and districts may use HSA monies to provide matching funds at the high school level. The Cycle 1 grant period runs from May 1, 2008, to May 31, 2010, and the Cycle 2 grant period runs from January 1, 2009, to May 31, 2010.

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[1]Information about the spring 2009 principal survey, including administration processes, response rates, and a copy of the survey, may be found in Appendix A. Information about site visits may be found in Appendix D.
[2]The final evaluation report (fall 2010) will analyze program costs in relation to student achievement outcomes, such as TAKS scores and graduation rates.

Grantee districts must budget their use of R-Tech funds within these dates. Permissible grant expenditures include costs incurred to provide:

- Research-based instructional support,
- Teacher training,
- Academic tutoring or counseling,
- Distance learning opportunities in the core content areas or in foreign languages, and
- Dual credit coursework in the core content areas or in foreign languages.

Because the evaluation focuses on districts that received Cycle 1 R-Tech grants, this chapter only addresses districts' use of Cycle 1 funding.

TEA initially awarded $6,384,743 in Cycle 1 R-Tech funding to 64 rural Texas districts. One district with an award of $60,000 withdrew from the program without accessing funding, which reduced the total grant award to $6,324,743. R-Tech Cycle 1 funding is awarded across two fiscal years (FY): FY 2008 (September 1, 2007-August 31, 2008) and FY 2009 (September 1, 2008-August 31, 2009). Sixty-two percent of grant funding was allocated to FY 2008 ($3,912,293), and the remainder allocated to FY 2009 ($2,412,450). Table 7.1 presents the minimum, maximum, total, and average grant awards across fiscal years and for the total Cycle 1 grant award. In order to ensure that a wide range of districts would have access to R-Tech funding, TEA established a maximum grant award of $200,000. The Agency did not specify a minimum award amount. As indicated in the table, R-Tech grant awards ranged from $16,000 to $200,000, and the average grant award was about $100,393.

Table 7.1
The Structure of Cycle 1 State-Level R-Tech Grant Funding

Award	FY 2008	FY 2009	Cycle 1 Total
Minimum award	$10,055.00	$5,945.00	$16,000.00
Maximum award	$120,886.00	$79,114.00	$200,000.00
Total awards	$3,912,293.00	$2,412,450.00	$6,324,743.00
Average award	$62,099.89	$38,292.86	$100,392.75

Source: Texas Education Agency (TEA) grant award documents.
Note. TEA established a maximum grant award of $200,000; it did not set a minimum award amount.

State grant funds are available to R-Tech districts through TEA's ER system, through which districts report grant expenditures and request reimbursements. Grant requirements establish that districts request funding "as close as possible to the time of making disbursements," and ask that grantees only request funding for expenditures that will be made within 3 days of a payment (TEA, 2008b). When requesting R-Tech payments, districts report expenditures in terms of budgeting categories identified in their grant applications (e.g., payroll, supplies and materials). TEA denies payment for funds requested for categories not included in a district's grant application, when the requested funding exceeds the allowable budget variation for a category, and when the total amount requested by a district exceeds its grant. Districts may only enter up to 90% of their cumulative expenditures in ER. When a district has met its final reporting requirements,[3] TEA releases the remaining 10% of the grant award and requests that the district submit a revised final expenditure report.

[3]Districts' final expenditure reports must be filed within 30 days of the grant's ending date.

LIMITATIONS OF THE ANALYSIS

The cost-effectiveness analysis presented in this chapter encounters some limitations that arise from the available data sources, from variations in districts' implementation plans and access to state grant funding across the program's first year, and from differences in districts' budgeting practices. The sections that follow discuss data sources and the limitations of analyses.

Data Sources

Perhaps the greatest limitation to the evaluation's analysis of R-Tech's cost effectiveness is its reliance on financial data provided through district expenditure reports and project budgets reported in district grant applications. In *Cost-Effectiveness Analysis* (2001), authors Levin and McEwan argue that analyses of project budgets and expenditure documents are "inadequate" to assess the "true" costs of an educational intervention such as R-Tech. The authors note that budgets do not capture the costs of "unpaid" resources such as volunteers and donated equipment, and that budgets do not include the costs of resources that were purchased prior to the implementation of an intervention. In the case of R-Tech, such resources may include computer equipment, lab space, printers, technology infrastructure, and teacher training purchased prior to and irrespective of R-Tech. Levin and McEwan further argue that budgets and expenditure reports "distort" the true costs of resources because costs are recorded for a particular year, but some resources are used well beyond the year in which costs are recorded. For example, computers and software purchased with R-Tech funding may be recorded in a district's budget for FY 2008, but the equipment also will be used in years to come, which overstates their costs in FY 2008 and understates their costs in subsequent years (pp. 45-46).[4]

A further limitation arises because the expenditure reports districts provide to TEA only document how districts use state grant funding and do not include information on how district matching funds are spent. Therefore, the chapter's analyses are limited to the use of state funding, and do not include information about district-level funding for R-Tech. While these limitations prevent researchers from assessing the "true" costs of R-Tech in terms of total project expenditures, the costs of pre-existing project resources, and the discounting of equipment that schools will use well beyond the R-Tech grant period, the available data sources do allow researchers to assess the state's costs in implementing R-Tech, which is of concern to state-level policymakers interested in how educational resources are used.

Variations in Districts Approach to Funding and Implementing R-Tech

Variations in districts' implementation plans and approaches to accessing R-Tech funds across the program's first year limit the second interim report's ability to fully answer the evaluation's questions about R-Tech's cost effectiveness during the program's first year. These variations underscore the preliminary nature of this chapter's analyses. The final evaluation report (fall 2010) will document districts' use of total grant funding when program implementation is largely complete and will provide more conclusive evidence of R-Tech's cost effectiveness.

Variations in access to state grant funds. Although R-Tech funding was allocated by fiscal year, grantee districts were not required to use funding within specified fiscal years. In May 2009, the cutoff point for expenditures analyzed in this report, Cycle 1 districts had used about 50% of total grant funding,

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[4]To overcome the limitations of budget and expenditure documents, Levin and McEwan (2001) recommend an approach to cost-effectiveness analysis that requires the identification of the specific "ingredients" used to implement an intervention, including personnel, facilities, equipment and supplies, and so on. They outline a process for establishing the "value" of individual ingredients through the analysis of market prices, subsidies, depreciation costs, discount rates, and adjustments for inflation. Such an analysis is beyond the scope of this evaluation.

accessing 70% of FY 2008 funds and 19% of FY 2009 funds.[5] Five Cycle 1 districts had not accessed any state grant funding in May 2009. Across the 58 districts that had accessed FY 2008 funds, the percentage of funds used ranged from 3% to 100%. For districts that had accessed FY 2009 funding, the amount of FY 2009 funds used ranged from 6% to 90%. In terms of total grant funding, the percentage of funds used by the 58 districts accessing state funding ranged from 2% to 96% in May 2009.[6]

Variations in implementation levels. As indicated in the previous section, five districts had not accessed any of their state grant awards in spring 2009, although four of these districts had students who received R-Tech services during the program's first year. In contrast, five districts had not served any students across the summer 2008, fall 2008, or spring 2009 reporting periods, but four of these districts had spent grant funding, accessing from $33,078 to $59,326 of state funding. Analyses presented in previous report chapters included 62 R-Tech districts, noting that one district had been omitted because it deferred implementation of its program to the 2009-10 school year. This district is included in discussions of cost effectiveness, however, because it accessed funding during R-Tech's first year. Therefore, the number of districts included in the chapter's analyses is 63.

Inconsistency Across Grant Application Budget Categories

Another limitation arises because districts were not consistent in how they classified planned expenditures in their grant applications. Grant applications enable districts to plan expenditures in terms of (1) payroll costs, (2) professional and contracted services, (3) supplies and materials, (4) other operating costs, and (5) capital outlay. However, districts classified expenditures differently across categories. For example, some districts included software purchases in "professional and contracted services," while others categorized software purchases as "supplies and materials," and some reported software purchases as "capital outlay." Similarly, some districts budgeted computer hardware in the "supplies and materials" category, while others considered hardware to be "capital outlay." Districts also use these budget categories to report expenditures in TEA's ER system, and the lack of consistency in district budgets limits the comparisons that may be made across the expenditure categories discussed in the chapter's next section.

DISTRICT ALLOCATION OF R-TECH FUNDS

The cost-effectiveness analysis seeks to understand how districts allocate their funds in implementing R-Tech. To address this question, researchers examined districts' expenditure patterns across the budget categories identified by TEA's ER system. Similar to grant application budget categories, ER classifies expenditures as (1) payroll costs, (2) professional and contracted services, (3) supplies and materials, (4) other operating costs, and (5) capital outlay. Each budget category is further divided into expenditures for *program costs* and those for *administrative costs*. Program costs include those expenditures directly related to implementing R-Tech, while administrative costs support functions related to project management and administration. Grant requirements limit the amount of R-Tech funding that may be spent on administrative costs to 5% of a district's total grant award in any fiscal year. Administrative funds must be used for administrative costs *directly* related to R-Tech, including salaries for staff who supervise R-Tech and costs associated with project accounting.

[5]Sixteen districts had used all of their FY 2008 funding and had begun to access FY 2009 funds in May of 2009.
[6]Although grant requirements limit districts to 90% of cumulative state funding prior to the close of the grant, in the case of R-Tech, cumulative funding was understood as the FY 2009 grant award. That is, districts that accessed 96% of total funding had accessed only 90% of FY 2009 funding.

Total R-Tech Expenditures by Budget Category

Table 7.2 presents the total ER-recorded expenditures for R-Tech districts as of May 2009. Results indicate that most R-Tech funds (about $1.8 million) were used to purchase supplies and materials for the grant. Smaller amounts of R-Tech funding were used for professional and contracted services (about $419,000), capital outlay (about $276,000), and payroll costs (about $227,000). The sections that follow provide information about the types of expenditures included in each cost category.

Table 7.2
Total District First Year Grant Expenditures, by R-Tech Funding Categories: May 2009

Cost Category	Program Costs	Administrative Costs	Total Costs
Payroll costs	$207,362.98	$19,650.65	$227,013.63
Professional and contracted services	$415,910.29	$2,966.00	$418,876.29
Supplies and Materials	$1,848,282.24	--	$1,848,282.24
Other operating costs	--	--	--
Capital outlay	$275,784.52	--	$275,784.52
Total Costs	**$2,747,340.03**	**$22,616.65**	**$2,769,956.68**

Source: Texas Education Agency Expenditure Reporting system data, May 2009.
Note. N=63.

Payroll costs. Payroll costs include expenditures for school employees and non-employees (e.g., consultants) who spend all or some of their time working on R-Tech activities. In grant applications, R-Tech districts indicated that payroll costs would be spent for extra-duty pay for school employees who work additional hours (e.g., before or after school) to provide R-Tech services, salaries for R-Tech facilitators and computer lab staff, as well as the costs of substitutes to enable teachers to participate in training. In May 2009, 8% of state-provided R-Tech funding had been used to cover payroll costs related to the grant. Across districts, payroll expenditures ranged from $0 to $25,641.48.

Professional and contracted services. The professional and contracted services category includes the costs of educational software, registration fees and tuition for online courses, professional development and training in the use of software, technical support services, and fees for services provided by ESCs in support of R-Tech. Fifteen percent of R-Tech expenditures in May 2009 had been used for professional and contracted services. Across districts, expenditures on professional and contracted services ranged from $0 to $69,249.79.

Supplies and materials. About two thirds (67%) of R-Tech expenditures had been spent on supplies and materials in May 2009. This budget category was used to pay for laptop and desktop computers, printers, LCD projectors, scanners, computer lab furnishings (e.g., tables and chairs), dual display video equipment, textbooks for dual credit courses, and some districts budgeted computer software in this category. District expenditures on supplies and materials ranged from $0 to $120,866.00.

Other operating costs. Other operating costs reported in district grant application budgets included travel expenses for staff and students participating in R-Tech and printing costs. R-Tech districts did not report any “Other Operating Costs” in May 2009.

Capital outlay. Capital outlay funds may be used to purchase nonexpendable, tangible, personal property with a useful life of more than 1 year. In grant application budgets, most districts categorized purchases of R-Tech computer hardware and software in the “supplies and materials” funding category; however, some districts recorded these purchases as “capital outlay.” About 10% of districts expenditures were recorded as capital outlay in May 2009. District expenditures on capital outlay ranged from $0 to $85,457.52.

Average Grant Expenditures and the Allocation of R-Tech Funds by Program Type

Table 7.3 presents average district expenditures across all districts. Noting the small proportion of funding allocated to administrative costs (0.8%), the comparisons of average expenditures by program type that follow focus on districts' *total costs* for each expenditure category and incorporate information from the "Total Costs" column in Table 7.3 as a benchmark for understanding whether program expenditures are above or below average relative to all R-Tech programs.

Table 7.3
Average District First Year Grant Expenditures, by R-Tech Funding Categories: May 2009

Cost Category	Program Costs	Administrative Costs	Total Costs
Payroll costs	$3,291.47	$311.92	$3,603.39
Professional and contracted services	$6,601.75	$47.08	$6,648.83
Supplies and Materials	$29,337.81	--	$29,337.81
Other operating costs	--	--	--
Capital outlay	$4,377.53	--	$4,377.53

Source: Texas Education Agency Expenditure Reporting system data, May 2009.

In order to compare district's use of R-Tech funds across the types of R-Tech programs the sections that follow examine district's average expenditures across cost categories.

Types of instructional programs. Researchers examined district grant applications and progress reports in order to categorize districts in terms of the types of instructional programs offered through R-Tech. This relies on the five general categories of R-Tech programs described in chapter 3: (1) self-paced programs focused on remediation, tutoring, or credit recovery; (2) dual credit and distance learning opportunities; (3) one-to-one support from tutors complemented by online instructional support; (4) school-wide technology immersion projects; and (5) the provision of iPods that enable students to access targeted instructional support (e.g., ELL programs). The categories are not discrete—districts may be included in more than one category. This occurs because R-Tech permits districts to implement different types of programs at the middle and high school levels. For example, a district may choose to offer dual credit coursework at its high school, but offer a self-paced program at its middle school. While middle schools and high schools may implement different types of programs, expenditures are reported at the district level, which prevents the identification of funds spent for middle school and high school programs.

Table 7.4 presents districts' average costs (administrative and program costs) by each of the five R-Tech program categories discussed in the previous paragraph. Results indicate that the ways in which districts choose to implement R-Tech affects how grant funds are spent. Perhaps most notable is the large amount spent on professional and contracted services for districts implementing dual credit/distance learning programs and districts implementing one-to-one tutoring and support, as well as the amount spent on supplies and materials by districts implementing technology immersion programs.

Table 7.4
R-Tech Average District First Year Grant Expenditures, by Program Type and Funding Categories: May 2009

Program Type	Number of Districts in Category	Payroll Costs	Professional and Contracted Services	Supplies and Materials	Capital Outlay
Self-paced software	54	$3,606.96	$6,651.69	$29,829.51	$4,442.66
Dual credit/distance learning	18	$4,200.75	$12,095.28	$19,626.84	$1,482.29
One-to-one tutoring and online instructional support	2	$955.00	$52,715.00	$0.00	$0.00
Technology immersion	2	$2,583.50	$3,150.00	$67,278.50	$0.00
iPods	2	$425.00	$2,055.00	$7,099.50	$0.00
All district programs	**63**	**$3,603.39**	**$6,648.83**	**$29,337.81**	**$4,377.53**

Sources: Texas Education Agency Expenditure Reporting system data, May 2009; district grant applications and progress reports.

Some districts implementing dual credit and distance learning programs contracted with external vendors to provide technology-based instructional programs, which explains their higher than average expenditures on professional and contracted services. Districts implementing one-to-one tutoring programs with online instructional support spent nearly 8 times as much on contracted services relative to the average for all R-Tech programs ($51,715 vs. $6,648). Both districts implementing this type of program contracted with TxRED to provide R-Tech services.[7] TxRED offers online dual credit courses, distance learning opportunities, online tutoring and credit recovery, and a range of technology-based professional development programs in conjunction with the University of Texas at Austin's K-16 program. Both districts contracting with TxRED offered dual credit programs at the high school level and one-to-one tutoring and online support for middle school students. In terms of their total budgets, the districts had allocated an average of $81,130 in state funding for TxRED services and had accessed an average of $52,715 to pay for services through May 2009, although neither district reported that students received R-Tech services during the program's first year.

Districts that implemented R-Tech as a school-wide technology immersion program spent more than twice the program average on supplies and materials ($67,278 vs. $29,337). This result is due to one district that budgeted its full grant award ($200,000) to purchase laptops for all teachers and students in Grades 6 through 12. The district had accessed 60% of its grant award ($120,886) in May 2009, which inflated the average expenditures for supplies and materials across the two districts.

Supplemental vs. non-supplemental programs. Although R-Tech funding was intended to support supplemental programs offered outside of the regular school day (e.g., before or after school), many grantee districts (40%) implemented R-Tech as part of the regular instructional day. For example, some districts used R-Tech funding to purchase laptop computers and software that teachers incorporated as part of daily instruction. In other districts, R-Tech funding supported improvements to computer labs and provided educational software that students accessed when teachers scheduled class time in the lab. Using descriptions of R-Tech programs provided in grant applications and progress reports, researchers categorized programs as supplemental or non-supplemental, depending on when students accessed R-Tech services (i.e., at a time outside of regularly scheduled classes or during regular class time).

[7]For more information about TxRED, visit the Consortium's web site at http://txred.org.

Table 7.5 presents average expenditures for districts that implemented R-Tech as a supplemental program and for those that incorporated R-Tech into the regular school day. Results indicate that supplemental and non-supplemental programs spent similar amounts, on average, for payroll costs. On average, supplemental programs spent about $880 more on professional and contracted services, but non-supplemental programs spent about $11,000 more on supplies and materials and about $5,000 more on capital outlay. Non-supplemental programs' expenditures on supplies and materials and capital outlay also exceeded the averages for all district programs by about $7,500 and $2,200, respectively.

Table 7.5
R-Tech Average District First Year Grant Expenditures, by Supplemental and Non-Supplemental Implementation and Funding Categories: May 2009

Program Type	Number of Districts in Category[a]	Payroll Costs	Professional and Contracted Services	Supplies and Materials	Capital Outlay
Supplemental programs	34	$3,310.40	$7,418.56	$25,687.10	$1,576.94
Non-supplemental programs	25	$3,330.89	$6,538.96	$36,890.93	$6,625.26
All district programs	**63**	**$3,603.39**	**$6,648.83**	**$29,337.81**	**$4,377.53**

Sources: Expenditure Reporting system data, May 2009; district grant applications and progress reports.
[a]Four districts are not included in either category because it was not possible to determine from grant applications and progress reports whether their programs were supplemental or non-supplemental.

The findings presented in Table 7.5 suggest that non-supplemental programs used substantially more state funding to purchase supplies and equipment for their R-Tech programs. It is likely that districts that implemented R-Tech as part of the regular school day did so for larger numbers of students, and therefore, needed to purchase considerably more resources than districts that implemented supplemental programs. This finding is explored in more detail in the next section.

THE COST EFFECTIVENESS OF R-TECH FUNDING

The cost-effectiveness findings presented in the following sections are preliminary and are not linked to student outcomes, such as TAKS scores and attendance rates. As discussed earlier in this chapter, districts varied in their approaches to implementing R-Tech across the program's first year. Some districts used their first year to plan R-Tech services, improve infrastructure, and to purchase equipment, while others fully implemented the program for students. These variations combined with heavy start-up investments in technology resources may distort per-student calculations of districts' use of state funding during R-Tech's first year. As explained earlier in this chapter, investments in equipment, such as computer hardware and software, will benefit districts for years to come, and analyses of district expenditures in terms of students served in R-Tech's first year will overstate R-Tech's per-student costs. These limitations will be offset to some extent in the evaluation's final report (fall 2010), which will examine costs across both years of R-Tech implementation, including all students served with grant funds. However, it is likely that equipment purchased with grant dollars will benefit students who do not participate in R-Tech as well as students enrolled in districts after grant funds expire, which limits the evaluation's ability to estimate the "true" per-student costs of R-Tech implementation.

Acknowledging the uneven implementation across the program's first year, the overstatement of first-year costs for technology resources, and researchers' inability to assess the true per-student costs of R-Tech, the cost-effectiveness findings presented in the sections that follow present *preliminary* analyses of the per-student costs of implementing R-Tech services by the size of R-Tech program, the type of program implemented, and whether districts implemented supplementary or non-supplementary programs. The student counts used in analyses are the number of unique students served by R-Tech across the summer 2008, fall 2008, and spring 2009 reporting periods. Students are counted as receiving R-Tech services if they participated in R-Tech during any of the three periods, and students who received services across multiple periods are included only once in counts.

The Scale of R-Tech Programs

Program size matters when estimating the per-student cost of educational interventions. Generally speaking, programs that are implemented more broadly and serve larger numbers of students experience economies of scale that enable them to enjoy lower per-student program costs. Levin (2002) explains:

> At lower enrollments the cost per student will be high because the fixed costs must be divided among a very small number. However, with larger enrollments the fixed costs do not rise commensurately so that average costs per student drops. Therefore, the comparison of costs must be sensitive to different levels of scale rather than relying on a single enrollment level to estimate costs (p. 26).

Table 7.6 presents information about the average number of students served, average expenditures, and average state-funded expenditures per student across districts grouped by scale of implementation. The table presents findings broken out by the total number of students served by R-Tech programs, categorizing districts as serving 0 students, 1 to 49 students, 50 to 99 students, 100 to 249 students, and so on.

Table 7.6
Preliminary Per-Student State-Funded R-Tech Expenditure Calculations, by the Number of Students Served: May 2009

Students Served: Summer 2008, Fall 2008, Spring 2009[a]	Number of Districts in Category	Average Number of Students Served	Average Expenditures	Average Expenditures per Student
0	5	Undefined	$35,390.32	Undefined
1-49	9	27.9	$12,811.81	$1,521.43
50-99	12	75.6	$19,349.62	$271.09
100-249	13	151.3	$34,828.79	$244.37
250-500	14	331.6	$72,747.62	$221.65
500 or more	10	708.0	$77,426.24	$111.31
Total	**63**	**235.7**	**$43,967.57**	**$419.64**[b]

Sources: Texas Education Agency (TEA) Expenditure Reporting system data, May 2009; TEA Student Upload data, summer 2008, fall 2008, spring 2009.
Notes. An undefined ratio occurs when 0 is the denominator.
[a]Students included in the analysis received R-Tech services in *at least* one of the following periods: summer 2008, fall 2008, and spring 2009. Students receiving services across multiple periods are counted only once in the analysis.
[b]Total average expenditures per student were calculated using only those districts that served R-Tech students during the summer 2008, fall 2008, and/or spring 2009 (n=58).

Given differences in how districts implemented R-Tech during the grant's first year, it is not surprising that there are wide variations across districts in the numbers of students served, average expenditures, as well as in average expenditures per student. Beyond expected variations, the information provided in Table 7.6 provides insight into how districts' implementation strategies may affect the overall cost effectiveness of R-Tech. The table demonstrates the economies of scale that exist for districts that implemented R-Tech broadly in the program's first year—while average expenditures increased when more students participated in the program, districts experienced a corresponding decrease in average costs per student when more students accessed services. Districts serving 500 or more students experienced the highest average costs ($77,426), but experienced per-student costs ($111) that were less than half that of most districts serving fewer students during R-Tech's first year.

Per-Student Costs by Type of Instructional Program

The cost-effectiveness analysis also seeks to understand how different approaches to implementing R-Tech may affect program costs. As discussed earlier in this chapter, researchers identified five non-discrete categories of R-Tech program configurations and categorized programs as providing supplemental vs. non-supplemental instruction.

Table 7.7 presents the average number of students served, average expenditures, and average expenditures per student for each R-Tech program configuration identified by this evaluation, as well as for all districts implementing R-Tech. Because neither of the districts offering one-to-one tutoring and online support served students during R-Tech's first year, the average per-student cost for this program category is undefined. Results indicate that the per-student costs of implementing R-Tech programs varied widely across R-Tech's first year. Variations reflect differences in the types of start-up costs districts experienced in implementing programs, as well as the number of students served. Districts offering self-paced remediation, tutoring, and credit recovery programs experienced the highest per-student costs ($429), which is likely the result of substantial start-up investments in technology resources. Table 7.4 in the previous section indicated that districts implementing self-paced programs spent about $34,000, on average, on *supplies and equipment* and *capital outlay* across their first year of implementation, and as noted earlier in this chapter, most districts included purchases of computer hardware and software in these expenditure categories. As districts serve more students with equipment purchased using grant funds, average expenditures per student are expected to drop. Similarly, districts implementing technology immersion programs experienced high start-up costs because of initial investments in technology resources. Technology immersion programs experienced the highest average costs of all program types ($73,012), but per-student average expenditures were considerably lower than those of self-paced programs ($269 vs. $429) because technology immersion programs were implemented more broadly, serving more than 300 students, on average, in R-Tech's first year. Again, as programs expand to serve more students over the second year of the grant, average expenditures per student are expected to drop substantially.

Table 7.7
Preliminary Per-Student State-Funded R-Tech Expenditure Calculations, by Program Type: May 2009

Program Type	Number of Districts in Category	Average Number of Students Served	Average Expenditures	Average Expenditures per Student
Self-paced software	54	256.0	$44,530.82	$428.57
Dual credit/distance learning	18	176.8	$37,405.15	$197.98
One-to-one tutoring and online instructional support[a]	2	0.0	$53,670.00	Undefined
Technology immersion	2	305.5	$73,012.00	$269.22
iPods	2	55.0	$9,579.50	$358.32
Total	**63**	**235.7**	**$43,967.57**	**$419.64**[b]

Sources: Texas Education Agency (TEA) Expenditure Reporting system data, May 2009; TEA Student Upload data, summer 2008, fall 2008, spring 2009; district grant applications and progress reports.
Notes. Program type categories are not discrete and will not total to 63; districts may be included in more than one category. Averages are averages across districts' total expenditures and per-student costs. An undefined ratio occurs when 0 is the denominator.
[a]No district offering one-to-one tutoring and online instructional support served any R-Tech students in summer 2008, fall 2008, or spring 2009.
[b]Total average expenditures per student were calculated using only those districts that served R-Tech students during the summer 2008, fall 2008, and/or spring 2009 (n=58).

Programs that required smaller investments in technology resources to get started experienced lower average costs during R-Tech's first year. While dual credit and distance learning programs spent less on average on supplies and materials, including technology resources, than other R-Tech programs, they tended to spend more on contracted services relative to other districts (see Table 7.4). This trend suggests that dual credit and distance learning programs may not experience a reduction in per-student costs across implementation years because, unlike purchases of technology equipment, resources spent on contracted services will not last beyond the contract period.

Supplemental vs. Non-Supplemental Implementations Per-Student Program Costs

As noted earlier in this chapter, about 40% of districts receiving R-Tech funding implemented the program as part of the regular school day rather than as a supplemental activity offered outside of students' regularly scheduled classes. Table 7.8 presents information about the average number of students served, average expenditures, and average expenditures per-student for districts offering supplemental and non-supplemental instruction. Results for all districts are presented for purposes of comparison.

Table 7.8
Preliminary Per-Student State-Funded R-Tech Expenditure Calculations, by Supplemental and Non-Supplemental Instruction: May 2009

Program Type	Number of Districts in Category	Average Number of Students Served	Average Expenditures	Average Expenditures per Student
Supplemental programs	34	171.6	$37,992.99	$612.30
Non-supplemental programs	25	349.8	$53,386.05	$187.04
Total	**63**	**235.7**	**$43,967.57**	**$419.64**[a]

Sources: Texas Education Agency (TEA) Expenditure Reporting system data, May 2009; TEA Student Upload data, summer 2008, fall 2008, spring 2009; district grant applications and progress reports.
Notes. Four districts are not included in either category because it was not possible to determine from grant applications and progress reports whether their programs were supplemental or non-supplemental.
[a]Total average expenditures per student were calculated using only those districts that served R-Tech students during the summer 2008, fall 2008, and/or spring 2009 (n=58).

Findings presented in Table 7.8 indicate that districts that implemented R-Tech as part of the regular school day (i.e., non-supplemental programs) experienced substantially lower per-student costs relative to districts that implemented supplemental programs ($187 vs. $612), as well as to R-Tech districts overall ($187 vs. $419). The reduced per-student costs for non-supplemental programs result from districts broader implementation of R-Tech. On average, districts that offered R-Tech services as part of the regular school day served 350 students during the first year of implementation. In contrast, districts offering supplemental programs served 172 students, on average.

SUSTAINABILITY

A central evaluation question is whether districts will continue to provide R-Tech services after grant funds expire in the spring 2010. The spring 2009 survey of R-Tech principals included questions about the barriers to sustaining the program and strategies for overcoming barriers. In addition, researchers questioned principals about R-Tech's sustainability during site visits to eight R-Tech districts in April 2009. Principals' responses are presented in the following sections.

Barriers to Sustainability

The spring 2009 survey asked principals to respond to a list of potential challenges to continuing R-Tech, indicating whether challenges were *not a barrier*, or were a *minor*, *moderate*, or *substantial* barrier to R-Tech's sustainability. Results presented in Figure 7.1 indicate that nearly half of responding principals (48%) felt that "insufficient financial resources" was a *moderate* or *substantial* barrier to continuing R-Tech services. Smaller percentages of principals responded that student disinterest (29%), insufficient technology resources (27%), and lack of technical support (23%) were *moderate* or *substantial* barriers to sustaining R-Tech.

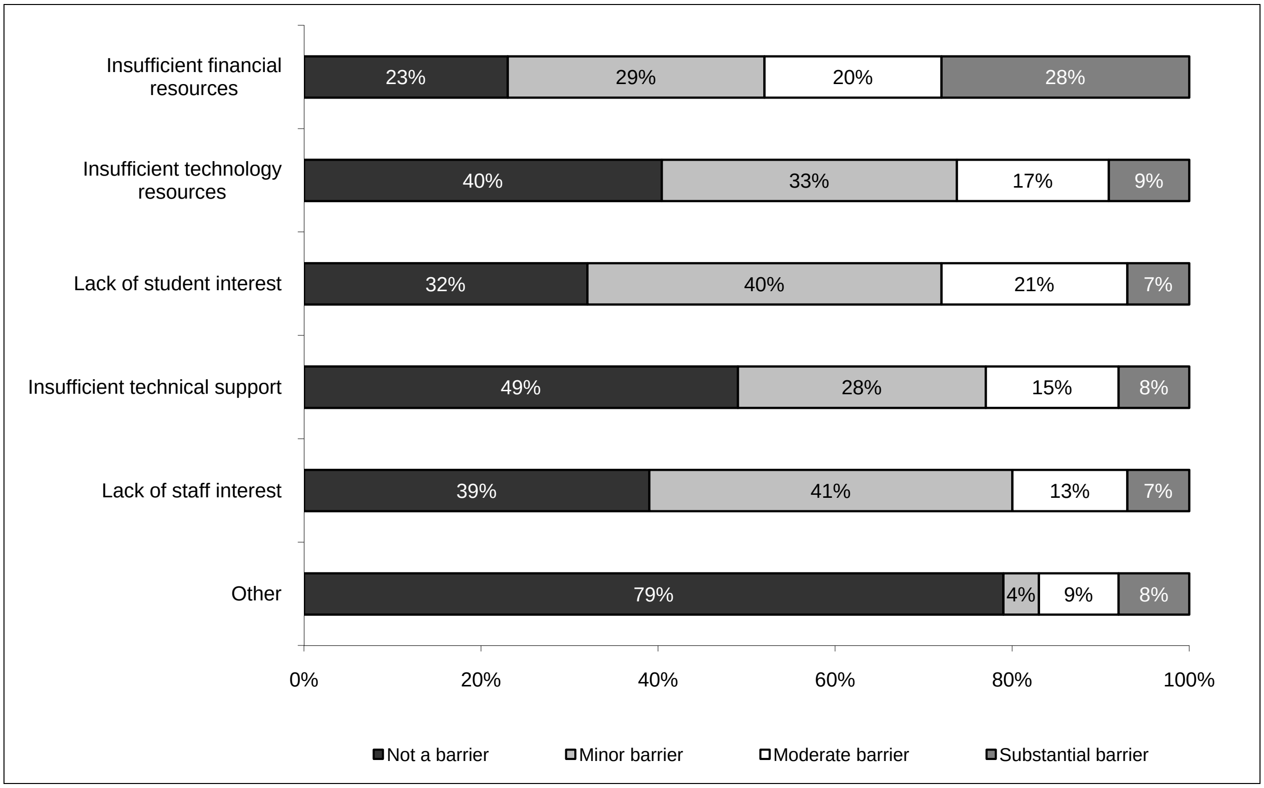

Figure 7.1. Principals' perceptions of barriers to R-Tech sustainability.
Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. N=75.

Overcoming Barriers

The spring 2009 survey also asked principals about the methods by which their schools may address sustainability barriers. As presented in Table 7.9, more than half of responding principals (55%) indicated that R-Tech services would be incorporated into regular classroom instruction after grant funds expired, and 53% of principals indicated that they would seek additional funding to support R-Tech. A smaller percentage of principals (25%) planned to incorporate R-Tech services into district alternative education programs, and 11% indicated that they would discontinue the program when grant funds expire. Principals who responded "other" were provided with space to enter written comments, and four principals provided comments. Two principals wrote that they "do not know" how to sustain the program. Another indicated that district administrators would decide whether to continue R-Tech, and another wrote, "There is no solution to transportation problems and conflicts with extracurricular activities before and after school."

Table 7.9
Principals' Strategies to Overcoming Barriers to Sustainability, as a Percentage of Respondents: Spring 2009

Strategy	Spring 2009 (N=75)
Incorporate R-Tech services into regular classroom instruction	54.7%
Seek additional funding	53.3%
Incorporate R-Tech services into an alternative education program	25.3%
Discontinue R-Tech services	10.7%
Other	9.3%

Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. Percentages will not total to 100. Principals could respond to more than one category.

Site visit interviews with principals in eight R-Tech districts provided more detailed information about the barriers principals confront in continuing R-Tech services once the grant expires. In interviews, several principals noted the financial challenge of sustaining the program. One district budgeted a substantial portion of grant funds to cover the salary of a full-time facilitator for its computer lab, and when funds expire, the position may be discontinued. The principal explained:

> [TEA] needs to know that grant funds are mainly used to pay that employee. If that [funding] stops, [the full-time facilitator] goes away. If [the full-time facilitator] goes away, there is no way [the services] can function…If [the facilitator] is not in [the lab] full-time, you can forget us doing this type of stuff.

However, a principal in another district expressed substantially greater commitment to sustaining R-Tech. "This is a long-term project that will continue with local and state funding," explained the principal. "Hopefully, more will be allocated at the state level. However we are committed to continuing the project with local and private funds if necessary."

Principals on several other campuses explained that if R-Tech did not positively affect students' TAKS scores, they would not continue the program. "When it comes down to it, [the] objective is the TAKS test," said one such principal, noting that R-Tech's future was dependent on its effect on TAKS outcomes. A principal on another campus expressed a similar view. "It has to do with the data," explained the principal, "I am a numbers person. If a program isn't making a difference in terms of [TAKS] results, I am not going to keep throwing money at it."

SUMMARY

The Texas Legislature allocated about $6.3 million in R-Tech Cycle 1 funding to 63 rural districts, with individual district grants ranging from $16,000 to an established maximum of $200,000. In May 2009, Cycle 1 districts had used about half of total funding, and the amount of grant funds accessed by individual districts ranged from 0% to 96%. The largest share of funding (67%) was spent on supplies and materials in support of the grant, including purchases of technology hardware and software, furnishings for computer labs, tuition and textbooks for dual credit courses, and other instructional materials. Some districts budgeted purchases of technology hardware and software as capital outlay, which absorbed about 10% of districts' total first year purchases. Districts implementing self-paced programs and technology immersion programs, as well as R-Tech programs implemented as part of the regular school day spent more on supplies and materials to support implementation, which likely reflects substantial investments in technology resources. Districts spent less on professional and contracted services and salaries in support of R-Tech during the project's first year (about 15% and 8% of all expended funds, respectively). Notably, districts implementing one-to-one tutoring programs with online instructional support spent more on contracted services, largely because both districts implementing this type of program purchased R-Tech programming and services from a consortium that supports rural public schools.

Districts that implemented R-Tech broadly, providing services to many students, experienced lower per-student costs than districts with narrower implementations targeted to specific student groups. As R-Tech expands to include more students during its second implementation year, many districts are expected to experience reductions in the per-student cost of implementation as program costs are spread across a greater number of students. In spite of expected reductions to the per-student cost of implementing R-Tech, nearly half (48%) of principals responding to the spring 2009 survey indicated that the lack of financial resources was a *moderate* or *substantial* barrier to sustaining R-Tech, and most (55%) indicated that R-Tech would be incorporated into regular classroom instruction when grant funds expire.

CHAPTER 8
SUMMARY OF FINDINGS AND DISCUSSION

Recognizing that rural schools face challenges in providing supplemental instruction to support student achievement and are often limited in their ability to offer a diverse curriculum, the Texas Legislature authorized the R-Tech Pilot Program in 2007. R-Tech provides $8 million in funding to allow rural Texas districts to implement technology-based supplemental educational programs for students in Grades 6 through 12 and to enable students attending rural high schools to participate in technology-based dual credit coursework and distance learning opportunities. R-Tech funding was awarded through a competitive grant process. Eligible districts must have enrolled fewer than 5,000 students and must not have been located in a metropolitan area in January 2007. Districts with limited course offerings and low accountability ratings received priority in grant funding.

R-Tech funding was awarded in two grant cycles. R-Tech Cycle 1 grants awarded about $6.3 million in funding to 64 districts to be used during the May 1, 2008, through May 31, 2010, grant period. Cycle 2 grants awarded about $1.5 million in grant funding to 19 districts to be used during the January 1, 2009, through May 31, 2010, grant period.[1] Grantee districts receive $200 per student per year in state funding for each student served by the grant and are required to provide $100 per student per year in matching funds. In funding R-Tech, the Legislature required that the program be evaluated to assess its effectiveness in improving student outcomes and specified that analyses consider how districts implement R-Tech, the program's effects on teacher and student outcomes, and its cost effectiveness. To address these goals, the evaluation considers the following five research questions:

1. How is R-Tech implemented across grantee districts and schools?
2. What is the level of student participation in R-Tech?
3. What is the effect of R-Tech on teachers?
4. What is the effect of R-Tech on student outcomes?
5. How cost effective is R-Tech?

The evaluation will produce two interim reports (fall 2008 and winter 2010) and a final report (fall 2010). The first interim report (fall 2008) presented findings describing districts implementation plans (Research Question 1) drawn from analyses of districts' grant applications to TEA. This report draws from a broader range of data sources to provide preliminary responses to each of the evaluation's research questions. This chapter discusses findings relevant to each research question. Results are limited to districts that received Cycle 1 grant awards[2] and address R-Tech's first implementation year (May 2008-May 2009).[3] The chapter also discusses policy implications suggested by the report's analyses and concludes with an overview of the ongoing evaluation.

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[1]Three Cycle 2 districts also received Cycle 1 grant awards.
[2]Although 64 districts initially received Cycle 1 grants, one district withdrew from the program without accessing grant funds and a second district deferred implementation of its R-Tech program to the grant's second year, which reduces the number of districts included in most analyses to 62.The district deferring implementation of its R-Tech program to the second grant year accessed R-Tech funding in the grant's first year and is included in analyses of R-Tech's cost effectiveness (N=63).
[3]R-Tech's first implementation year includes the 2008 summer session, as well as the fall 2008 and spring 2009 semesters.

EVALUATION RESEARCH QUESTIONS

The following responses to the evaluation's research questions are preliminary and are drawn from information collected during R-Tech's first implementation year. Research questions are broad in scope and include sub-questions that address specific aspects of program implementation and effectiveness. The ongoing evaluation will incorporate information gathered during R-Tech's second implementation year and will provide more complete responses to questions in the evaluation's final report (fall 2010).

Research Question 1: How Is R-Tech Implemented Across Grantee Districts and Schools?

The following sections address the characteristics of the districts and campuses receiving R-Tech Cycle 1 grants, as well as the students they enroll, and consider the types of programs districts chose to implement, barriers to program implementation, and how barriers were overcome.

What are the characteristics of districts and schools that receive R-Tech grants?

As previously noted, legislative requirements for R-Tech participation included a district enrollment of fewer than 5,000 students and a location outside metropolitan area. Districts with limited course offerings and high academic need, as demonstrated by 2007 accountability ratings, received priority in grant awards.

R-Tech districts. Sixty-three districts participated in Cycle 1 of the R-Tech program. Districts were well-distributed throughout the state's 20 ESC regions. On average, R-Tech districts enrolled 1,614 students, compared to the statewide average of 3,900 students. The proportion of R-Tech districts rated Exemplary or Recognized in 2007 lagged the state average. Although a majority of grantee districts (79%) received an Academically Acceptable rating, many implemented R-Tech to address an existing and, in some cases, growing achievement gap between low-income and more affluent students, as well as between minority and non-minority students.

R-Tech schools. Of the 115 schools participating in R-Tech Cycle 1 grants, 51% were high schools, 40% were middle schools, 6% were elementary schools that served Grade 6, and 3% of schools served a range of grade levels (e.g., K through 12). On average, R-Tech campuses enrolled 408 students, compared to the statewide average of 617 students. In 2007, R-Tech campuses lagged the state average in the proportion of schools rated Exemplary and exceeded the state average in terms of schools rated Academically Unacceptable.

What are the characteristics of students in R-Tech grantee districts and schools?

Consistent with national enrollment trends in rural schools, R-Tech campuses enrolled a larger percentage of White students relative to statewide averages (63% vs. 37%) and smaller percentages of Hispanic (27% vs. 44%) and African American students (9% vs. 15%), and similar percentages of low income students (47% vs. 49%). In comparison to state averages, students attending R-Tech schools had slightly higher TAKS scores, lower dropout rates, and higher graduation and advanced course completion rates in 2007.

What types of programs did R-Tech districts implement?

Using descriptions of R-Tech programs included in district grant applications and progress reports to TEA, researchers identified five types of R-Tech programs implemented by Cycle 1 districts during R-Tech's first year. Program types include: (1) self-paced instructional software providing remediation, tutoring, and credit-recovery; (2) dual credit and distance learning programs that allow students to earn college credit for courses that also fulfill high school requirements; (3) one-to-one tutoring with online instructional support; (4) technology immersion programs; and (5) iPods loaded with instructional content. The program types are not discrete. That is, districts may operate more than one type of program. For example, some R-Tech districts offered dual credit instruction at the high school and implement a self-paced program focused on TAKS remediation at the middle school.

In addition, researchers also categorized R-Tech programs as *supplemental* or *non-supplemental* depending on when students access R-Tech services. Supplemental programs provided R-Tech services outside of regularly scheduled classes (e.g., before or after school, during a free period) and non-supplemental programs integrated R-Tech services into regular class instruction.

Self-paced instructional programs. Most Cycle 1 districts (87%) implemented some form of self-paced program during R-Tech's first year. Self-paced programs were generally delivered in computer labs and used software focused on providing students with targeted remediation and support. Programs often included diagnostic assessments that identified individual areas of weakness and provided students with lessons directed at specific academic skills. After completing units, students generally completed a post-assessment that measured learning and identified areas requiring further support. Some self-paced programs permitted students to complete entire courses of study (e.g., algebra) and recover credit for failed or incomplete coursework. Sixty percent of self-paced programs were implemented as supplemental instruction, where students accessed resources outside of regularly scheduled classes.

Dual credit and distance learning programs. Less than a third (30%) of districts offered dual credit and distance learning opportunities as part of R-Tech. Dual credit courses enable students in Grades 11 and 12 to earn credit for college coursework taken while in high school. Such programs are generally taught by university or community college instructors, and require that districts and college/university partners coordinate course schedules as well as attendance and grading requirements. R-Tech dual credit courses may be taken online or through video conferencing arrangements in which students submit work and take exams electronically. Surveyed students who participated in R-Tech dual credit programs reported high levels of satisfaction with their classes, indicating that dual credit courses were more challenging than their regular high school courses and were providing preparation for college. About 60% of districts offering dual credit courses implemented supplemental programs in which students participated in courses outside of regularly scheduled classes.

One-to-one tutoring with online instructional support. Two R-Tech districts plan to implement programs in which tutors work with students one-on-one and students receive additional online support. Both districts contracted services from TxRED, a consortium that provides technology-based instructional support, including dual credit coursework, to rural Texas districts. Neither program served students during R-Tech's first implementation year, and it is not clear whether programs will be offered as supplemental or non-supplemental instruction.

Technology immersion programs. Two districts implemented R-Tech as a technology immersion program in which all students and teachers received laptops. Teachers received training in the integration of technology in classroom instruction and used laptops to prepare and deliver instructional content. Students used laptops as part of regular instruction and were able to take laptops home. Students with home Internet access were able to use laptops to access online resources at home. Researchers categorized both immersion programs as non-supplemental instruction because students primarily used laptops during regularly scheduled instruction.

iPods loaded with instructional content. Two districts used R-Tech resources to purchase iPods and loaded machines with instructional resources that students accessed outside of school. One district distributed iPods loaded with core content area resources to all middle school students and another district provided iPods loaded with resources to support the development of English language skills to middle school ELL students. These programs were characterized as supplemental programs because students primarily used iPods outside of class.

What barriers limited the implementation of R-Tech programs?

Data collected through site visit interviews and focus groups, as well as surveys of school staff and students participating in R-Tech indicate that the most substantial challenges to implementing R-Tech resulted from student resistance to the program and from transportation and scheduling conflicts that limited students' ability to participate in services. Districts offering supplemental programs in which R-Tech services were offered after school experienced the greatest challenges. Respondents in such districts reported that some students simply would not stay after school. Conflicts with extra-curricular activities and students' need to ride buses to get home also limited program participation.

Principals and R-Tech facilitators also reported that technical issues created challenges to implementation. Some districts experienced problems resulting from outdated computer hardware and incompatible software, and others lacked the bandwidth to adequately support broad access to the Internet. In addition to technology challenges, districts experienced difficulties in communicating program goals to parents and teachers, and completing program reporting requirements.

How were implementation barriers overcome?

Districts used a range of strategies to increase student participation in R-Tech, including expanding R-Tech access times, providing incentives to encourage attendance (e.g., snacks), or making participation mandatory for some students. Some districts adjusted their implementation plans and incorporated R-Tech into the regular school day rather than offering services after school, and several districts added bus routes to accommodate students' transportation needs.

To address technology challenges, districts purchased new computer hardware and software, updated infrastructure, and worked closely with technical support staff to resolve issues. Principals and program facilitators also reported holding information sessions to communicate R-Tech's goals to staff and developing promotional materials to expand parents' awareness of the program. In response to the spring survey, principals and program facilitators indicated that R-Tech implementation was facilitated by strong support from district administrators and teacher buy-in. Survey respondents highlighted the importance of grant funding, noting that the additional resources enabled districts to improve the quality of their technology resources and designate an R-Tech facilitator to support student and teacher access to R-Tech services.

Research Question 2: What Is the Level of Student Participation in R-Tech?

Student participation information reported through TEA's data upload system indicates that access to R-Tech resources increased across the program's first implementation year. About 1,400 students participated in R-Tech in summer 2008, about 8,800 participated in fall 2008, and nearly 12,800 participated in spring 2009. The increase in student participation in R-Tech reflects variations in districts implementation schedules. While less than half of districts (47%) offered R-Tech services in summer, nearly all districts (92%) had implemented the program in spring 2009. The sections that follow provide information about students' level of participation in R-Tech services, including how students were identified for services, the characteristics of students who received services, and the amount of time students spent using R-Tech resources.

How are students identified for R-Tech services?

As discussed earlier in this chapter, districts varied in how they implemented R-Tech and differences in program configurations affected how students were identified to receive services. Several districts implemented school-wide technology immersion programs in which all students used R-Tech resources. Other districts targeted their programs to a specific subject area (e.g., ELA or math), and students accessed resources as part of class time scheduled in computer labs. In other districts, R-Tech services were offered outside of regular class time to students who were "identified" for services. Results from the surveys of and site visit interviews with principals and R-Tech facilitators indicate that most students were identified for R-Tech because of weak academic outcomes, including poor TAKS scores, failing grades, teacher referrals, and prior failures. Some districts also referred students with poor attendance as a means to help students "catch up." Several districts targeted R-Tech services to specific student groups. For example, one district provided R-Tech services designed to help ELL students build language skills and another district implemented a behavior modification program for students receiving disciplinary referrals.

What are the characteristics of students who participate in R-Tech services?

Comparisons of the demographic characteristics of students who received R-Tech services to those who did not revealed few differences for the fall 2008 or spring 2009 reporting periods. That is, the characteristics of students who participated in R-Tech during the school year reflected the larger school population in terms of their ethnicity and economic characteristics. However, students who participated in R-Tech as part of the 2008 summer session differed from the population of students who did not receive such services. R-Tech summer school students were more likely to be African American (18% vs. 9%) and from low income backgrounds (55% vs. 46%) than students who did not participate in R-Tech during summer school. Perhaps most notable is that students who participated in R-Tech as part of summer school were more likely to be in middle school than in high school (65% vs. 35%), and the largest proportion of R-Tech summer school students were in eighth grade (29%). This finding may suggest that districts used R-Tech to provide remediation to middle school students in order to reduce retention rates and support students' transition to high school.

How many hours per week do students receive R-Tech services?

Districts also indicated the average number of hours each participating student received R-Tech services each week in their reports to TEA for each of the three grant periods. Analysis of student participation data indicate that R-Tech services offered as part of summer school programs were more intensive than services offered during the school year. Students participating in R-Tech as part of the 2008 summer session accessed resources for an average of 8.5 hours per week. However, in fall 2008 students accessed resources for an average of 3.7 hours per week, and in spring 2009, students averaged 3.8 hours per week using R-Tech resources. The intensity of R-Tech services offered during the summer session may reflect the condensed timeline for summer courses, but it also may indicate that students identified for R-Tech summer programs spent more time with resources in order to make up coursework or recover the credits needed to move to the next grade level in the fall.

Research Question 3: What is the Effect of R-Tech on Teachers?

Technology has the potential to improve rural teachers' access to professional development through the provision of online training opportunities, and several states have implemented statewide programs focused on providing rural teachers with technology-based training to support and improve instruction. R-Tech facilitates improved teacher performance in rural districts by enabling districts to use grant funds to provide teachers with professional development in research-based instruction and strategies to increase course rigor. The following sections provide information about the effect of R-Tech on teachers, focusing on how districts implement R-Tech training, the types of training offered, and the effects of training on teachers' classroom instruction.

How do grantee districts and schools implement the teacher training component of the R-Tech program?

Although all Cycle 1 grantee districts reported plans to offer professional development in support of R-Tech in their grant applications, results from surveys and focus group interviews with teachers on R-Tech campuses indicate that R-Tech professional development was weakly implemented during the program's first year. Variations in districts implementation strategies and poor communication of grant goals affected teachers' access to training opportunities. Across site visit districts, principals expressed the need to improve communication about the grant, its goals and expectations, and the opportunities it provides for teachers in terms of instructional resources and training.

Results from teacher surveys conducted in fall 2008 and spring 2009 indicate that few teachers participated in R-Tech training during the grant's first year. Less than 5% of teachers responding to the fall 2008 survey (54 individuals) and 38% of spring survey respondents (215 individuals) knew they had participated in R-Tech professional development. However, some survey respondents were unsure if the professional development they received was related to R-Tech or not.

What types of training do teachers participate in as part of the R-Tech program?

Of the 215 teachers responding to the spring survey who participated in R-Tech professional development, most received training in TAKS/TEKS preparation, technology-based instruction, working with at-risk students, using instructional hardware and software, and aligning curriculum. Most professional development activities were presented in face-to-face formats, and few surveyed teachers reported accessing online training opportunities provided through R-Tech.

Although few surveyed teachers reported participating in online professional development activities, district-provided teacher usage data indicates that about 800 teachers (about 22% of all teachers on R-Tech campuses) received online training as part of R-Tech. Across the 2008-09 school year, teachers who participated in online training did so for an average of 16 hours. Middle school teachers had higher levels of participation (approximately 19 hours, on average) than high school teachers (approximately 16 hours, on average), and both middle and high school teachers had higher levels of participation in fall 2008 than in spring 2009.[4]

What is the effect of R-Tech teacher training on teacher effectiveness?

Results of the spring 2009 teacher survey suggest that R-Tech professional development activities had little effect on teachers' classroom practices during the pilot's first year. Less than half of surveyed teachers agreed that R-Tech had affected classroom instruction or lesson planning, and less than a third were using students' PEPs to inform instruction. However, the effects of training may differ across districts implementing different types of R-Tech programs. During focus groups conducted as part of spring site visits, teachers working at a school implementing a technology immersion program reported receiving training in how to integrate technology into instruction. While immersion teachers were overwhelmed by training content, they were also enthusiastic about the potential of technology to transform classroom instruction. Focus group teachers on campuses implementing self-paced instructional programs said they appreciated learning about vendor-provided software, but did not link training content to instructional practice.

While few teachers reported improvements in instructional practice from R-Tech training, focus group teachers reported other positive effects from the grant. Teachers said R-Tech increased their access to

[4]No teachers participated in training in summer 2008.

technology resources and their ability to differentiate instruction. In addition, focus group teachers felt that students were more engaged when they used technology-based resources.

Research Question 4: What Is The Effect of R-Tech on Student Outcomes?

Although the ongoing evaluation will include a broader range of student outcome indicators, the findings presented in this report are limited to R-Tech's effects on students' TAKS scores, which as noted in chapter 1, may produce misleading conclusions about the program's effectiveness. Recognizing this limitation, readers are asked to interpret the findings presented in the following sections with caution. The final evaluation report (fall 2010) will provide more comprehensive analyses of R-Tech's effects on student outcomes for the grant's full implementation period.

Is there a relationship between students' access time and TAKS outcomes?

Increased hours spent participating in R-Tech services had no effect on students' 2009 TAKS scores. Results may be due to the limited time most students spent in R-Tech activities—more than 80% of students receiving R-Tech services in fall 2008 and spring 2009 averaged 4 or fewer hours per week using resources—and TAKS, as well as other standardized achievement tests, may lack the sensitivity to measure subtle achievement gains.

Is there a relationship between R-Tech program configurations and students' TAKS outcomes?

The following sections consider whether the manner in which districts implemented R-Tech may have affected students' TAKS outcomes. Findings consider whether students who participated in R-Tech as part of the regular school day (i.e., non-supplementary programs) experienced different outcomes from students who participated in supplementary services offered outside of classroom instruction (e.g., before or after school) and whether differences in the types of R-Tech programs affects TAKS outcomes. Although researchers identified five types of R-Tech programs (i.e., self-paced instruction, dual credit/distance learning programs, one-to-one tutoring with online instructional support, technology immersion programs, and iPods loaded with instructional content), the small number of districts offering one-to-one tutoring with online instructional support, technology immersion programs, and iPods loaded with instructional content precluded the inclusion of these program types in analyses.

Supplementary vs. non-supplementary programs. Implementing R-Tech as a supplementary program offered outside of regularly scheduled classes demonstrated a consistently negative relationship with students' TAKS outcomes across testing areas; however, with exception social studies, the relationships were not statistically significant. Although preliminary, these results may indicate that offering R-Tech services during regular instructional hours or during elective periods may produce greater TAKS gains than offering services outside regular instructional hours.

Program type. R-Tech programs that used self-paced computer software had a statistically significant negative relationship with students' TAKS reading/ELA scores, but no significant relationship with students' TAKS mathematics, science, and social studies scores. R-Tech dual credit and distance learning programs did not demonstrate a statistically significant relationship with students' TAKS reading/ELA and mathematics scores. These results should be interpreted with caution because it was not possible for researchers to control for the many factors that affect students' testing outcomes or for the non-random identification of students for R-Tech services.

Research Question 5: How Cost Effective Is R-Tech?

While student outcomes are an important indicator of the effectiveness of an educational intervention, policymakers are also concerned with whether the funds used to implement a program are used effectively. Cost-effectiveness analyses generally compare multiple programs designed to achieve the same outcome; however, in the case of this evaluation, the only program under consideration is R-Tech. Because researchers did not have access to data on similar programs, the cost-effectiveness analysis presented in this report compares costs across different approaches to implementing R-Tech, using five researcher-identified program configurations discussed earlier in this chapter and considers cost differences between districts implementing R-Tech as a supplemental vs. non-supplemental program (i.e., as part of regular instruction). Recall that program configuration categories are not discrete, and districts may be included in more than one category.

The cost-effectiveness analysis seeks to understand how districts allocated funding across R-Tech's first year, which program configurations made the most effective use of funding, and whether R-Tech will be sustained when grant funding expires. The findings presented in this section are limited to state grant funding and do not consider districts' use of matching funds. Further, findings rely on districts' use of grant funds during the R-Tech's first grant year, in which many districts invested heavily in technology hardware, software, and infrastructure. Although these expenditures are included in analyses, their per-student costs are overstated because the technology resources will be used by many more students during the grant's second year and the years that follow. Findings presented in the evaluation's final report (fall 2010) will offset this limitation to some extent by measuring per-student costs in terms of all R-Tech students served by resources for the full 2-year grant period.

How are grant funds allocated in R-Tech districts?

In order to understand how R-Tech districts allocated grant funds across the project's first year, researchers examined district expenditure data submitted to TEA through May 2009 using the Agency's ER system. The ER system includes five expenditure categories: (1) payroll costs, (2) professional and contracted services, (3) supplies and materials, (4) other operating costs, and (5) capital outlay. Researchers also analyzed district budgets included in grant applications to identify the purposes of the costs recorded in each expenditure category.

Payroll costs. Funds allocated to payroll costs must be spent on district employees or non-employees (e.g., consultants) who work part-time or full-time on R-Tech activities. Only 8% of the funding expended on R-Tech through May 2009 had been allocated to payroll costs. In grant applications, districts indicated that payroll expenditures would be used to cover the salaries of R-Tech facilitators, computer lab staff, extra duty pay for teachers who worked before or after school to provide R-Tech services, and for substitutes to enable teachers to participate in professional development. Districts that implemented dual credit and distance learning programs tended to have higher average expenditures on payroll costs than R-Tech districts generally ($4,200 vs. $3,603, on average), while districts that used R-Tech funds to purchase iPods with educational programs targeted to specific student populations (e.g., ELL) expended well below the average amount spent on payroll costs for all R-Tech districts ($425 vs. $3,603). The reasons for these differences are not clear.

Professional and contracted services. In May 2009, about 15% of all expended state grant funding was spent on professional and contracted services. District grant applications indicated that funding was used to pay for educational software, registration fees and tuition for dual credit or distance learning courses, technical support, and professional development activities. Districts implementing dual credit coursework and distance learning programs tended to have higher average expenditures in this category ($12,065) than the average for all R-Tech districts ($6,648). Perhaps most noteworthy, however, is the amount expended for professional and contracted services by districts offering one-to-one tutoring and online instructional support ($52,715). Both districts in this category contracted with TxRED to provide dual credit programs at the high school and technology-based instructional support at the middle school. Districts allocated an average of $81,130 for TxRED services and accessed $52,715 of this funding during R-Tech's first year, although neither district had implemented the program for students in May 2009.

Supplies and materials. Across all R-Tech districts, the largest share of state-funded grant revenue was used to purchase supplies and materials (67%) during the pilot's first year. In grant applications, districts indicated that grant funds would be used to purchase computer hardware and software, furnishings for computer labs, LCD projectors, printers, textbooks for dual credit courses, and other materials related to implementing a technology-based educational program. Districts implementing self-paced programs focused on remediation, tutoring, and credit recovery; technology immersion programs; and R-Tech programs implemented as part of the regular school day (i.e., non-supplemental programs) tended to spend more on supplies and materials than districts implementing supplemental programs offered outside of regularly scheduled classes. This finding reflects the substantial investment in technology resources that such districts required in order to implement their R-Tech programs.

Other operating costs. Districts did not report spending any grant revenue on other operating costs during R-Tech's first year, although several districts budgeted for other operating costs, including travel costs for staff and students participating in R-Tech, as well as printing costs, in grant applications.

Capital outlay. Districts may use capital outlay funds to purchase tangible, nonexpendable property that will be used for more than 1 year. Across districts, about 10% of expended R-Tech funds were spent for capital outlay, and grant applications indicated that funding was used to purchase technology resources, including computer hardware and software. Similar to results for "supplies and materials," districts that implemented self-paced programs and districts that included R-Tech as part of the regular school day tended to spend more average funding on capital outlay.

Which R-Tech program configurations make the most effective use of funding as measured by reduced program costs?

In spite of substantial start-up investments related to the purchase of technology resources, districts that implemented R-Tech for larger numbers of students experienced reduced per-student costs. Across all R-Tech districts, the average cost per student of implementing the program in terms of state funding was about $420 during the program's first year. Note that this amount overstates the average cost per student because districts invested substantial R-Tech funding in technology resources that will be used over the life of the grant and beyond. As more students access R-Tech services during the grant's second year, per-student costs are expected to drop. The following sections discuss how districts' implementation strategies affected costs during R-Tech's first year, and consider program size, the type of program implemented, and whether R-Tech services were implemented as supplemental or non-supplemental programs. Findings are preliminary and are not linked to student outcomes; therefore, it is not possible to determine how effectively funds were spent at this time.

Program Size

Not surprisingly, districts that served large numbers of students in R-Tech services had the lowest per-student program costs over the pilot's first year. Districts that served 500 or more students had average per-student program costs of about $111, while districts that served fewer than 50 students had average per-student program costs of about $1,521. Mid-sized programs, serving between 100 and 249 students, had average per-student costs of about $244.

Type of R-Tech Program

Self-paced instructional programs. Most R-Tech districts (87%) offered some form of self-paced instructional program, including online tutoring, remediation, and credit recovery. As noted in the previous section, this program configuration required substantial investment in technology resources to expand and update existing computer labs and, in some cases, to purchase laptop computers that students could use at home. Districts implementing self-paced programs served, on average, about 256 students in R-Tech and incurred average per-student costs of about $428 during the program's first year. These costs are expected to drop in the grant's second year as more students are served with the technology resources purchased through R-Tech.

Dual credit and distance learning programs. About 30% of districts offered dual credit and distance learning programs using R-Tech funding. These districts spent less on technology purchases, but more on contracted services that provide technology-based instruction. Overall, districts implementing this type of program served an average of 177 students and experienced the lowest per-student costs—$198 per student, on average—in R-Tech's first year. However, unlike investments in technology, revenue spent on contracted services will not extend beyond the contract period, so it is not clear whether districts implementing dual credit and distance learning programs will experience a reduction in per-student costs during the project's second year.

One-to-one tutoring and online instructional support. Neither of the two districts offering this type of program served students during R-Tech's first year; therefore, it is not possible to calculate a per-student cost of implementation.

Technology immersion projects. The two districts that implemented R-Tech as a technology immersion project, in which each student was provided with a laptop and access to technology resources, invested heavily in technology resources during the program's first year, spending an average of $67,278 on supplies and materials in support of the grant. These districts implemented R-Tech broadly, serving 306 students, on average, which reduced their per-student costs of implementation relative to other R-Tech districts. Technology immersion districts had an average per-student program cost of about $269, while the average for all R-Tech districts was $420 across the first year of implementation. Similar to self-paced programs, technology immersion projects may expect their per-student costs to decline in the R-Tech's second year as more students access technology resources purchased with grant funds.

iPods with targeted instructional resources. Two districts used R-Tech funding to purchase iPods loaded with instructional resources for a targeted group of students (e.g., ELLs). These districts implemented the program narrowly, serving only 55 students, on average, and had average per-student costs of about $358.

Supplemental vs. Non-Supplemental Services

Although R-Tech was intended to provide supplemental instructional support offered outside of regular instruction (e.g., before or after school), many districts (40%) implemented R-Tech as part of daily instruction. Some districts implemented technology immersion projects in which students used laptops in core classes, some districts purchased sets of laptops that teachers used in the classroom, and other districts expanded access to computer labs, in which teachers scheduled class time for students to access services. Comparisons of per-student costs across the two approaches to implementation indicate that districts that incorporated R-Tech into regular instruction (i.e., non-supplemental programs) experienced substantially lower per-student costs relative to districts that implemented supplemental programs ($187 vs. $612). This difference results from the number of students who were able to access R-Tech services. Districts offering supplemental programs served an average of 172 students, while districts implementing R-Tech as part of the regular school day served an average of 350 students across the program's first year.

Is R-Tech sustainable?

Information about districts' ability to sustain R-Tech services once grant funds expire was gathered from spring 2009 surveys of principals on R-Tech campuses and through principal interviews conducted during spring site visits to eight R-Tech districts. Principals' survey and interview responses reflect ambivalence about the sustainability of R-Tech. At the end of R-Tech's first year, principals were unsure of R-Tech's effects on testing outcomes, and whether they would continue to fund the program when the grant expired. According to surveyed principals, lack of funding to sustain services is the greatest barrier to extending R-Tech beyond the grant period. Approximately half (48%) of responding principals indicated that insufficient financial resources created a *moderate* or *substantial* barrier to continuing the program. Surveyed principals also identified strategies to continuing R-Tech, and most principals (55%) indicated that they would incorporate R-Tech into regular classroom instruction rather than providing supplemental instruction offered outside of scheduled classes. A somewhat smaller percentage of principals indicated that they would seek additional funding sources (53%), and 25% planned to incorporate R-Tech into an alternative education program for at-risk students.[5] During site visit interviews, principals underscored the financial challenges to continuing R-Tech, but also emphasized concerns about the program's effect on TAKS scores. Some interviewed principals said that if R-Tech was not effective in improving students' TAKS outcomes, they would not continue the program.

DISCUSSION OF FINDINGS

The following sections discuss the second interim report's key findings and provide recommendations to policymakers and individuals charged with implementing R-Tech. Recommendations strive to inform subsequent policy decisions and to shape implementation strategies for the grant's second year.

Supplemental vs. Non-Supplemental Implementation

While R-Tech is intended to provide supplemental instruction offered outside of students' regularly scheduled classes, many districts planned R-Tech as part of regular class instruction, designing programs that incorporated laptops in daily lessons or expanding access to computer labs and updating equipment to enable teachers to schedule class time for students to use R-Tech resources. In addition, some districts that initially implemented R-Tech as a supplemental program encountered challenges that limited the program's effectiveness when offered outside of regularly scheduled classes. In some districts, transportation challenges created barriers to students' program participation when bus schedules prevented students from arriving early or staying after school. Some students were unable to participate in R-Tech services because of conflicts with extra-curricular activities, and others simply would not participate in instruction offered outside the regular school day. In response to these challenges, some districts adjusted their implementation plans to incorporate R-Tech into the school day and encouraged teachers to permit students to visit computer labs during class time.

Although preliminary, the analyses presented in this report suggest that districts that implemented R-Tech as part of regular instruction experienced improved outcomes relative to districts that adhered to the program's intent and implemented supplemental programs. Early results from analyses of R-Tech's effects on students' TAKS scores indicate that students who participated in R-Tech as part of regular instruction (i.e., non-supplemental programs) may enjoy improved testing outcomes relative to students participating in supplemental programs. Results from site visits suggest that teachers who used resources as part of classroom instruction provided greater direction for student learning with R-Tech resources and used program-provided data to a greater extent to individualize technology-based lessons and monitor student progress. Further, preliminary findings from the analysis of R-Tech's cost effectiveness indicate that districts that implemented non-supplemental programs experienced lower per-student program costs,

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[5] Principals were able to indicate multiple strategies for sustaining R-Tech; percentages will not total to 100.

in large part because greater numbers of students were able to access resources when services were included as part of regular instruction. These results suggest that districts that implement R-Tech as part of regular instruction may be using resources more effectively and efficiently than districts that offer supplemental programs.

Given these findings, policymakers may want to consider whether program guidelines should be revised to encourage districts to implement R-Tech services as part of classroom instruction, as well as offering supplementary programs. Expanding R-Tech to regular instruction would enable greater student access to resources and increase teacher awareness of the program and its instructional benefits. Further, the expansion of R-Tech to regular classroom instruction would reduce the per-student cost of the program, and it is possible that expanded access to resources will produce positive effects on student achievement outcomes.

Communication About R-Tech

Poor communication of R-Tech's goals and expectations created implementation challenges across R-Tech districts. Within districts, communication break downs tended to occur between the organizational tiers that structure employment in public schools. For example, in many districts, central office staff charged with overseeing grant application processes did not communicate R-Tech goals and expectations to individuals at the campus-level who were responsible for implementing the program, while at the school level, some administrators did not provide sufficient information to teachers about R-Tech. Administrators in R-Tech districts also felt their programs could be improved if they had opportunities to communicate with staff in other grantee districts about implementation strategies.

Within district communication. In many districts, campus-level staff did not participate in grant application processes and were unaware of grant requirements. In particular, few R-Tech administrators and facilitators knew that the grant required the development of PEPs to monitor student progress, and at least one district misunderstood R-Tech's access requirements. Administrators in this district understood that access to resources was to be provided for 10 hours a *day* rather than 10 hours a *week*. The district used grant funding to pay for a full-time facilitator for its computer lab, and to provide extra-duty pay for teachers who staffed the lab before and after school. While teachers in the district appreciated students' expanded access to computers, school administrators noted that the facilitator's position and access to the lab would be discontinued when grant funds expired. The poor communication of R-Tech requirements suggests that district-level staff who complete grant applications may want to spend time ensuring that campus-level staff charged with implementation have complete information about program goals and requirements. Districts may also want to ensure that future grant writing activities engage campus-level staff, including teachers, in grant application and planning activities.

Further, poor communication of project goals between campus-level administrators and teachers also created implementation barriers. In many districts, teachers were unaware of R-Tech resources and training opportunities. Campus-level administrators are advised to place greater emphasis on communicating grant goals and encouraging teachers' use of resources and to include teachers in implementation activities.

Between district communication. Several campus-level administrators and R-Tech facilitators in site visit districts expressed a desire to exchange information with staff in other R-Tech districts, and asked that TEA facilitate opportunities for districts to communicate with one another. Should TEA choose to facilitate such activities during the project's second year, many implementation challenges may be overcome through shared information about successful implementation strategies and improved program outcomes.

THE ONGOING EVALUATION

The final evaluation report (fall 2010) will present results for the full R-Tech implementation period (May 2008-May 2010) and will include more conclusive findings about the program's effects on students and teachers, and how program configurations may affect student achievement outcomes and project costs. Many of the limitations of this report, including incomplete data on student achievement outcomes, and uneven first year implementation of R-Tech across districts, will be offset by the inclusion of information collected during R-Tech's second implementation year in the final report.

During R-Tech's second implementation year, the evaluation's ongoing activities will include spring 2010 surveys of principals and teachers on R-Tech campuses, R-Tech facilitators, and students receiving R-Tech services during the program's second year. Surveys administered at the conclusion of the R-Tech grant period will provide information about fully implemented programs, ongoing challenges to implementation, as well as how challenges may have been overcome. Surveys will also identify changes in implementation roles and stakeholders' perceptions of the program's benefits. In addition, the spring 2010 surveys will ask principals and R-Tech facilitators to identify which of the researcher-identified program categories used in the evaluation best describes their districts' implementation of R-Tech. The inclusion of program categories on the surveys will allow researchers to refine program descriptions and more fully assess the effects of program configurations. Researchers will visit R-Tech districts again in spring 2010. Site visits will include interviews with principals and R-Tech facilitators, focus group discussions with teachers and students, and observations of R-Tech service delivery. Site visits will identify how programs may have changed during R-Tech's second implementation year and how changes may have shaped program outcomes.

In addition to surveys and site visits, the ongoing evaluation will include a broader range of student outcome measures, including course completion data, graduation rates, and indicators of college readiness, as well as TAKS scores. The expanded student outcome data will provide a more complete view of R-Tech's effects on student achievement outcomes, including whether students are able to recover the credits needed to graduate on time. The final evaluation report will consider how different program configurations may affect student outcomes. In addition, the ongoing evaluation will incorporate information on districts' full use of state grant funding, which will enable a more accurate assessment of R-Tech's cost effectiveness.

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APPENDIX A
THE ONLINE PRINCIPAL AND R-TECH FACILITATOR SURVEY

The evaluation included information gathered through voluntary, online surveys of principals of R-Tech campuses and R-Tech program facilitators administered in fall 2008 and spring 2009. The surveys asked principals and facilitators a common set of questions about R-Tech's implementation, the program's effects on students and teachers, and campus-level goals for R-Tech. Principals were routed to a set of open-ended questions asking about their goals for R-Tech's effects on teachers, as well as how they will know if these goals have been met. R-Tech facilitators were routed to a set of questions asking about the training they may have received to support the implementation of R-Tech. Principals who also acted as R-Tech facilitators responded to both sets of questions. The spring 2009 survey also included items asking about principals' and facilitators' roles in implementation, and how challenges to implementation may have been overcome during R-Tech's first year. The spring survey also asked principals about the sustainability of R-Tech after grant funds expire.

This appendix contains information about survey administration procedures, response rates, and the characteristics of survey respondents. It also contains supplemental tables that present additional information cited in report chapters and copies of the fall and spring principal and R-Tech facilitator surveys.

SURVEY ADMINISTRATION

Fall 2008

In November 2008, the principal of each of the 115 campuses that districts indicated were implementing R-Tech in their grant applications was sent a link to a voluntary, online survey of principals and R-Tech facilitators. Principals were asked to forward the link to the individual or individuals who acted as R-Tech facilitators on their campuses. Principals and facilitators were provided with 3 weeks to complete the fall 2008 survey and received multiple reminders about survey deadlines. Given weak survey response rates at the survey's deadline, evaluators kept the survey open for 3 additional weeks and sent additional reminders encouraging principals and facilitators to participate.

Spring 2009

Identical procedures were used to administer the principal and facilitator survey in May 2009. However, survey links were sent to the principals at the revised list of 115 campuses that R-Tech districts indicated were implementing the program in the spring 2008. Similar to the fall survey, weak response rates at the close of the spring survey caused evaluators to keep the survey open beyond its deadline, but due to the close of the school year and project timelines, the survey was extended only for an additional 10 days. The shortened survey timeline is likely the cause of reduced response rates for the spring 2009 administration.

Number of Survey Respondents and Response Rates: Fall 2008 and Spring 2009

Number of survey respondents. In fall 2008, 153 individuals responded to the online survey of principals and R-Tech facilitators. Of the respondents, 66 acted *only* as a principal on an R-Tech campus, 71 acted as R-Tech facilitators and were *not* principals, and 16 served in *both* roles. Twelve campuses responding to the survey had multiple R-Tech facilitators and had multiple facilitator responses to the survey (11 campuses had two facilitator survey respondents and one campus had 11 facilitator survey respondents).

In spring 2009, 136 individuals responded to the online survey. Of spring 2009 respondents, 60 individuals acted *only* as a principal, 61 individuals acted as a facilitator and were *not* principals, and 15 individuals served in *both* roles. Again, seven campuses had more than one individual acting as the R-Tech facilitator (four campuses had two facilitator respondents, two campuses had three facilitator respondents, and one campus had nine facilitator respondents).

Table A.1
The Number of Responses, by Respondent Type: Fall 2008 and Spring 2009

Respondent Type	Fall 2008 Number of Responses	Spring 2009 Number of Responses
Principal only	66	60
R-Tech facilitator only	71	61
Principal and facilitator[a]	16	15
Total	**153**	**136**

Sources: R-Tech Principal/Facilitator Survey, fall 2008 and spring 2009
[a]Respondent serves in both roles.

Response rates are calculated at the campus-level for both principals and R-Tech facilitators. Because each campus may be reasonably understood to have one principal, the campus-level response rate for principals may be understood as the principal response rate for the survey. However, for R-Tech facilitators, the same reasoning does not apply. R-Tech requires that grantee districts provide *an* R-Tech facilitator to support implementation, monitor student PEPs, and monitor technology access and use. In addition, districts are required to have *on-site*, or campus-level, R-Tech facilitators to support students' daily use of R-Tech resources and report student usage (TEA, 2008b). In most districts in which R-Tech facilitators responded to the survey, both sets of responsibilities were managed by campus-level facilitators, and, as noted earlier, some schools had more than one campus-level facilitator. Further, some respondents indicated that they acted as the facilitator for the district, but in most cases, these individuals were located on a campus (e.g., high school principal or middle school technology coordinator). Because districts varied widely in the ways in which they assigned facilitator responsibilities and because it is not clear how many individuals acted as facilitators across respondent and non-respondent campuses, it is not possible to establish facilitator-level response rates for the surveys.

Campus-level response rates. Campus-level response rates are calculated for the total number of campuses participating in R-Tech in fall 2008 and spring 2009 (N=115 and N=115, respectively) and whether each R-Tech campus had a principal or facilitator who responded to the survey. Campuses with multiple facilitators responding to the survey are counted only once in the calculation of response rates. Principals who served dual roles—principal and facilitator—are included in the calculation of response rates for both principals and facilitators.

Table A.2
Campus-Level Response Rates, Principal and R-Tech Facilitator: Fall 2008 and Spring 2009

	Fall 2008 (N=115)		Spring 2009 (N=115)	
	Campuses with Survey Respondents	Percentage of Campuses Responding	Campuses with Survey Respondents	Percentage of Campuses Responding
Principal	82	71.3%	75	65.2%
R-Tech Facilitator	75	65.2%	65	56.5%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Notes. Campuses with multiple facilitators responding to the survey are counted only once in the calculation of response rates. Principals who serve dual roles—principal and facilitator—are included in the response rate calculations for both principals and facilitators.

CHARACTERISTICS OF SURVEY RESPONDENTS

Table A.3 presents the characteristics of respondents to the fall 2008 and spring 2009 principal and R-Tech facilitator surveys.

Table A.3
The Characteristics of Principal/Facilitator Survey Respondents, as a Percentage of Respondents, by Role: Fall 2008 and Spring 2009

	Fall 2008			Spring 2009		
Characteristic	Principals (n=82)	Facilitators (n=71)	All Respondents (N=153)	Principals (n=75)	Facilitators (n=61)	All Respondents (N=136)
Gender						
Male	65.9%	23.9%	46.4%	70.7%	19.7%	47.8%
Female	34.1%	76.1%	53.6%	29.3%	80.3%	52.2%
School level						
Middle school	36.6%	15.5%	26.8%	40.0%	24.6%	33.1%
High school	58.5%	67.6%	62.7%	50.7%	52.5%	51.5%
Other[a]	4.9%	16.9%	10.5%	9.3%	23.0%	15.4%
Experience (average years)						
At current school	6.6	11.3	8.8	6.8	8.1	7.4
In current position at current school	3.3	5.8	4.4	3.7	4.7	4.1

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
[a] "Other" types of R-Tech schools included combined middle and high schools, district level school, and an intermediate school.

SUPPLEMENTAL TABLES

This section presents supplemental information referenced in report chapters.

Table A.4
Principals' and Facilitators' Roles in R-Tech Planning and Implementation, as a Percentage of Respondents by Task: Fall 2008 and Spring 2009

Role	Principals (N=75)	Facilitators (N=61)
Planning implementation		
No involvement	12.0%	19.7%
Minor involvement	18.7%	14.8%
Moderate involvement	37.3%	16.4%
Substantial involvement	32.0%	49.2%
Identifying students		
No involvement	14.7%	24.6%
Minor involvement	18.7%	16.4%
Moderate involvement	34.7%	19.7%
Substantial involvement	32.0%	39.3%
Monitoring students' use		
No involvement	8.0%	13.1%
Minor involvement	33.3%	16.4%
Moderate involvement	49.3%	31.1%
Substantial involvement	9.3%	39.3%
Communicating with parents		
No involvement	10.7%	23.0%
Minor involvement	33.3%	32.8%
Moderate involvement	36.0%	26.2%
Substantial involvement	20.0%	18.0%
Participating in training		
No involvement	16.0%	14.8%
Minor involvement	40.0%	16.4%
Moderate involvement	30.7%	36.1%
Substantial involvement	13.3%	32.8%
Developing PEPs		
No involvement	17.3%	29.5%
Minor involvement	38.7%	24.6%
Moderate involvement	32.0%	24.6%
Substantial involvement	12.0%	21.3%
Providing technical support		
No involvement	32.0%	18.0%
Minor involvement	32.0%	24.6%
Moderate involvement	30.7%	27.9%
Substantial involvement	5.3%	29.5%
Other		
No involvement	34.6%	68.8%
Minor involvement	30.8%	6.3%
Moderate involvement	26.9%	12.5%
Substantial involvement	7.7%	12.5%

Source: R-Tech Principal/Facilitator Survey, spring 2009.

Table A.5
The Challenges to R-Tech Implementation, as a Percentage of Respondents: Fall 2008 and Spring 2009

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)
Communication of R-Tech goals to parents		
Not a challenge	20.9%	18.4%
Minor challenge	46.4%	33.1%
Moderate challenge	25.5%	33.8%
Substantial challenge	7.2%	14.7%
Project reporting requirements		
Not a challenge	29.4%	23.5%
Minor challenge	39.9%	36.8%
Moderate challenge	23.5%	23.5%
Substantial challenge	7.2%	16.2%
Insufficient planning time		
Not a challenge	NA	20.6%
Minor challenge	NA	40.4%
Moderate challenge	NA	22.8%
Substantial challenge	NA	16.2%
Communication of R-Tech goals to staff		
Not a challenge	40.5%	28.7%
Minor challenge	39.2%	33.1%
Moderate challenge	18.3%	27.9%
Substantial challenge	2.0%	10.3%
Development of students' PEPs		
Not a challenge	26.8%	22.8%
Minor challenge	40.5%	40.4%
Moderate challenge	28.1%	30.1%
Substantial challenge	4.6%	6.6%
Monitoring students' progress		
Not a challenge	35.9%	23.5%
Minor challenge	39.2%	43.4%
Moderate challenge	22.9%	25.0%
Substantial challenge	2.0%	8.1%
Coordinating training for staff		
Not a challenge	32.0%	23.5%
Minor challenge	41.8%	44.9%
Moderate challenge	20.3%	24.3%
Substantial challenge	5.9%	7.4%
Conflicts with other programs		
Not a challenge	45.1%	31.6%
Minor challenge	37.3%	44.1%
Moderate challenge	13.1%	16.9%
Substantial challenge	4.6%	7.4%

(continued)

Table A.5
The Challenges to R-Tech Implementation, as a Percentage of Respondents: Fall 2008 and Spring 2009 (continued)

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)
Level of technology resources		
Not a challenge	39.2%	32.4%
Minor challenge	41.2%	40.4%
Moderate challenge	17.0%	19.9%
Substantial challenge	2.6%	7.4%
Level of technical support		
Not a challenge	43.8%	36.8%
Minor challenge	40.5%	39.7%
Moderate challenge	12.4%	18.4%
Substantial challenge	3.3%	5.1%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Note. NA=Not applicable. These challenges were not included on the fall 2008 survey.

Table A.6
The Barriers to Student Participation in R-Tech Services, as a Percentage of Respondents: Fall 2008 and Spring 2009

Barrier and Intensity	Fall 2008 (N=153)	Spring 2009 (N=136)
Student resistance		
Not a barrier	23.5%	28.7%
Minor barrier	45.8%	36.0%
Moderate barrier	26.1%	23.5%
Substantial barrier	4.6%	11.8%
Conflicts with school-sponsored extra-curricular activities		
Not a barrier	39.9%	36.8%
Minor barrier	36.6%	36.8%
Moderate barrier	21.6%	12.5%
Substantial barrier	2.0%	14.0%
Conflicts with athletic programs		
Not a barrier	37.9%	40.4%
Minor barrier	37.9%	28.7%
Moderate barrier	19.6%	16.9%
Substantial barrier	4.6%	14.0%
Conflicts with non-school extra-curricular activities		
Not a barrier	45.8%	43.4%
Minor barrier	41.8%	36.0%
Moderate barrier	12.4%	13.2%
Substantial barrier	0.0%	7.4%

(continued)

Table A.6
The Barriers to Student Participation in R-Tech Services, as a Percentage of Respondents: Fall 2008 and Spring 2009 (continued)

Barrier and Intensity	Fall 2008 (N=153)	Spring 2009 (N=136)
Conflicts with student employment		
Not a barrier	42.5%	49.3%
Minor barrier	33.3%	30.1%
Moderate barrier	22.9%	14.0%
Substantial barrier	1.3%	6.6%
Other		
Not a barrier	72.0%	50.0%
Minor barrier	4.0%	13.6%
Moderate barrier	4.0%	13.6%
Substantial barrier	20.0%	22.7%
Transportation limits		
Not a barrier	42.5%	50.0%
Minor barrier	26.1%	22.8%
Moderate barrier	19.6%	13.2%
Substantial barrier	11.8%	14.0%
Parent resistance		
Not a barrier	65.4%	58.1%
Minor barrier	23.5%	33.8%
Moderate barrier	9.2%	5.1%
Substantial barrier	2.0%	2.9%

Source: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.

Table A.7
The Barriers to Dual Credit Implementation, as a Percentage of Respondents: Fall 2008 and Spring 2009

Challenge to Implementing Dual Credit	Fall 2008 (N=33)	Spring 2009 (N=29)
Misaligned university and district semester timelines		
Not a challenge	36.4%	31.0%
Minor challenge	30.3%	31.0%
Moderate challenge	27.3%	24.1%
Substantial challenge	6.1%	13.8%
Tuition costs		
Not a challenge	27.3%	34.5%
Minor challenge	33.3%	31.0%
Moderate challenge	12.1%	24.1%
Substantial challenge	27.3%	10.3%

(continued)

Table A.7
The Barriers to Dual Credit Implementation, as a Percentage of Respondents: Fall 2008 and Spring 2009 (continued)

Challenge to Implementing Dual Credit	Fall 2008 (N=33)	Spring 2009 (N=29)
Textbook costs		
Not a challenge	27.3%	34.5%
Minor challenge	30.3%	31.0%
Moderate challenge	27.3%	24.1%
Substantial challenge	15.2%	10.3%
Student disinterest		
Not a challenge	24.2%	44.8%
Minor challenge	48.5%	24.1%
Moderate challenge	15.2%	27.6%
Substantial challenge	12.1%	3.4%
Coordination/ communication with university partners		
Not a challenge	45.5%	37.9%
Minor challenge	39.4%	41.4%
Moderate challenge	12.1%	20.7%
Substantial challenge	3.0%	0.0%
Student failure in dual credit courses		
Not a challenge	NA	41.4%
Minor challenge	NA	41.4%
Moderate challenge	NA	6.9%
Substantial challenge	NA	10.3%
Coordinating technical support between district and university partners		
Not a challenge	NA	31.0%
Minor challenge	NA	51.7%
Moderate challenge	NA	13.8%
Substantial challenge	NA	3.4%
Identification of appropriate course offerings		
Not a challenge	63.6%	34.5%
Minor challenge	27.3%	55.2%
Moderate challenge	6.1%	10.3%
Substantial challenge	3.0%	0.0%
Other[a]		
Not a challenge	75.0%	50.0%
Minor challenge	25.0%	16.7%
Moderate challenge	0.0%	33.3%
Substantial challenge	0.0%	0.0%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Notes. The number of respondents (N) represents principals and facilitators at schools implementing dual credit programs. NA=Not applicable. These statements were not included on the fall 2008 survey.
[a]Only one respondent reporting “other” challenges clarified their response within an open-ended item. This respondent reported the campus lacked the staff necessary to implement dual credit programs as they had intended.

APPENDIX B
ONLINE TEACHER SURVEY

The evaluation included a voluntary, online survey of teachers all teachers working on R-Tech campuses. The survey was administered in fall 2008 and again in spring 2009. The survey asked teachers about their roles in planning and implementing the R-Tech program, the content and format of the professional development teachers received in support of R-Tech, the most and least useful aspects of R-Tech training, their awareness of R-Tech's goals, and the effects of R-Tech on teachers. This appendix provides information about survey administration procedures, response rates, and the characteristics of survey respondents. The appendix also includes supplemental tables referenced in report chapters and a copy of the online teacher survey.

SURVEY ADMINISTRATION

Fall 2008

The link to the teacher survey was sent to the principal of each R-Tech campus in November 2008. Principals were asked to forward the link to each teacher working on the campus. Teachers were provided with 3 weeks to complete the survey, and requests to remind teachers to complete the survey were sent to the principal. Given weak survey response rates at the survey's deadline, evaluators kept the survey open for 3 additional weeks and sent additional requests to principals to encourage teacher participation.

Spring 2009

Identical survey procedures were used in April 2009. As in the fall, teachers were given 3 weeks to complete the survey, and survey reminders were sent to the principal. Again, weak response rates caused evaluators to keep the survey open beyond the deadline; however, due to the close of the school year and project timelines, evaluators were able to provide teachers only with an additional 10 days to complete the survey. The shortened extension period is likely the source of the reduced teacher response rate for the spring 2009 survey.

Campus- and Teacher-Level Survey Response Rates

Table B.1 presents campus- and estimated teacher-level response rates for the fall and spring administrations of the teacher survey. In the fall 2008, 1,213 teachers working on 92 R-Tech campuses responded to the survey of teachers, and in spring 2009, 568 teachers on 77 R-Tech campuses responded to the survey. The percentage of campuses with teachers responding in fall 2008 and spring 2009 were 80% and 67%, respectively.

However, campus-level response rates mask the substantial variation in teacher response rates across R-Tech campuses. The range of teachers responding to the survey within R-Tech campuses ranged from 1 to 56 in fall 2008, and from 1 to 42 in spring 2009. In order to gain a clearer sense of teacher response rates, researchers estimated teacher-level response rates using campus-level teacher counts included in AEIS data files for the 2007-08 school year.[1] In terms of the percentage of teachers responding to the survey, teacher-level response rates are much lower—33% in fall 2008 and 16% in spring 2009. Within R-Tech campuses with teachers responding to the survey, teacher response rates ranged from 1% to more than 100% in both the fall 2008 and spring 2009 survey administrations. Within campus response rates of greater than 100% are likely the result of teachers' aides and other support staff participating in the

[1]The 2007-08 AEIS teacher counts were the most current data available at the report's writing.

survey. It is unclear how variations in teacher survey response rates across R-Tech campuses may affect evaluation findings, and readers are asked to use caution when interpreting survey results.

Table B.1
Campus and Teacher-Level Response Rates, R-Tech Teacher Survey: Fall 2008 and Spring 2009

Response Rate	Fall 2008	Spring 2009
Campus-Level Response Rates		
Number of campuses surveyed	115	115
Campuses with teachers responding	92	77
Percentage of campuses with respondents	80.0%	67.0%
Teacher-Level Response Rates		
Teacher counts 2007-08	3,672	3,620
Number of teachers responding to survey	1,213	568
Percentage of teachers responding to survey	33.0%	15.7%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009; Academic Excellence Indicator System (AEIS) data files, 2007-08
Notes. While the number of campuses is 115 across both survey administrations, the composition of the 115 campuses changed across survey administrations. The change in the composition of campuses participating in
R-Tech affected the number of teachers included in 2007-08 teacher counts across survey administrations.

CHARACTERISTICS OF SURVEY RESPONDENTS

Table B.2 presents information about the characteristics of teachers who responded to the fall and spring surveys.

Table B.2
The Characteristics of Teacher Survey Respondents, as a Percentage of Respondents: Fall 2008 and Spring 2009

Characteristic	Fall 2008 Middle School Teachers (n=374)	Fall 2008 High School Teachers (n=839)	Fall 2008 All Teachers (N=1,213)	Spring 2009 Middle School Teachers (n=197)	Spring 2009 High School Teachers (n=371)	Spring 2009 All Teachers (N=568)
Gender						
Male	22.7%	41.5%	35.7%	21.8%	35.8%	31.0%
Female	77.3%	58.5%	64.3%	78.2%	64.2%	69.0%
Teaching assignment: Grade						
6th grade	41.7%	5.4%	16.6%	49.2%	5.9%	21.0%
7th grade	71.4%	11.9%	30.3%	69.0%	12.9%	32.4%
8th grade	66.3%	12.4%	29.0%	72.1%	14.0%	34.2%
9th grade	3.2%	74.3%	52.3%	3.6%	78.7%	52.6%
10th grade	1.1%	83.4%	58.0%	2.0%	86.0%	56.9%
11th grade	0.8%	84.5%	58.7%	1.5%	87.1%	57.4%
12th grade	0.5%	81.6%	56.6%	0.0%	82.7%	54.0%
Experience (in average years)	6.4	7.3	7.0	6.7	7.0	6.9

Source: R-Tech Teacher Survey, fall 2008, spring 2009.
Note. In some R-Tech districts, middle school teachers also worked in the high school, and high school teachers also worked in the middle school. This explains why a high school teacher may teach middle school grades and vice versa.

SUPPLEMENTAL TABLES

The following tables present additional information cited in report chapters.

Table B.3
Teachers' Roles in R-Tech Planning, as a Percentage of Respondents: Fall 2008 and Spring 2009

Planning Role	Fall 2008 (N=1,213)	Spring 2009 (N=568)
Decision to apply for grant		
No role	90.7%	87.5%
Minor role	6.5%	8.3%
Moderate role	2.6%	3.5%
Substantial role	0.2%	0.7%
Selection of vendors		
No role	93.6%	91.9%
Minor role	4.5%	4.4%
Moderate role	1.6%	2.8%
Substantial role	0.2%	0.9%
Other role		
No role	96.0%	93.0%
Minor role	1.9%	3.2%
Moderate role	1.3%	1.8%
Substantial role	0.8%	2.0%
Drafting the grant application		
No role	94.9%	93.8%
Minor role	4.2%	3.5%
Moderate role	0.9%	2.1%
Substantial role	0.0%	0.5%

Source: R-Tech Teacher Survey, fall 2008, spring 2009.

Table B.4
Teachers' Role in R-Tech Implementation, as a Percentage of Respondents: Fall 2008 and Spring 2009

Implementation Role	Fall 2008 (N=1,213)	Spring 2009 (N=568)
Supervise or monitor students		
No role	67.0%	54.4%
Minor role	11.4%	12.1%
Moderate role	9.5%	15.3%
Substantial role	12.1%	18.1%
Provide tutoring to students		
No role	67.3%	55.3%
Minor role	12.5%	15.1%
Moderate role	9.6%	13.7%
Substantial role	10.6%	15.8%
Communication with parents		
No role	75.5%	69.0%
Minor role	13.3%	16.0%
Moderate role	8.2%	8.5%
Substantial role	3.0%	6.5%
Monitor Personal Education Plans		
No role	76.0%	69.9%
Minor role	8.9%	12.0%
Moderate role	8.8%	8.8%
Substantial role	6.3%	9.3%
Identification of students		
No role	77.9%	71.0%
Minor role	11.2%	15.7%
Moderate role	7.4%	7.9%
Substantial role	3.5%	5.5%
Develop Personal Education Plans		
No role	79.6%	74.8%
Minor role	9.8%	11.6%
Moderate role	6.1%	7.7%
Substantial role	4.5%	5.8%
Identify R-Tech professional development topics		
No role	82.5%	77.8%
Minor role	12.0%	11.8%
Moderate role	4.1%	7.6%
Substantial role	1.4%	2.8%
Provide technical support		
No role	82.7%	78.7%
Minor role	12.0%	13.4%
Moderate role	3.5%	4.8%
Substantial Role	1.7%	3.2%

Source: R-Tech Teacher Survey, fall 2008, spring 2009.

Table B.5
Teachers' Views of R-Tech Goals and Outcomes, as a Percentage of Respondents, by Level of Agreement: Fall 2008 and Spring 2009

Statements about Goals	Fall 2008 (N=1,213)	Spring 2009 (N=568)
Overall, I am pleased with the services provided by R-Tech.		
Agree/Strongly agree	39.7%	50.7%
Disagree/Strongly disagree	3.1%	4.2%
Don't know	57.3%	45.1%
R-Tech is positively affecting student achievement on campus.		
Agree/Strongly agree	38.3%	50.4%
Disagree/Strongly disagree	2.4%	5.1%
Don't know	59.3%	44.5%
Vender services are aligned with the TEKS/TAKS.		
Agree/Strongly agree	38.4%	47.5%
Disagree/Strongly disagree	2.7%	4.4%
Don't know	58.9%	48.1%
Goals are clearly communicated.		
Agree/Strongly agree	35.9%	44.5%
Disagree/Strongly disagree	16.7%	18.3%
Don't know	47.5%	37.1%
Vender services are aligned with our campus goals.		
Agree/Strongly agree	35.4%	42.4%
Disagree/Strongly disagree	3.2%	5.8%
Don't know	61.4%	51.8%
I use information from student's Personal Education Plans when I plan classroom instruction.		
Agree/Strongly agree	23.7%	29.4%
Disagree/Strongly disagree	19.3%	25.0%
Don't know	57.0%	45.6%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009.
Notes. Results for teachers who *agree/ strongly agree* with survey items represent the sum of percentages of teachers who indicated they *agreed* or *strongly agree* and results for *disagree/strongly disagree* represent the sum of percentages of teachers who indicated they *disagreed* or *strongly disagreed* with statements on fall and spring surveys. Notably small percentages of teachers *strongly agreed* (< 12%) or *strongly disagreed* (< 5%) across statements of R-Tech goals.

Table B.6
The Effects of R-Tech Implementation on Teachers, as a Percentage of Respondents, by Level of Agreement: Fall 2008 and Spring 2009

Positive Effects	Fall 2008 (N=1,213)	Spring 2009 (N=568)
I have a greater awareness of technology-based learning opportunities for students.		
Agree/Strongly agree	49.5%	59.9%
Disagree/Strongly disagree	5.9%	6.2%
Don't know	44.6%	34.0%
I have the opportunity to participate in technology-based professional development.		
Agree/Strongly agree	47.9%	55.6%
Disagree/Strongly disagree	5.1%	8.6%
Don't know	47.0%	35.7%
My technical skills and abilities have improved.		
Agree/Strongly agree	43.4%	53.2%
Disagree/Strongly disagree	7.4%	9.2%
Don't know	49.1%	37.3%
I have a better understanding of the needs of at-risk students.		
Agree/Strongly agree	41.5%	50.5%
Disagree/Strongly disagree	10.3%	11.8%
Don't know	48.2%	37.7%
My teaching has improved.		
Agree/Strongly agree	38.3%	47.2%
Disagree/Strongly disagree	7.6%	9.7%
Don't know	54.1%	43.1%
My lesson plans have improved.		
Agree/Strongly agree	36.2%	43.5%
Disagree/Strongly disagree	11.4%	13.7%
Don't know	52.4%	42.8%

Source: R-Tech Teacher Survey, fall 2008, spring 2009.
Notes. Results for teachers who *agree/ strongly agree* with survey items represent the sum of percentages of teachers who indicated they *agreed* or *strongly agreed* and results for *disagree/strongly disagree* represent the sum of percentages of teachers who indicated they *disagreed* or *strongly disagreed* with statements on fall and spring surveys. Notably small percentages of teachers *strongly agreed* (< 14%) or *strongly disagreed* (< 3%) across statements about R-Tech effects.

APPENDIX C

ONLINE STUDENT SURVEY

In order to gain students' views about R-Tech services, the evaluation included a voluntary, online survey of students who participated in R-Tech during the 2008 summer session, fall 2008, and/or spring 2009 semesters. The survey asked students about their access to R-Tech services, their perceptions of R-Tech technology resources, the subject areas they studied using R-Tech, as well as what they liked most and least about using technology resources for learning. Students participating in dual credit coursework were routed to a separate survey section addressing the courses taken for dual credit and students' perceptions of course rigor and content. This appendix contains information about the administration of the student survey, survey response rates, the characteristics of survey respondents, and a copy of the online student survey administered in spring 2009.

SURVEY PROCEDURES

Parental Consent

Three weeks in advance of survey administration, principals on 115 R-Tech campuses were asked to distribute a letter to parents of students participating in R-Tech services during the 2008 summer session, fall 2008, and/or spring 2009 semesters requesting parent consent for students to participate in the survey. The letter explained survey content and provided parents with a link that enabled them to preview the survey. The letter clarified that participation in the survey was voluntary and that students who did not participate in the survey would not experience any penalties. Parents who *did not* want their students to participate in the survey were asked to return a signed form to TCER or to notify TCER that they did not approve of their students' participation by telephone or e-mail. TCER does not have information about how many parents received consent forms; however, five parents returned forms indicating that they *did not* want their students to participate in the spring survey. Principals received notification of the students whose parents requested that they not participate in the survey in advance of survey administration.

Survey Administration

In spring 2009, principals were provided with a link to an online survey of students receiving R-Tech services during the 2008 summer session, the fall 2008, and/or spring 2009 semesters. Principals were asked to forward the link to a convenient location for students to access the survey (e.g., a computer lab). Principals on campuses attended by students whose parents had returned forms indicating that they did not want their child to participate in the survey also received a list of students who should *not* participate in the survey. Students were given 3 weeks to complete the survey. However, weak response rates at the survey's deadline caused evaluators to keep the survey open for 10 additional days, and principals were sent reminders to encourage student participation.

Number of Survey Respondents and Response Rates, Spring 2009

Table C.1 presents campus- and student-level response rates for spring 2009 online student survey, and indicates that 2,993 students attending 54 campuses responded to the survey.[1] Less than half of R-Tech campuses (47%) had students who participated in the survey. Using student data upload information submitted by districts to TEA for the summer 2008, fall 2008, and spring 2009 reporting periods, TCER identified 14,849 unique students who received R-Tech services during the program's first year, and calculated a student-level survey response rate (i.e., the percentage of students receiving R-Tech services who participated in the survey) of approximately 20%. Across campuses with students participating in the survey, the number of survey respondents ranged from 1 to 363 students. It is unclear how variations in the number of students responding to the survey across R-Tech campuses may affect evaluation findings, and readers are asked to use caution when interpreting survey results.

Table C.1
Campus- and Student-Level Response Rates, R-Tech Student Survey: Spring 2009

Response Rate	Spring 2009
Campus-Level Response Rates	
Number of campuses surveyed	115
Campuses with students responding	54
Percentage of campuses with respondents	47.0%
Student-Level Response Rates	
Number of students participating in R-Tech[a]	14,849
Number of students responding to survey	2,993
Percentage of students responding to survey	20.1%

Sources: R-Tech Student Survey, spring 2009; Texas Education Agency, Student Upload data: summer 2008, fall 2008, and spring 2009
[a]Total number of unique students who received R-Tech services in *at least* one of the following periods: summer 2008, fall 2008, and spring 2009. Students receiving services across multiple periods are counted only once.

[1]In total, 3,047 students responded to the online survey; however, 54students indicated that they did not agree to complete the survey. These students were exited from the survey and no further data were collected. The student-level response rate presented in Table C.1 is based on the 2,993 students who provided responses to the survey.

CHARACTERISITICS OF SURVEY RESPONDENTS

Table C.2 provides information about the characteristics of students who participated in the spring 2009 survey. Results are presented for middle school students, high school students, and all respondents.

Table C.2
The Characteristics of Student Survey Respondents, as a Percentage of Respondents: Spring 2009

Characteristic	Spring 2009 Middle School Students (n=1,530)	Spring 2009 High School Students (n=1,463)	Spring 2009 All Respondents (N=2,993)
Gender			
Male	51.8%	52.2%	52.0%
Female	48.2%	47.8%	48.0%
Ethnicity			
African American	8.0%	9.3%	8.7%
Hispanic/Latino	47.5%	32.2%	40.0%
White	39.7%	54.8%	47.1%
Other[a]	4.8%	3.8%	4.3%
Grade Level			
6th grade	24.3%	--	12.4%
7th grade	32.5%	--	16.6%
8th grade	43.1%	--	22.1%
9th grade	--	23.9%	11.7%
10th grade	--	27.8%	13.6%
11th grade	--	28.4%	13.9%
12th grade	--	19.9%	9.7%

Source: R-Tech Student Survey, spring 2009.
[a] Students entering written responses for “Other” identified themselves as “multiracial,” “Asian,” “Chinese,” “Korean,” “Indian,” “American,” “Scandinavian,” “Pacific Islander,” “German,” “ Native American,” “Jewish,” “brown,” and “unsure.”

APPENDIX D
R-TECH SITE VISITS

In order to gain a more holistic understanding of how R-Tech is implemented in Cycle 1 grantee districts, as well as how implementation designs may affect teacher and student outcomes, the evaluation included site visits to eight R-Tech districts (13 campuses) conducted in April 2009. Site visit districts were selected such that each category of R-Tech program identified by the evaluation was represented (i.e., self-paced programs, dual credit programs, technology immersion programs, and programs providing iPods loaded with instructional content),[1] and that programs varied in terms of size, location, types of students served (e.g., percentages of low income or ELLs), and R-Tech vendor selections. Researchers also confirmed that site visit districts had fairly well established programs that had been serving students across the fall 2008 and the spring 2009 grant periods. In addition, researchers identified alternate districts offering similar programs in case any of the initially identified districts declined to participate in site visits.

In January 2009, TCER sent an e-mail to district- and campus-level administrators in identified districts, inviting participation in the R-Tech site visits. The e-mail described site visit activities and clarified that visits were designed to enhance evaluation findings and that site visit data would not be used to monitor districts' compliance with grant requirements. TCER researchers followed up with phone calls to answer questions and encourage participation in the visits. TEA provided support, assuring districts that site visits were a valuable component of the evaluation and that researchers were not compliance monitors. As a result, all of the initially identified eight districts agreed to participate in the site visits. The following sections provide information about site visit activities and the types of R-Tech programs offered by site visit districts.

SITE VISIT ACTIVITIES

In site visit districts, researchers visited each campus implementing R-Tech (e.g., middle school and high school) and conducted interviews with campus principals and R-Tech facilitators and held focus group discussions with teachers involved in the grant. Researchers also conducted focus group discussions with students who received R-Tech services on campuses in which more than three students had returned materials indicating parental consent to participate in discussions. The process for obtaining informed consent is discussed in the section describing student focus groups discussions. In districts offering dual credit programs, a separate focus group was held for students enrolled in dual credit courses. In addition, researchers observed delivery of R-Tech services; however, in one district, services were provided in students' homes, which prevented researcher observation.

In collaboration with TEA, TCER developed interview and focus group discussion protocols, as well as an observation instrument designed to collect information about R-Tech service delivery. Protocols were reviewed and approved by TEA's Data Information and Review Committee (DIRC) in March 2009. Site visits schedules were developed in coordination with district staff, and all visits were completed in April 2009. The sections that follow provide information on each site visit activity.

The Principal Interview

The principal interview gathered information about the grant application processes, program planning, the roles and responsibilities of staff involved in implementing R-Tech, as well as the challenges of implementing R-Tech and how challenges may have been overcome. The interview also addressed

[1]Neither district offering one-to-one tutoring with online instructional support served students during R-Tech's first implementation year.

R-Tech's effects on student and teacher outcomes and program sustainability. Principal interviews were conducted on each site visit campus. In one district, the principals of both campuses participating in the grant were unavailable on the day of the site visit, and interviews were conducted by telephone at a later date.

The R-Tech Facilitator Interview

Similar to the principal interview, the program facilitator interview asked about grant planning and implementation processes, the roles of staff in implementing R-Tech and the challenges and benefits of participation in R-Tech. The facilitator interview also asked about the training facilitators may have received in support of the grant. Researchers conducted facilitator interviews in all R-Tech districts.

Teacher Focus Group Discussions

Using data provided by districts through TEA's R-Tech Teacher Upload for the fall 2008 grant period, researchers identified teachers involved in the program to participate in focus group discussions. Researchers requested the schools' master schedules, which provide information about teacher schedules and conference periods, in advance of site visits. To the extent possible, researchers scheduled focus group discussions during a common conference period or planning time. In several districts, however, teachers did not have common free periods and focus groups were held after school. Researchers apprised teachers that participation in the focus group was voluntary. During discussions, researchers probed teachers' roles in planning and implementing R-Tech; their involvement in grant activities, including professional development; and the challenges and benefits teachers and students experience as a result of the grant.

Student Focus Group Discussions

Prior to scheduled site visits, TCER sent principals at each site visit campus a packet containing a letter to parents requesting permission for students to participate in focus group discussions, parental consent forms, and a postage paid envelope in which parents could return signed consent forms to TCER. TCER requested that principals distribute materials to students who participated in R-Tech services during the fall 2008 or spring 2009 semesters, and that students deliver materials to parents. The parent letter clarified that participation in the discussion was voluntary and students would not be penalized for choosing not to participate. It indicated that focus group discussions would be recorded, but that students would not be identified by name and responses would remain confidential. The letter provided information about the types of questions researchers would ask during focus groups and requested "active parent consent" for student participation in discussions. Parents indicated consent by returning a signed consent form to TCER in the provided postage paid envelope. The number of parents who returned signed consent forms varied from 1 to 15 across site visit campuses.

Researchers scheduled student focus groups at campuses in which the parents of three or more students returned signed consent forms. At campuses in which consent was provided for more than eight students, researchers randomly selected eight students to participate in focus groups. Separate focus groups were scheduled for students participating in dual credit coursework. Researchers provided campus principals with a list of students identified for focus groups and asked principals to facilitate the activity by providing a space for the focus group (e.g., a conference room) and releasing students from class at the scheduled time for the discussion. At the start of focus groups, researchers advised students that their parents had provided consent for their participation in the discussion, but that students' participation was voluntary. Researchers asked students to describe what they did using R-Tech resources and the locations and times that they accessed resources. Researchers asked whether learning with R-Tech resources was different than traditional classroom instruction and what students liked most and least about using technology resources for learning. Students participating in dual credit courses responded to questions about the format of dual credit instruction, the courses they took, how dual credit courses differed from regular high school coursework, and the challenges and benefits students experienced as a result of their participation in dual credit courses.

Observation of R-Tech Services

With the exception of District C, in which students participated in R-Tech services at home (see program descriptions in the next appendix section), researchers observed the delivery of R-Tech services at each site visit campus. Observations documented the number of students receiving services, when and where services were delivered, teacher or facilitator roles and the types of materials involved in providing services, as well as students' engagement in learning.

SITE VISIT DISTRICTS

Table D.1 provides an overview of the types of programs provided by districts that participated in site visits, the grade levels served, as well as information about site visit activities. The sections that follow provide more information about the R-Tech programs offered by individual districts.

Table D.1
Overview of R-Tech Site Visit District Programs

District	Grade Levels Served	Program Type	Site Visit Notes
A	7 – 12	Self-paced software providing credit recovery and TAKS remediation; dual credit coursework (Grades 11 and 12)	All site visit activities completed at combined MS/HS campus. No focus group with dual credit students.
B	6 – 12	Self-paced software providing credit recovery and TAKS remediation.	All site visit activities completed at MS and HS.
C	6 – 8	Instructional content loaded on iPods	Unable to observe R-Tech service delivery (provided at students' homes); all other activities completed.
D	6 – 9	Self-paced TAKS remediation	Principal interviews conducted by telephone; all other activities completed during site visit.
E	7 – 8	Self-paced computer software; TAKS remediation and credit recovery	All site visit activities completed at participating campus.
F	6 – 12	School-wide technology immersion program; Dual credit coursework (Grades 11 and 12)	All site visit activities completed at MS and HS, including focus group for students participating in dual credit coursework.
G	6 – 12	Self-paced remediation in ELA	All site visit activities completed at MS and HS.
H	6 – 12	Self-paced program focused on social and behavioral modification	No student focus groups (MS or HS); all other activities completed.

Sources: District grant applications and progress reports; site visit data.
Notes. HS=High School; MS=Middle School.

District A

District A is one of the smallest districts participating in R-Tech, and is located in a remote agricultural community with few resources to support student learning beyond those provided by the district. A substantial proportion of District A's students come from economically disadvantaged backgrounds, and many students are characterized as "at risk" of academic failure. District A implements R-Tech as a self-paced program, providing credit recovery, credit acceleration, and online tutorials for students in Grades 7 through 12 using Web-based software. In addition, the district offers a dual credit program in coordination with the regional ESC for students in Grades 11 and 12. Middle school and high school students attend the same campus, and the district used R-Tech funding to update and expand access to the campus' computer lab. The district initially planned to provide access to R-Tech services after school and on Saturdays; however, students' unwillingness to participate in services outside of school caused the district to revise its plans to include R-Tech services as part of the school day. In addition, the district uses R-Tech resources to provide tutoring in preparation for TAKS testing during regularly scheduled class time. Dual credit coursework is provided through the high school's distance learning lab using video conferencing equipment.

District B

District B is located in a small community that lies outside a large metropolitan area. Most district students are White, and few come from economically disadvantaged backgrounds. However, school administrators became increasingly concerned by poor TAKS performance and high dropout rates among the district's low income and minority students, and noted that few such students had access to technology resources outside the classroom. While the district had a computer lab in place prior to R-Tech, it lacked the resources to staff the lab, and the lab remained closed during the school day and after school.

The district used R-Tech funds to open a second "R-Tech" lab furnished with new hardware and to hire a full-time lab facilitator. The lab is accessible to both middle and high school students and R-Tech is implemented as a TAKS remediation program in the core content areas for students in Grades 6 through 12 using a self-paced software program purchased prior to the district's R-Tech application. Although the source of confusion is unclear, school administrators understood that R-Tech required students to have access to services 10 hours *a day* rather than 10 hours *a week*. As a means to ensure extended access to its lab each day, the full-time facilitator provides supervision during the school day, and teachers staff the R-Tech lab before and after school. In spite of expanded access to the lab, District B implements its R-Tech program as part of its regular school day. Students who have performed poorly on TAKS are assigned to receive R-Tech services as part of a TAKS preparation class that takes the place of an elective course. In addition, core content area teachers use R-Tech resources to support TAKS preparation by scheduling class time in the lab. However, teachers note that all students benefit from expanded access to the lab because they are able use computers to complete homework assignments that require the use of online resources.

District C

District C is located in a rural, farming community experiencing an influx of Hispanic students, many of whom are characterized as ELL or LEP. As a means to support students' development of English language skills, the district used R-Tech resources to purchase iPods, which it provided to ELL students in Grades 6 through 8. Teachers loaded iPods with instructional resources targeted to students learning English, including podcasts addressing grammar and vocabulary, and lessons across the four core content areas. Students take iPods home and access podcasts outside of the regular school day. Many students use iPod resources with family members, which administrators note has improved the language skills of parents and siblings. Teachers received vendor-provided training in how to find and create instructional videos and integrate their use in the classroom. In the future, district representatives hope to expand the program into all classrooms at the middle and high school levels. The district's primary R-Tech objective is to improve TAKS scores among its ELL and LEP students.

District D

District D is in a small community located at the fringe of large metropolitan area. The district enrolls a large proportion of low income students, and nearly all students are White. Many of the district's students reside in a local children's home and face academic challenges resulting from homelessness, poverty, and parental neglect. District administrators note that high poverty levels and low property values make District D one of the poorest school districts in the state.

District D is seeking to improve its TAKS scores through R-Tech and used grant funding to implement an online program that provides self-paced remediation in core content areas and tutorials focused on TAKS preparation in its middle school and high school (Grades 6 through 9). The district purchased additional computers for its computer labs and enabled students to access the program before and after school, and during free periods. Students with home Internet access may connect to R-Tech resources, and the district supported the children's home in expanding its Internet access to enable students to use the program. Students assigned to the district's alternative placement program also use R-Tech resources.

District E

District E is one of the largest districts participating in R-Tech and is located in a "bedroom community" at the outskirts of a large urban area. The district enrolls large proportions of low income and minority students, many of whom struggle with ELA and math content and have failed portions of the TAKS test. District E used R-Tech funding to implement a self-paced tutoring and remediation program focused on math and ELA for a targeted group of low performing students in Grades 7 and 8. The school implements an 8-period school day, which provides students with an extra period for an elective or study hall. Students identified for R-Tech are scheduled to receive services in the computer lab during their extra period, and students may also access services after school.

District F

District F is located in the county seat of a rural community focused on manufacturing and oil and gas production. The district is experiencing changes in the makeup of its student population, and enrolls increasing numbers of minority and low income students. District administrators were concerned with the "significant" achievement gap they observed for the growing number of minority and low income students, and sought R-Tech funding to implement a technology immersion program that would address students' individual learning styles and provide the technical skills needed by the region's employers.

District F used R-Tech funds to purchase laptops for all students and teachers in Grades 6 through 12. Students are issued their own laptops which they use in class and at home. Teachers receive continuing training in the integration of technology in classroom instruction and use laptops to prepare and deliver course content and to tailor instruction to individual student needs. The district also implements a dual credit program in its high school. The dual credit program is offered using two-way video conferencing equipment located in the high school's distance learning lab. Students participating in dual credit coursework use laptops to take notes and to communicate online with course instructors

District G

District G is located in a rural, manufacturing community in the vicinity of a mid-sized urban area. The district enrolls a predominantly minority student population, many of whom are from low income backgrounds. District administrators recognized a longstanding pattern of poor achievement in reading comprehension among students, and after administering a survey, realized that most students did not have access to home computers that could supplement learning. The district used R-Tech funding to purchase a self-paced remediation program targeted to ELA. All students in Grades 6 through 12 use the program as part of regular instruction in English. Students read non-fiction texts and current event articles and respond to a series of questions about what they have read. The program is intended to improve students' vocabulary and comprehension skills. Students may access the program outside of school hours for additional support by checking out laptops or using workstations at the public library.

District H

District H is located in a rural community with roots in ranching, tourism, and outdoor recreation. Most of the district's students are White and from low income backgrounds, and many are at risk of academic failure. A school administrator explained that many district students come from families marked by "chronic generational underachievement" and that "parents are not equipped to model appropriate behaviors and reinforce their use." Recognizing that "psycho-social factors affect achievement," district administrators implemented R-Tech as a social and behavioral program designed to increase attendance rates and academic achievement for its middle and high school students

The district used R-Tech resources to purchase a self-paced software program that promotes empathy, problem solving, connectedness, assertiveness, and pro-social behavior. The program is available to all students in Grades 6 through 12. At-risk middle school students are assigned to use the program either before or after school, and high school students access the program when they are assigned to after school detention or Saturday school because of disciplinary referrals. High school students are required to complete academic work first (e.g., homework) and then may use R-Tech resources.

APPENDIX E

THE IMPLEMENTATION OF DUAL CREDIT COURSES ON R-TECH CAMPUSES

The legislation enabling R-Tech allows participating districts to use grant funding to implement "distance learning opportunities that enable students to earn college credit in the subject areas of English language arts, social studies, mathematics, science or languages other than English" (TEC § 29.919 [d][5]). Dual credit course arrangements enable 11th- and 12th-grade students[1] to simultaneously earn high school and college credit by "successfully completing a college course that covers all the TEKS of any specified high school course" (TEA, 2007). Students participating in dual credit courses may not be required to pay tuition costs or to purchase texts used in college classes.

Some research has indicated that technology-based dual credit opportunities provide rural districts with a cost-effective means of diversifying course offerings and increasing academic rigor (Malhoit, 2005). Participation in dual credit courses may also provide encouragement for students to pursue postsecondary educational opportunities, and offset education costs by enabling students to earn college credit while receiving a publicly funded high school education (Maloney, Lain, & Clark, 2009). As indicated in chapter 3, 18 of the 62 districts (29%) that implemented R-Tech during the program's first year offered dual credit coursework. This appendix provides information about the dual credit programs implemented as part of R-Tech. It describes the characteristics of students participating in dual credit courses, the challenges districts experience in implementing dual credit courses, and students' perceptions of course offerings.

DATA SOURCES

This appendix draws on data provided to TEA through the Agency's R-Tech data upload system as well as from PEIMS data. In addition, analyses present findings from the fall and spring surveys of principals and program facilitators in R-Tech districts, as well as from the spring survey of students participating in R-Tech services. More information on the survey administration process, response rates, respondent characteristics, and supplemental tables providing additional information on findings cited in this appendix may be found in Appendix A (principal and facilitator survey) and Appendix C (student survey).

STUDENTS' PARTICIPATION IN DUAL CREDIT PROGRAMS

The following sections present information about the students participating in R-Tech dual credit programs, including the demographic characteristics and the subject areas students addressed through dual credit coursework. Students identified as participants in dual credit courses were included in districts' student upload data for the fall 2008 and spring 2009 reporting periods[2] and upload reports indicated that their primary instructional area was "Distance Learning to Earn College Credit." Of the 3,390 students in Grades 11 and 12 included in the data upload for the fall and spring reporting periods, 232 (6.8%) were enrolled in R-Tech dual credit courses during the 2008-09 school year.

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[1]Students enrolled in Texas' early college high schools may participate in some dual credit courses as early as the ninth grade.
[2]No students participated in R-Tech funded dual credit coursework as part of the 2008 summer session.

The Characteristics of Dual Credit Students

Table E.1 presents the characteristics of 11th- and 12th-grade students who participated in R-Tech dual credit programs during the 2008-09 school year. Results indicate that relative to other 11th- and 12th-grade R-Tech students, dual credit students were less likely to be African American (3% vs. 9%) or from low income backgrounds (27% vs. 43%), and were more likely to be female (58% vs. 47%) and White (70% vs. 62%). In addition, proportionately fewer special education (0% vs. 13%) and LEP (0% vs. 3%) students participated in dual credit courses relative to other R-Tech participants.

Table E.1
The Characteristics of Students Participating in R-Tech Dual Credit Programs, Grades 11 and 12: Fall 2009 and Spring 2008

Student Group	Dual Credit[a,b] (N=232)	Non-Dual Credit[c,d] (N=3,158)
African American	2.7%	9.4%
Hispanic	26.5%	27.8%
White	69.9%	61.7%
Other	0.8%	1.1%
Female	58.0%	47.1%
Male	53.4%	51.7%
Economically disadvantaged	27.0%	43.2%
Special education	0.4%	13.3%
Limited English proficient	0.0%	2.7%

Sources: Public Education Information Management System fall 2007 snapshot data for the students attending the 115 participating campuses; Texas Education Agency R-Tech Student Upload data, fall 2008, and spring 2009.
[a]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall 2008 or spring 2009 was distance learning to earn college credit.
[b]There were 6 of the 232 students who had missing demographic information. The percentages in the table were based on the 226 students who had demographic information.
[c]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall 2008 or spring 2009 was research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, Web-based program, or Apangea lecture.
[d]There were 143 of the 3,158 students who had missing demographic information. The percentages in the table were based on the 3,015 participants who had demographic information.

The Subject Areas Studied by Dual Credit Students

Table E.2 presents information about the subject areas 11th- and 12th-grade students participating in R-Tech dual credit programs studied relative to other 11th- and 12th-grade students receiving R-Tech services. Results indicate some notable differences in the subject areas emphasized in dual credit programs. Relative to 11th- and 12th-graders participating in other R-Tech programs, students in dual credit programs were considerably more likely to focus on social studies (60% vs. 10%) and ELA (40% vs. 27%). In contrast, students in other programs were more likely to focus on math (50% vs. 7% for dual credit students) and science (19% vs. 3%). The reasons for these differences were not clear in spring 2009.

Table E.2
The Subject Areas Addressed by Students Participating in R-Tech Dual Credit Programs, Grades 11 and 12: Fall 2009 and Spring 2008

Subject Area	Dual Credit[a,b] (N=232)	Non-Dual Credit[c,b] (N=3,158)
Mathematics	7.3%	49.5%
English language arts	39.7%	26.7%
Science	3.4%	18.5%
Social studies	59.9%	9.9%
Language other than English	0.0%	0.8%
Other subject area	0.0%	0.1%

Sources: Public Education Information Management System fall 2007 snapshot data for the students attending the 115 participating campuses; Texas Education Agency R-Tech Student Upload data, fall 2008, and spring 2009.

[a]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall 2008 or spring 2009 was distance learning to earn college credit.

[b]Percentages total to more than 100% because a student could have a different primary academic area in fall 2008 and spring 2009.

[c]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall 2008 or spring 2009 was research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, Web-based program, or Apangea lecture.

THE IMPLEMENTATION OF TECHNOLOGY-BASED DUAL CREDIT COURSES

The fall and spring survey of principals and R-Tech facilitators contained items addressing the provision of technology-based dual credit courses. Survey respondents were asked if their schools offered dual credit instruction as part of R-Tech. Principals and facilitators who responded “Yes” were routed to a separate set of questions addressing the challenges of implementing dual credit courses as well as how challenges were overcome. In fall 2008, 33 of 153 survey respondents (22%) indicated that their schools offered a dual credit program. In spring 2009, 29 of 136 survey respondents (21%) reported offering dual credit courses as part of R-Tech.

The Challenges to Implementing Technology-Based Dual Credit Programs

The survey provided principals and facilitators with a list of common challenges to implementing dual credit courses and asked respondents to indicate whether challenges were a *minor*, *moderate* or *substantial barrier* to implementation or whether challenges were not *a barrier*. Table E.3 presents the summed percentages of survey respondents who considered each challenge to be a *moderate* or *substantial* barrier. Summed percentages are the percentage of respondents who indicated *moderate* challenges plus the percentage of respondents who indicated *substantial* challenges. (See Table A.7 in Appendix A for percentages by each response category for each survey item across both survey administrations). Response patterns indicate that as dual credit programs got started in the fall, principals and administrators considered tuition and textbook costs to be the greatest barrier; however, as the year progressed, respondents were more concerned with the lack of alignment between college and district calendars. Differing calendars may create challenges for districts when colleges have different semester start/end dates, holidays, exam dates, and grading periods. Although the percentages of survey respondents who felt textbook and tuition costs were challenges to dual credit courses declined across survey administrations, more than a third of respondents still indicated these expenses were *moderate* or *substantial* challenges in spring 2009. Although the state provides funding for high school textbooks, it is not obligated to pay for materials for students’ college courses, and districts must allocate funds for students’ college texts.

Table E.3
Principals’ and Facilitators’ Perceptions: Moderate and Substantial Barriers to Dual Credit Implementation, as a Summed Percentage of Respondents: Fall 2008 and Spring 2009

Moderate/Substantial Challenges to Implementing Dual Credit Courses	Fall 2008 (N=33)	Spring 2009 (N=29)
Misaligned university and district semester timelines	33.4%	37.9%
Tuition costs	39.4%	34.4%
Textbook costs	42.5%	34.4%
Student disinterest	27.3%	31.0%
Coordination/ communication with university partners	15.1%	20.7%
Student failure in dual credit courses	NA	17.2%
Coordinating technical support between district and university partners	NA	17.2%
Identification of appropriate course offerings	9.1%	10.3%
Other	0.0%	33.3%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009.
Notes. Summed percentages represent total of two response categories: (1) the percentage of respondents who indicated *moderate* challenges, and (2) the percentage of respondents who indicated *substantial* challenges.
The number of respondents (N) represents principals and facilitators at schools implementing dual credit programs. Results will not total to 100; respondents could indicate multiple challenges. NA=Not applicable. These statements were not included on the fall 2008 survey.

The survey also provided respondents with space to enter open-ended comments describing other challenges. While a third of spring respondents indicated other challenges, only one person entered a written response. The response indicated that the district lacked the necessary staff to implement dual credit courses effectively.

Overcoming Challenges to Dual credit Implementation

The spring survey also provided respondents with an opportunity to indicate how challenges to implementing dual credit courses may have been overcome. The survey presented respondents with a list of strategies and asked them to mark all that may have been used to support the implementation of dual credit instruction. As presented in Table E.4, a majority of survey respondents (66%) indicated that they worked with university staff to resolve problems, such as calendar conflicts and communication issues. Many respondents reported using HSA and local funds to pay textbook and tuition costs. A large proportion of principals and facilitators (41%) supported students enrolled in dual credit courses by providing additional tutoring and academic counseling.[3] An equal proportion of respondents (41%) held informational sessions to increase student interest and awareness of dual credit opportunities.

Table E.4
Districts' Methods to Overcoming Challenges to Dual Credit Implementation, as a Percentage of Survey Respondents: Spring 2009

Method	All Respondents (N=29)
Collaborated with university staff to resolve challenges	65.5%
Used HSA or other funds to support costs	44.8%
Provided additional academic support for students	41.4%
Held information sessions for students and parents	41.4%
Adjusted district calendar to accommodate university timelines	13.8%
Other	17.2%

Source: R-Tech Principal/Facilitator Survey, spring 2009.
Note. The number of respondents (N) represents the principals and facilitators implementing dual credit courses. Percentages will not total to 100 because respondents could select more than one method.

STUDENTS' PERCEPTIONS OF DUAL CREDIT COURSES

The spring 2009 student survey asked respondents if they had taken a technology-based course that enabled them to receive college credit during R-Tech's first year. The survey routed students who had participated in R-Tech dual credit offerings to a separate set of questions asking about the courses they took and their perceptions of dual credit offerings. Of the 707 students in the eleventh and twelfth grades who responded to the spring survey, 171 (24%) responded that they participated in dual credit courses as part of R-Tech.

Student-Reported Dual Credit Subject Area

The survey provided students with space to enter the courses they took as part of dual credit programs, and researchers categorized answers by common subject area. Table E.5 presents students' responses, and similar to findings presented in Table E.2, results indicate that most surveyed students (54%) focused on subject areas related to social studies (e.g., history, government, and economics). Many students also took courses related to English (49%), and notably small percentages of students took dual credit courses

[3] High school students who fail dual credit courses may jeopardize their eligibility for financial aid or to participate in college sports programs because dual credit courses are college classes.

related to math (9%) or science (6%). Surveyed students also reported participating in dual credit courses related to psychology and sociology (15%) or business related courses (15%). Students entering “Other” courses reported taking courses such as art appreciation, journalism, criminal justice, and courses focused on the use of technology.

Table E.5
Subject Areas Addressed in Dual Credit Courses, as a Percentage of Survey Respondents: Spring 2009

Subject Area	All Respondents (N=171)
English	49.1%
History	28.7%
Government/Economics	24.0%
Psychology/Sociology	15.2%
Business and business management	14.6%
Math	9.4%
Science	5.8%
Languages	4.1%
Other	9.4%

Source: R-Tech Student Survey, spring 2009.
Note. Percentages will not total 100; students could list more than one course name.

Students’ Perceptions of Dual Credit Coursework

The survey provided students with a list of statements about dual credit courses and asked them to rate their level of agreement with each statement. Researchers coded their responses: *strongly disagreed* (-10), *disagreed* (-5), *unsure* (0), *agreed* (5), and *strongly agreed* (10) as a means to clearly illustrate variations in levels of agreement. Table E.6 presents students’ mean responses. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Table E.6
Students’ Perceptions of Participation in Dual Credit Courses, as a Mean of Respondents: Spring 2009

Statement	All Respondents (N=171)[a]
Dual credit coursework is preparing me for college.	5.0
I would like to take more dual credit courses using technology resources.	3.7
The calendar for my course is different from my regular classes.	3.4
Dual credit courses are more challenging than regular courses.	3.2
It is easy to communicate with other students.	2.9
It is easy to communicate with the instructors.	2.5
I can get help easily when I don’t understand information.	1.8
I had difficulty obtaining the textbook and other materials.	-1.6

Source: R-Tech Student Survey, spring 2009.
Notes. Items have been coded: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), *strongly agree* (10). Items closer to 10 indicate higher levels of agreement with each statement.
[a]The number of respondents represents students enrolled in dual credit courses during the 2008-09 school year.

Responses suggest that R-Tech dual credit offerings positively enhance students’ high school experience and provide access to rigorous course content. Students expressed the highest level of agreement with the statement indicating dual credit courses provided preparation for college. Responses also indicate that students would like to enroll in more dual credit courses and that dual credit courses were more challenging than regular high school classes. Students expressed lower levels of agreement with statements that it was easy to communicate with instructors, other course students, and that it was easy to get help with difficult content. Students also expressed agreement that dual credit courses have different calendars than their high schools, which confirms principals' and facilitators' concerns about scheduling conflicts that affect when students take exams, have holidays, or receive grades.

SUMMARY

About 29% of R-Tech districts offered dual credit programs as part of R-Tech during the program's first year, and about 7% of the 11th- and 12th-grade students participating in R-Tech enrolled in dual credit courses. Relative to other 11th- and 12th-grade students receiving R-Tech services, dual credit students were more likely to be White or female, and less likely to be African American or from economically disadvantaged backgrounds. Students enrolled in dual credit courses tended to focus on subject areas related to social studies (e.g., history, government, economics) and English, and proportionately few students took math and science courses for dual credit.

Principals and facilitators on campuses implementing dual credit programs reported challenges in working out differences between district and university calendars and in identifying funds to pay college costs for tuition and textbooks. They overcame challenges by collaborating with staff at partner universities and adjusting district timelines for dual credit students. Districts also used HSA funding to cover the costs of college courses.

Surveyed students who participated in dual credit courses felt that such courses were more rigorous than their regular high school classes and provided strong preparation for postsecondary educational opportunities. Students also indicated that they would like to participate in more dual credit courses, which suggests districts may want to expand dual credit offerings.

APPENDIX F
TECHNICAL APPENDIX—HIERARCHICAL LINEAR MODELING (HLM)

EFFECTS OF R-TECH ON STUDENTS' TAKS SCORES (CHAPTER 6)

The evaluation investigates three aspects of the R-Tech program: (1) the effect of reported R-Tech instructional hours per week on students' TAKS scores, (2) the effect of supplemental vs. non-supplemental provision of services, and (3) the effect of program type on students' TAKS scores. The two primary types of R-Tech program implemented during the project's first year were self-paced computer software and dual credit or distance learning. Three other program types were not included in these analyses because they were only implemented in two districts apiece. Inclusion would have resulted in collinearity issues and could have resulted in the identification of the districts and campuses.

Analyses

The effects of R-Tech instructional time, program type, and supplemental status on students' reading/ELA, mathematics, science, and social studies TAKS *T* scores were analyzed using a two-level hierarchical linear model (HLM). HLM is a "value added" methodology. That is, after controlling for students' initial achievement and characteristics and accounting for variance at both the student and school level, researchers can assess the "value added" by an indicator like program type or supplemental status. Analyses were conducted for students participating in R-Tech in fall 2008 and/or spring 2009. Separate analyses were performed for the supplemental status indicator and for program type.

Student-level model. In the student-level model, spring 2009 TAKS *T* scores[1] were regressed on spring 2008 TAKS *T* scores, average number of R-Tech primary instructional hours per week,[2] economic status (0 if not disadvantaged, 1 if disadvantaged), African American status (0 if not African American, 1 if African American), Hispanic status (0 if not Hispanic, 1 if Hispanic), gender (0 if male, 1 if female), middle school grades (1 if in Grades 6, 7, or 8; 0 if in Grades 9, 10, or 11), and LEP status (1 if LEP, 0 if not). That is,

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\textit{Spring 2008 T score [grand mean centered]})_{ij} + \beta_{2j}(\textit{R-Tech instructional hours per week [grand mean centered]})_{ij} + \beta_{3j}(\textit{Economic status})_{ij} + \beta_{4j}(\textit{African American status})_{ij} + \beta_{5j}(\textit{Hispanic status})_{ij} + \beta_{6j}(\textit{Female})_{ij} + \beta_{7j}(\textit{Middle school grades})_{ij} + \beta_{8j}(\textit{LEP status})_{ij} + r_{ij}.$$

[1]The specific TAKS test used in the analysis corresponded to a primary, secondary, or tertiary instructional focus reported for a student in the fall 2008 or spring 2009 student upload.
[2]The average primary instructional hours per week was calculated by summing the fall 2008 primary instructional hours per week and the spring 2009 primary instructional hours per week and dividing by 2, given that fall and spring hours were in the 0 to 20 range. The mean of the average primary instructional hours per week was 2.3 with a range from 0.01 to 20. The distribution was positively skewed and not normal (Kolmogorov-Smirnov *Z* = 19.6). For example, 43% of participants averaged 1 hour or less per week, and 61% averaged 2 hours or less per week.

With 2009 TAKS reading/ELA, mathematics, science, and social studies *T* scores for R-Tech campuses, significant variation was found across schools. Specifically, 14% of the variance in TAKS reading/ELA *T* scores, 17% of the variance in TAKS mathematics *T* scores, 17% of the variance in TAKS science *T* scores, and 27% of the variance in TAKS social studies *T* scores was between campuses.[3] Thus, the school means (β_{0j}) were specified as randomly varying. The coefficients for spring 2008 *T* scores (β_{1j}) and R-Tech instructional hours per week (β_{2j}) were also specified as randomly varying when chi-square statistics were significant. The coefficients for the remaining independent variables were specified as fixed.

School-level model. At the school level, one model was used to answer the question of whether services provided outside regular instructional hours or services provided during regular instructional hours differentially effected students' TAKS scores, after controlling for school achievement[4] or the percentage of students passing all 2009 TAKS tests (with percentages ranging from 0.0% to 89.0%, and with a grand mean of 64.8%), as well as initial achievement, number of R-Tech instructional hours per week, ethnicity, economic status, LEP status, gender, and grade level. A second model was developed to answer the question of whether program type (self-paced computer software and dual credit or distance learning) had an effect on students' TAKS scores, again net of the control variables. That is,

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Supplemental status[or Program type]})_j + \gamma_{02}(\text{School achievement [grand mean centered]})_j + \mu_{0j}.$$

Data were analyzed using a two-level HLM. A student was included in the analysis for a particular TAKS test if his or her fall 2008 or spring 2009 student upload indicated that the content area was a primary, secondary, or tertiary instructional focus.[5] Researchers posit that R-Tech instructional hours, supplemental status, and program type, along with school achievement, gender, economically disadvantaged status, ethnicity, LEP status, grade grouping, and prior year TAKS score are related to the current year TAKS score. Statistical details for the TAKS reading/ELA analyses are provided in Tables F.1, F.2, and F.3, for the TAKS mathematics analyses in Tables F.4, F.5, and F.6, for the TAKS science analyses in Tables F.7, F.8, and F.9, and for the TAKS social studies analyses in Tables F.10, F.11, and F.12.

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[3]Variation in TAKS scores can be divided between variation over students and variation over schools. The percentage of this total variation in TAKS scores that is over schools is reported here. The presence of significant variation over schools indicates the need to employ multi-level modeling rather than conventional regression.
[4]Note that when both school poverty or the percentage of economically disadvantaged students at a school (a continuous variable with percentages ranging from 4.5% to 100%, and with a grand mean of 52.1%) and 2009 school achievement were included in the school-level model, coefficient sizes were inflated indicating collinearity between the two indicators. School achievement was used as the sole contextual variable because it resulted in the greatest reduction in campus level variance. The 2009 school achievement data were preliminary results provided by TEA.
[5]In the data uploads hosted by TEA, R-Tech districts submitted information on students' program participation. Three data fields in the uploads were the primary, secondary, and tertiary academic or instructional areas of a students' R-Tech program.

Table F.1
Descriptive Statistics for TAKS Reading/ELA Achievement

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	5,524	0.46	0.50
African American	5,524	0.07	0.26
Hispanic	5,524	0.30	0.46
Economically disadvantaged (1 = yes, 0 = no)	5,524	0.55	0.50
Limited English proficient (1 = yes, 0 = no)	5,524	0.04	0.20
Middle grades (6 to 8 = 1, 9 to 11 = 0)	5,898	0.55	0.50
R-Tech instructional hours	5,678	2.19	2.14
TAKS reading/ELA *T* Score (2008)	3,816	48.52	9.30
TAKS reading/ELA *T* Score (2009)	5,268	47.79	9.22
School-Level Descriptive Statistics: (Level 2)			
School achievement (percentage)	80	65.32	12.96
Supplemental status (1 = yes, 0 = no)	80	0.56	0.50
Self-paced software (1 = yes, 0 = no)	80	0.90	0.30
Distance learning (1 = yes, 0 = no)	80	0.25	0.44

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.2
Hierarchical Regression Models Predicting the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Reading/ELA Achievement

Group	School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status				
	Intercept	48.857	0.529	92.30***
	Supplemental status	-0.795	0.411	-1.93
	School achievement[a]	0.011	0.021	0.53
	Female	0.747	0.233	3.21**
	African American	-1.244	0.547	-2.27*
	Hispanic	-0.366	0.387	-0.95
	Economic disadvantage	-0.873	0.292	-2.99**
	Limited English proficient	-3.608	0.917	-3.94***
	Middle school level[c]	0.355	0.426	0.83
	R-Tech instructional hours[a,d]	-0.095	0.084	-1.13
	Spring 2008 *T* score[a]	0.498	0.032	15.45***
Program Type				
	Intercept	49.826	0.664	75.03***
	Self-paced software[b]	-1.356	0.591	-2.29*
	Distance learning[b]	-0.447	0.497	-0.90
	School achievement[a]	0.006	0.020	0.32
	Female	0.756	0.232	3.27**
	African American	-1.375	0.534	-2.57*
	Hispanic	-0.468	0.389	-1.21
	Economic disadvantage	-0.870	0.293	-2.97**
	Limited English proficient	-3.757	0.906	-4.15***
	Middle school level[c]	0.318	0.428	0.74
	R-Tech instructional hours[a,d]	-0.150	0.079	-1.90
	Spring 2008 *T* score[a]	0.499	0.032	15.40***

*$p < .05$; **$p < .01$; ***$p < .001$.
Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Notes. Data from the fall 2008 or spring 2009 student upload indicated that English language arts was a primary, secondary, or tertiary instructional focus. Analyses included 3,411 R-Tech participants from 75 campuses. Fourteen percent of the variance in Texas Assessment of Knowledge and Skills (TAKS) reading/English language arts scores was between campuses. The percentage of within-school variance explained by the student-level predictors was 38%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 1% for the supplemental status model and 9% for the program type model. Note that when both campus poverty (a continuous variable with percentages ranging from 4.5% to 100%, and with a grand mean of 52.1%) and campus achievement were included in the school-level model, coefficient sizes were inflated indicating collinearity between the two indicators. Campus achievement was used as the sole contextual variable because it resulted in the greatest reduction in level 2 variance.
[a]The predictor was centered around its grand mean.
[b]The program types were limited to self-paced computer software and dual credit or distance learning because each of the remaining program types (tutoring and homework support online, school-wide technology immersion, and use of iPods to deliver content) was implemented in only two districts. Technically, this avoided multicolinearity issues, and, practically, it avoided identifying districts and campuses.
[c]The student was in Grades 6, 7, or 8 in 2008-09.
[d]Average number of reported R-Tech instructional hours per week.

Table F.3
Variance Decomposition from Conditional HLM Models Showing the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Reading/ELA Achievement

Test/ Random Effect	Variance Component	*df*	X^2	*p*
Supplemental Status				
Level-1 student effect	46.8960			
School mean	2.0169	61	175.99	0.000
Instructional hours-outcome slope		Effect not random		
2008 TAKS-outcome slope	0.0360	63	220.02	0.000
Program Type				
Level-1 student effect	46.9020			
School mean	1.8516	60	184.26	0.000
Instructional hours-outcome slope		Effect not random		
2008 TAKS-outcome slope	0.0354	63	219.27	0.000

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.4
Descriptive Statistics for TAKS Mathematics Achievement

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	8,428	0.48	0.50
African American	8,428	0.11	0.31
Hispanic	8,428	0.30	0.46
Economically disadvantaged (1 = yes, 0 = no)	8,428	0.56	0.50
Limited English proficient (1 = yes, 0 = no)	8,428	0.04	0.19
Middle grades (6 to 8 = 1, 9 to 11 = 0)	8,893	0.53	0.50
R-Tech instructional hours	8,672	2.20	2.42
TAKS mathematics *T* score (2008)	5,867	47.84	8.47
TAKS mathematics *T* score (2009)	7,925	47.76	8.77
School-Level Descriptive Statistics: (Level 2)			
School achievement (percentage)	84	64.82	13.31
Supplemental status (1 = yes, 0 = no)	84	0.56	0.50
Self-paced software (1 = yes, 0 = no)	84	0.92	0.28
Distance learning (1 = yes, 0 = no)	84	0.26	0.44

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.5
Hierarchical Regression Models Predicting the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Mathematics Achievement

Group	School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status				
	Intercept	48.260	0.313	154.10***
	Supplemental status	-0.339	0.340	-1.00
	School achievement[a]	0.067	0.015	4.38***
	Female	-0.060	0.150	-0.40
	African American	-0.326	0.295	-1.11
	Hispanic	0.047	0.245	0.19
	Economic disadvantage	-0.490	0.186	-2.64**
	Limited English proficient	-1.408	0.556	-2.53**
	Middle school level[c]	0.083	0.325	0.26
	R-Tech instructional hours[a,d]	-0.054	0.083	-0.65
	Spring 2008 *T* score[a]	0.699	0.026	26.65***
Program Type				
	Intercept	47.620	0.522	91.16***
	Self-paced software[b]	0.457	0.481	0.95
	Distance learning[b]	0.286	0.330	0.87
	School achievement[a]	0.072	0.015	4.80***
	Female	-0.059	0.151	-0.39
	African American	-0.346	0.298	-1.16
	Hispanic	0.018	0.241	0.07
	Economic Disadvantage	-0.487	0.185	-2.63**
	Limited English proficient	-1.423	0.565	-2.52*
	Middle school level[c]	0.000	0.332	0.00
	R-Tech instructional hours[a,d]	-0.044	0.095	-0.46
	Spring 2008 *T* score[a]	0.698	0.026	26.42***

*$p < .05$; **$p < .01$; ***$p < .001$.

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Notes. Data from the fall 2008 or spring 2009 student upload indicated that mathematics was a primary, secondary, or tertiary instructional focus. Analyses included 5,334 R-Tech participants from 78 campuses. Seventeen percent of the variance in Texas Assessment of Knowledge and Skills (TAKS) mathematics scores was between campuses. The percentage of within-school variance explained by the student-level predictors was 59%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 45% for the supplemental status model and 39% for the program type model. Note that when both campus poverty (a continuous variable with percentages ranging from 4.5% to 100%, and with a grand mean of 52.1%) and campus achievement were included in the school-level model, coefficient sizes were inflated indicating collinearity between the two indicators. Campus achievement was used as the sole contextual variable because it resulted in the greatest reduction in level 2 variance.

[a]The predictor was centered around its grand mean.

[b]The program types were limited to self-paced computer software and dual credit or distance learning because each of the remaining program types (tutoring and homework support online, school-wide technology immersion, and use of iPods to deliver content) was implemented in only two districts. Technically, this avoided multicolinearity issues, and, practically, it avoided identifying districts and campuses.

[c]The student was in Grades 6, 7, or 8 in 2008-09.

[d]Average number of reported R-Tech instructional hours per week.

Table F.6
Variance Decomposition from Conditional HLM Models Showing the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Mathematics Achievement

Test/ Random Effect	Variance Component	*df*	X^2	*p*
Supplemental Status				
Level-1 student effect	27.0093			
School mean	1.2474	61	154.54	0.000
Instructional hours-outcome slope	0.1693	63	118.00	0.000
2008 TAKS-outcome slope	0.0329	63	399.44	0.000
Program Type				
Level-1 student effect	26.9878			
School mean	1.3867	60	159.60	0.000
Instructional hours-outcome slope	0.2198	63	117.87	0.000
2008 TAKS -outcome slope	0.0333	63	400.72	0.000

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.7
Descriptive Statistics for TAKS Science Achievement

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	865	0.47	0.50
African American	865	0.09	0.28
Hispanic	865	0.28	0.45
Economic disadvantage (1 = yes, 0 = no)	865	0.45	0.50
Limited English proficient (1 = yes, 0 = no)	865	0.03	0.17
R-Tech instructional hours	892	2.60	2.37
TAKS science *T* score (2008)	686	48.84	8.94
TAKS science *T* score (2009)	732	48.48	9.49
School-Level Descriptive Statistics: (Level 2)			
School achievement (percentage)	33	62.60	15.88
Supplemental status (1 = yes, 0 = no)	33	0.52	0.51
Self-paced software (1 = yes, 0 = no)	33	0.91	0.29
Distance learning (1 = yes, 0 = no)	33	0.27	0.45

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.8
Hierarchical Regression Models Predicting the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Science Achievement[a]

Group	School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status				
	Intercept	49.792	1.043	47.72***
	Supplemental status	-1.692	1.039	-1.63
	School achievement[a]	0.007	0.071	0.10
	Female	0.350	0.498	0.70
	African American	0.847	0.757	1.12
	Hispanic	-0.804	0.422	-1.91
	Economic disadvantage	-0.171	0.450	-0.38
	Limited English proficient	-0.872	1.265	-0.69
	R-Tech instructional hours[a,c]	0.324	0.275	1.18
	Spring 2008 *T* score[a]	0.799	0.046	17.51***
Program Type				
	Intercept	48.197	1.282	37.59***
	Self-paced software[b]	0.772	1.254	0.62
	School achievement[a]	0.035	0.070	0.50
	Female	0.373	0.500	0.75
	African American	0.786	0.756	1.04
	Hispanic	-0.887	0.409	-2.17*
	Economic disadvantage	-0.165	0.449	-0.37
	Limited English proficient	-0.841	1.256	-0.67
	R-Tech instructional hours[a,c]	0.411	0.271	1.52
	Spring 2008 *T* score[a]	0.801	0.046	17.39***

*p < .05; **p < .01; ***p < .001.
Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Notes. Data from the fall 2008 or spring 2009 student upload indicated that science was a primary, secondary, or tertiary instructional focus. Analyses included 609 R-Tech participants from 29 campuses. Seventeen percent of the variance in Texas Assessment of Knowledge and Skills (TAKS) science scores was between campuses. The percentage of within-school variance explained by the student-level predictors was 70%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 15% for the supplemental status model and 0% for the program type model. Note that when both campus poverty (a continuous variable with percentages ranging from 4.5% to 100%, and with a grand mean of 52.1%) and campus achievement were included in the school-level model, coefficient sizes were inflated indicating collinearity between the two indicators. Campus achievement was used as the sole contextual variable because it resulted in the greatest reduction in level 2 variance.
[a]The predictor was centered around its grand mean.
[b]Program type was limited to self-paced computer software because only a small number of the Grade 11 science students were exclusively in a dual credit or distance learning program.
[c]Average number of reported R-Tech instructional hours per week.

Table F.9
Variance Decomposition from Conditional HLM Models Showing the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Science Achievement

Test/ Random Effect	Variance Component	*df*	X^2	*p*
Supplemental Status				
Level-1 student effect	22.6931			
School mean	4.4767	13	30.36	0.004
Instructional hours-outcome slope	0.8218	15	37.74	0.001
2008 TAKS -outcome slope	0.0318	15	43.32	0.000
Program Type				
Level-1 student effect	22.6952			
School mean	5.5274	13	33.24	0.002
Instructional hours-outcome slope	0.8219	15	41.08	0.000
2008 TAKS -outcome slope	0.0330	15	43.32	0.000

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.10
Descriptive Statistics for TAKS Social Studies Achievement

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	418	0.49	0.50
African American	418	0.06	0.24
Hispanic	418	0.25	0.43
Economic disadvantage (1 = yes, 0 = no)	418	0.30	0.46
Limited English proficient (1 = yes, 0 = no)	418	0.01	0.11
R-Tech instructional hours	432	3.07	2.41
TAKS social studies *T* score (2008)	361	51.41	9.81
TAKS social studies *T* score (2009)	342	51.65	10.12
School-Level Descriptive Statistics: (Level 2)			
School achievement (percentage)	33	62.88	15.31
Supplemental status (1 = yes, 0 = no)	33	0.55	0.51
Self-paced software (1 = yes, 0 = no)	33	0.91	0.29
Distance learning (1 = yes, 0 = no)	33	0.33	0.48

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

Table F.11
Hierarchical Regression Models Predicting the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Social Studies Achievement[a]

Group	School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status				
	Intercept	53.513	0.875	61.17***
	Supplemental status	-1.674	0.620	-2.70*
	School Achievement[a]	0.007	0.041	0.18
	Female	-1.682	0.667	-2.52*
	African American	-1.985	1.227	-1.62
	Hispanic	-1.614	0.940	-1.72
	Economic disadvantage	-0.267	0.877	-0.31
	Limited English proficient	-3.645	3.668	-0.99
	R-Tech instructional hours[a,c]	-0.372	0.202	-1.84
	Spring 2008 *T* score[a]	0.758	0.048	15.86***
Program Type				
	Intercept	52.183	0.950	54.92***
	Self-paced software[b]	0.421	0.855	0.49
	School achievement[a]	0.045	0.045	0.99
	Female	-1.662	0.671	-2.48*
	African American	-1.587	1.277	-1.24
	Hispanic	-1.564	0.972	-1.61
	Economic disadvantage	-0.361	0.890	-0.41
	Limited English proficient	-3.481	3.799	-0.92
	R-Tech instructional hours[a,c]	-0.345	0.185	-1.87
	Spring 2008 *T* score[a]	0.749	0.046	16.34***

$*p < .05$; $**p < .01$; $***p < .001$.
Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.
Notes. Data from the fall 2008 or spring 2009 student upload indicated that social studies was a primary, secondary, or tertiary instructional focus. Analyses included 307 R-Tech participants from 26 campuses. Twenty-seven percent of the variance in Texas Assessment of Knowledge and Skills (TAKS) social studies scores was between campuses. The percentage of within-school variance explained by the student-level predictors was 50%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 0% for both the supplemental status and program type models.
[a]The predictor was centered around its grand mean.
[b]Program type was limited to self-paced computer software because only a small number of the Grade 11 social studies students were exclusively in a dual credit or distance learning program.
[c]Average number of reported R-Tech instructional hours per week.

Table F.12
Variance Decomposition from Conditional HLM Models Showing the Effects of Instructional Time, Program Type, and Supplemental Status on TAKS Social Studies Achievement

Test/ Random Effect	Variance Component	*df*	X^2	*p*
Supplemental Status				
Level-1 student effect	36.3546			
School mean	1.9311	16	22.91	0.116
Instructional hours-outcome Slope	Effect Not Random			
2008 TAKS -outcome Slope	0.0175	18	26.97	0.079
Program Type				
Level-1 student effect	36.7378			
School mean	2.0722	16	23.34	0.105
Instructional hours-outcome slope	Effect Not Random			
2008 TAKS -outcome slope	0.0114	18	26.58	0.087

Sources: Texas Education Agency (TEA) R-Tech Student Upload data: fall 2008 and spring 2009. Public Education Information Management System (PEIMS) student demographic data from fall 2008. Texas Assessment of Knowledge and Skills 2008 and 2009 individual student data from TEA.

HLM Analyses Limitations

The goal of analyses is not to generalize the results to all students who participated in R-Tech programs in all school districts. Rather, the purpose is to generalize the results to the target population of students who took part in R-Tech instructional activities in the 115 participating campuses from the 62 participating school districts. Yet, even with this rather modest aim, there are several potential limitations to the generalizability of the findings. These are discussed in the sections that follow.

Missing data. Consider that there were 14,217 students who participated in R-Tech activities in fall 2008 or spring 2009. Of these, 12,786 were in Grades 6 through 11 in 2008-09. Of the Grades 6 through 11 students, 5,936 reported reading/ELA as an instructional focus, and 9,165 reported mathematics as an instructional focus (see Table F.13). In addition, 900 Grade 11 students reported science as an instructional focus, and 444 reported social studies as an instructional focus (Table F.13). Table F.13 reports the numbers of these students having valid data at each step in the construction of the data files used in the HLM analyses. It is apparent that survivorship complicates student-level analyses. Student cohort membership declined at each step in the construction of data files. For example, of the 5,936 students who reported reading/ELA as an instructional focus, 5,559 had valid demographic data (a reduction of 377 or 6.4%), 5,545 reported valid fall 2008 or spring 2009 instructional hours (a reduction of 14 or 0.3%), 3,624 had valid 2008 and 2009 reading/ELA TAKS scores (a reduction of 1,921 or 34.6%), and 3,411 had valid campus supplemental status and program type data (a reduction of 213 or 5.9%). Overall, the original 5,936 sample of students with reading/ELA as an instructional focus was reduced by 2,525 or 42.5%. A major portion of this reduction (32.4%) was due to students not having valid TAKS scores in both spring 2008 and spring 2009. Similarly, the original sample of 9,165 students who reported mathematics as an instructional focus was reduced by 3,831 or 41.8%. The reduction in the Grade 11 science sample was 291 students or 32.3%, and the reduction in the Grade 11 social studies sample was 137 students or 30.9%.

Table F.13
Number of Cases at Each Step in the HLM Analyses

Steps	Reading/ ELA	Mathematics	Science	Social Studies
Subject as a primary, secondary, or tertiary instructional focus for R-Tech activities in fall 2008 or spring 2009	5,936	9,165	900	444
Valid gender, ethnic, economic, and LEP data	5,559	8,658	869	429
Valid R-Tech instructional hours in fall 2008 or spring 2009	5,545	8,529	864	428
Valid TAKS scores in spring 2008 and spring 2009	3,624	5,576	611	316
Valid campus supplemental status and program type data	3,411	5,334	609	307
Percentage reduction	**42.5%**	**41.8%**	**32.3%**	**30.9%**

When missing data are an issue, researchers must ask whether the surviving samples used in the HLM analyses are representative of the original samples. Do R-Tech students who have complete data (i.e., possibly indicating continuous enrollment) resemble the entire R-Tech student population? (This is especially relevant when considering programs with high turnover rates, such as credit recovery programs. Many R-Tech programs fit this category.) Table F.14 compares the original samples with the restricted samples used in each of the HLM analyses. Gender differences between the two samples were slight as were ethnic differences for the reading/ELA and mathematics analyses. The restricted science and social studies samples had lower percentages of minority students. The restricted reading/ELA, mathematics, and science samples had lower percentages of LEP students. All of the restricted samples had lower percentages of economically disadvantaged students and students participating in special education services. Thus, the restricted samples were different than the original samples—they were less likely to be economically disadvantaged, LEP, and special education students.

Table F.14
Demographic Characteristics of Full and Restricted or Partial Samples

Characteristic	Reading/ELA		Mathematics		Science		Social Studies	
	Full	Partial	Full	Partial	Full	Partial	Full	Partial
Percentage minority	37.3%	37.1%	41.2%	41.0%	36.9%	32.0%	31.9%	23.8%
Percentage female	46.1%	47.1%	48.4%	49.2%	47.0%	48.4%	50.1%	49.8%
Percentage disadvantaged	55.0%	52.5%	55.9%	53.5%	45.2%	38.4%	30.8%	23.8%
Percentage Limited English proficient	4.2%	2.9%	3.8%	2.5%	3.0%	1.6%	1.2%	1.3%
Percentage special education	16.4%	3.8%	13.0%	2.6%	15.1%	3.0%	8.9%	2.6%

TAKS as the measure of student achievement. Because the TAKS is not a vertically equated test (i.e., the skills measured and the scoring from one grade to the next is along a continuum), results are not comparable from grade to grade and from year to year. Thus, researchers used standard scores (*T* scores) to compare students from one year to the next. These scores allow for normative comparisons (where students fall in the distribution of test scores from one year to the next), but not for criterion-referenced comparisons (where students fall on a proficiency scale from one year to the next).

TAKS does not measure science and social studies at each of the tested grade levels. Thus, to include a prior year TAKS test, science and social studies samples included only Grade 11 students. This resulted in relatively small numbers of students in the science and social studies analyses.

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