The Texas Rural Technology (R-TECH) Pilot Program

Cycle 1 Final Evaluation Report

November 2010

TCER
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THE TEXAS RURAL TECHNOLOGY (R-TECH) PILOT PROGRAM

CYCLE 1 FINAL EVALUATION REPORT

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Prepared for
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Texas Center for Educational Research

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ACRONYMS

AEIS	Academic Excellence Indicator System
AskTED	Texas Education Directory
ELA	English/Language Arts
ELL	English language learner
ER System	Expenditure Reporting System
ESC	Education Service Center
ESL	English as a Second Language
FY	Fiscal Year
HSA	High School Allotment Fund
HB	House Bill
HLM	Hierarchal Linear Modeling
LEP	Limited English Proficient
NCES	National Center for Education Statistics
NCLB	No Child Left Behind
PEIMS	Public Education Information Management System
PEP	Personal Education Plan
R-Tech	Rural Technology Pilot Program
SES	Supplemental Education Services
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

Executive Summary

The evaluation of the Texas Rural Technology (R-Tech) Pilot sought to understand how districts implemented R-Tech grants, the effects of implementation on student and teacher outcomes, as well as the cost effectiveness and sustainability of R-Tech. The Texas legislature (80th Texas Legislature, Regular Session, 2007) authorized the creation of R-Tech in order to support the state's small, rural districts in implementing technology-based supplemental education programs. R-Tech grants were intended to support supplemental educational programs, including online courses, offered outside of students' regularly scheduled classes (e.g., before or after school). Districts that received grants were required to provide students in Grades 6 through 12 with access to technology-based instructional resources for a minimum of 10 hours a week; however, the grant did not establish minimum requirements for students' use of R-Tech resources.

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 considered 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 (December 2008 and February 2010) and a final report (fall 2010). The findings presented here are drawn from the evaluation's final report (fall 2010). The report considers outcomes for 63 districts that received Cycle 1 grant awards[1] across the 2-year grant period (May 2008 through May 2010).

KEY FINDINGS BY RESEARCH QUESTION

The sections that follow present key findings relative to each of the evaluation's research questions. Results are drawn from data collected across the full 2-year implementation period for Cycle 1 districts.

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 and finds that some 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.

[1]To date, there have been three cycles of R-Tech grant awards.

- Most districts (87%)[2] implemented R-Tech as a self-paced program focused on tutoring, remediation, or credit recovery. Self-paced programs provided access to online lessons that students worked through at their own pace. Many self-paced programs included diagnostic assessments of students' individual learning needs and tailored instruction based on assessment outcomes. Some programs enabled students to complete entire courses online, allowing students to make up credit for incomplete or failed courses.

- 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. 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).

- 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 used laptops throughout the school day and schools may have permitted students to take laptops home.

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

The sections that follow summarize student participation in R-Tech across the 2-year grant period and discuss how most students were identified for R-Tech services.

- In the second year of implementation, a larger proportion of districts and campuses reported greater numbers of students participating in R-Tech. 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; while approximately 3,300 students participated in summer 2009, about 13,000 participated in fall 2009, and nearly 14,000 participated in spring 2010.

- The average amount of time each student accessed R-Tech services during the grant's second year decreased from levels reported in year 1, with approximately half of all students accessing R-Tech services less than 2 hours a week. Districts varied in how they implemented R-Tech and how students were identified to receive services, but most campuses identified students because of weak academic outcomes, including poor Texas Assessment of Knowledge and Skills (TAKS) scores, failing grades, and teacher referrals.

- Student resistance, transportation challenges, and scheduling conflicts created the greatest barriers to participation in supplemental R-Tech programs. Districts addressed participation barriers by expanding available times and locations for R-Tech services, requiring participation of some students, and increasingly integrating R-Tech services into regular classroom instruction (i.e. non-supplemental implementation).

[2]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.

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 across implementation years. However, teachers working in districts in which R-Tech was incorporated as part of regular instruction reported using resources to a greater extent than teachers in districts implementing supplementary programs. Teachers in non-supplementary districts reported using R-Tech resources to differentiate instruction, provide remediation and support for struggling learners, and to reinforce concepts taught in class.

- According to results from surveys and focus group discussions, teachers on R-Tech campuses received limited training. Specifically, less than 5% of teachers responding to the fall 2008 survey (54 individuals), 38% of spring 2009 survey respondents (215 individuals), and 29% of spring 2010 respondents (392 individuals) knew they had participated in R-Tech professional development. Most teachers receiving R-Tech training attended sessions provided by vendors onsite and in-person which addressed preparation for standardized tests, integrating instructional technology into classroom instruction, and working with at-risk students.

- Beyond professional development opportunities, teachers reported that they benefitted from the increased access to technology provided by R-Tech, which allowed them to enhance their lesson plans, provide visual and auditory examples of lesson content, differentiate instruction, and provide remediation to struggling students. Additionally, teachers reported increased student engagement when students used instructional technology resources.

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 and attendance outcomes. Given differences in the availability of data, the evaluation's analyses of attendance outcomes are limited to R-Tech's first implementation year, while analyses of TAKS outcomes consider the program's full 2-year implementation period.

- Comparisons of changes in the percentages of R-Tech participants and non-participants[3] who met TAKS passing standards from 2008 (the year prior to R-Tech implementation) to 2010 (the grant's final year) indicate that R-Tech participants had larger gains in TAKS passing rates than non-participants in mathematics and science. These gains were not found in reading/English language arts (ELA) or social studies.

- Students who spent more time participating in R-Tech services did not experience improved testing or attendance outcomes relative to students who spent less time in R-Tech. However, researchers were not able to control for unobserved student differences that may have affected outcomes. For example, students who spent more time in R-Tech may have been at greater academic risk, requiring more remediation time than students who spent less time using resources.

- Students participating in self-paced programs experienced reduced TAKS scores in reading/ELA and mathematics relative to R-Tech students who participated in other program types; however, self-paced programs had no demonstrated relationship to TAKS outcomes in science and social studies. R-Tech dual credit and distance learning programs did not demonstrate a statistically significant relationship with students' TAKS reading/ELA and mathematics scores. Again, results should be interpreted with

[3]Non-participants are students who attended R-Tech campuses but did not receive R-Tech services.

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.

- Students who received R-Tech services as non-supplemental instruction offered during the regular school day experienced improved TAKS testing outcomes in reading/ELA and mathematics relative to students who participated in supplemental R-Tech programs. Students who participated in R-Tech during the regular school day also experienced improved attendance outcomes. These findings suggest that R-Tech services implemented as part of regular instruction may improve students' TAKS and attendance 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 resulted from 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 use caution when interpreting the results of the evaluation's cost effectiveness analysis. At the time of the report's writing, only 31 Cycle 1 districts had accessed their full grant awards, and the remaining 32 districts had used only 71% of their grant funding.

- 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 in terms of state-provided grant funding across the 2-year grant period was $294. Districts that implemented programs serving 1,000 or more students experienced average per-student costs of $141, while districts that served fewer than 100 students had average per-student costs of $774.

- 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 ($212 vs. $353, on average). The difference in costs results from differences in the numbers of students served. Districts implementing supplemental programs served an average of 346 students across the 2-year grant period, while districts implementing non-supplemental programs served an average of 692 students.

- More than half (58%) of principals responding to the spring 2010 survey reported that insufficient financial resources created a *moderate* or *substantial* barrier to continuing R-Tech after grant funds expired in May 2010. Most surveyed principals (60%) indicated that they would seek additional funding to continue the program, and 31% indicated they would continue services by incorporating R-Tech into regular classroom instruction.

CONCLUSION

The overarching finding of the evaluation is that rural districts struggled to implement supplementary R-Tech programs in which instruction was offered outside of the regular school day. Many rural students travel great distances to school and depend on buses for transportation. In many districts, bus schedules did not permit students to arrive early or remain after school in order to receive supplementary instruction. Conflicts with extracurricular activities, student work schedules, and family responsibilities also limited some students' ability to participate in R-Tech programs, and some students simply refused to participate in instruction offered outside of the school day.

Findings from the evaluation's second interim report indicated that many districts revised their implementation plans in order to overcome these challenges. As a means to ensure greater student participation in R-Tech, many districts included services as part of the school day and encouraged teachers to use resources as part of classroom instruction. Findings from the 2-year evaluation indicate that districts that incorporated R-Tech as part of regular instruction (i.e., non-supplementary programs) experienced benefits relative to districts that adhered to the grant's intent and implemented supplementary programs. The evaluation's results indicate that districts implementing non-supplementary programs:

- Served more students using R-Tech resources,
- Experienced lower average per-student implementation costs,
- Had better student outcomes in reading/ ELA and mathematics,
- Improved attendance outcomes, and
- Achieved greater teacher buy-in and support for grant goals.

Recognizing the challenges that rural districts experience in implementing supplemental instructional programs and the benefits of including technology-based resources as part of classroom instruction, the evaluation recommends grant guidelines be revised to enable districts to include R-Tech services as part of regular instruction in addition to offering supplementary programs. Doing so will enable more students to access R-Tech resources, increase teacher awareness of services, reduce program costs, and may lead to improved achievement outcomes.

CHAPTER 1
INTRODUCTION

House Bill (HB) 2864 (80th Texas Legislature, Regular Session, 2007) authorized the Texas Education Agency (TEA) to create the Texas Rural Technology (R-Tech) Pilot, which provided funding to support the state's small, rural districts in implementing technology-based supplemental education programs, including online courses. In authorizing R-Tech, the legislature called for the program to be evaluated in order to assess its effectiveness and specified that the evaluation include an examination of R-Tech implementation, its effects on teachers and students, as well as its cost effectiveness. The findings presented here comprise the final report in the R-Tech evaluation.

Grant funds were initially awarded in two periods, or cycles, to support R-Tech programs implemented during the period spanning May 2008 through May 2010. [4] R-Tech Cycle 1 grants awarded about $6.3 million to 63 districts[5] for the period from May 1, 2008, through May 31, 2010, and Cycle 2 grants awarded about $1.5 million to 19 districts[6] for the period from January 1, 2009, through May 31, 2010. The evaluation is limited to only those districts receiving R-Tech Cycle 1 grants and is 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?

In answering these questions the evaluation relies on data collected across the 2008-09 and 2009-10 school years, including the 2008 and 2009 summer sessions.

BACKGROUND

R-Tech grants support 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.

In order to be eligible for funding, R-Tech Cycle 1 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[7] and to districts with high academic need as demonstrated by their 2007 accountability ratings. Grantee districts received $200 per school year in state grant funding

[4]In 2009, the legislature authorized the continuation of R-Tech in the General Appropriation Act for TEA under Rider 81, providing $3.75 million to fund a third cycle of R-Tech grants. Thirty-one districts received Cycle 3 grants. The Cycle 3 grant period runs from February 1, 2010, through February 29, 2012.
[5]Cycle 1 grants initially included 64 districts; however, one Cycle 1 grantee opted not to participate in the program. The district that chose to withdraw from R-Tech did not access any of its grant award.
[6]Three of the 19 Cycle 2 districts also received Cycle 1 grant awards.
[7]R-Tech grants prioritized rural districts in which campuses were not able to offer the range of course selections available in metropolitan areas.

for each student receiving R-Tech services and were required to provide $100 per participating student per school year in matching funds.[8] As a condition of funding, districts were expected to provide students with access to R-Tech services for a minimum of 10 hours per week. The grant did not establish a minimum requirement in terms of how much time students spent using services.

INTERIM EVALUATION FINDINGS

The evaluation produced two interim reports (December 2008 and February 2010), as well as this final report (fall 2010). The evaluation's interim reports provided baseline[9] information about students' academic outcomes and presented preliminary responses relevant to the evaluation's research questions drawn from data collected during Cycle 1 districts' first implementation year (May 2008 through May 2009). Interim findings indicated that while R-Tech was 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 expanded access to computer labs, enabling teachers to schedule class time for students to use R-Tech resources. Some districts that initially implemented R-Tech as a supplemental program encountered challenges that limited the program's effectiveness when services were 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, interim findings suggested that Cycle 1 districts that implemented R-Tech as part of regular instruction may have experienced improved outcomes relative to districts that adhered to the program's intent and implemented supplemental programs. Results from analyses of R-Tech's first-year effects on students' Texas Assessment of Knowledge and Skills (TAKS) scores indicated that students who participated in R-Tech as part of regular instruction had improved testing outcomes relative to students participating in supplemental programs. In addition, teachers who used R-Tech 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 than teachers in districts with supplemental programs. Further, preliminary findings from the evaluation's cost effectiveness analysis indicated that districts implementing R-Tech as part of regular instruction tended to have lower per-student program costs, in large part because greater numbers of students were able to access resources when services were included as part of regular instruction.

The evaluation's second interim report (February, 2010) included a description of the characteristics of the districts and campuses that participated in R-Tech Cycle 1 grants. The report demonstrated that grantee districts met grant criteria in terms of their representation of diverse geographical regions of the state, district size, and demonstrated academic need, as well as the proportions of middle and high school students to be served by R-Tech. This information has not changed across the 2-year implementation period for R-Tech's Cycle 1 grants and it is not repeated in this report. Readers interested in the

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

characteristics of districts receiving Cycle 1 grants may find this information in chapter 2 of the evaluation's second interim report.[10]

THE FINAL REPORT

The evaluation's final report builds on interim results using data collected across R-Tech Cycle 1 districts' full grant period (May 2008 through May 2010). 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 report's methodologies and data sources, as well as its limitations.

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 than 660,000 students in rural public schools (Johnson & Strange, 2009). Fifteen percent of Texas' more than 4.5 million public school students attend a rural public school, and 30% of the state's public schools are located in rural areas (Johnson & Strange, 2009). 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, 2009). 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 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

[10]The R-Tech second interim report is available on the TEA's website at: http://www.tea.state.tx.us/index4.aspx?id=2926&menu_id=949 as well as TCER's website at: http://tcer.org/research/rtech/index.aspx

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 (McColl & Malhoit, 2004). 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 students who struggle academically. While tutoring before or after school has been a longstanding feature of most educational systems, the provision of formalized supplemental education services 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 supplemental education, 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 vendors providing supplemental education programs and the types of services they provide make it difficult to identify what the actual "effect" of services may be. The effects of supplemental programs 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 supplemental programs makes it difficult to know whether observed effects result from participation in supplemental instruction or the characteristics of the students who receive services. Each of these challenges to evaluating supplemental programs is discussed in greater detail in the sections that follow.

Many service providers. In part, the lack of evidence of the effectiveness of supplemental programs is due to wide variation in the type and quality of services provided to students. That is, supplemental programs are 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 supplemental education 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 supplemental education providers have produced mixed results.

Difficulty isolating the effects of supplemental programs. 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 TAKS, lack the sensitivity to measure incremental changes in achievement (Baker, 2007; Linn & Miller, 2005; Kane, 2004).

Nonrandom assignment of students to supplemental programs. 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 supplemental programs 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 students who participate in supplemental instruction are motivated students who are willing to come before or after school to receive tutoring, then differences in the test scores between participants and non-participants 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 instruction, 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 supplemental programs and consider qualitative outcomes such as improved student self-esteem, motivation, and study skills, as well as test scores. The authors warn:

> To the extent the evaluation studies and the public weigh SES [supplemental education services]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 evaluation's findings 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 and to refine program categories.

Analysis of districts' progress reports (N=63) 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.[11]

Surveys

This 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 (chapter 2), chapters discussing R-Tech's effects on students and teachers (chapters 3 and 4), and the sustainability of R-Tech services (chapter 6). 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, spring 2009, and again in spring 2010. 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. The spring 2010 survey measured changes in respondents' perceptions across the grant's 2-year implementation period, and asked principals to identify the type of R-Tech program offered on their campus and whether services were provided in a supplemental program or as part of regular instruction. A detailed description of survey administration procedures, survey response rates, characteristics of survey respondents, supplemental tables cited in report chapters, and a copy of the spring 2010 facilitator and principal survey 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—in fall 2008 and spring 2009—and again in spring 2010. 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

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[11] Researchers sought to gain a more refined understanding of variations in districts' implementation strategies by including program descriptors on the evaluation's spring 2010 principals' survey; however, many principals responded with descriptions of interventions unrelated to R-Tech. Given variances in the reliability of principals' survey responses, the final report incorporates the categories identified in analyses of district grant applications and progress reports.

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, and the spring 2010 survey measured changes in teachers' perceptions across the full 2-year grant period. The spring 2010 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. Students who participated in R-Tech services during the 2008-09 school year, including the 2008 summer session, were invited to participate in a voluntary, online survey in spring 2009, and students who participated in R-Tech services during the 2009-10 school year, including the 2009 summer session, were invited to participate in a spring 2010 survey. Both surveys 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, response rates, 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 six R-Tech districts (9 campuses) in spring 2010. Site visits included interviews with campus administrators and 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), and programs offered to all students.

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 2), the program's effects on students and teachers (chapters 3 and 4), and the sustainability of R-Tech services (chapter 6). 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.

Quantitative Data and Analyses

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 (i.e., TAKS outcomes), 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 that are 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' use of R-Tech resources. Student and teacher usage data were provided to TEA through a data upload system hosted by TEA. Districts submitted upload data for students and teachers participating in R-Tech at three points across each of the project's implementation years: (1) the conclusion of the summer session (2008 and 2009), (2) the conclusion of the fall semester (2008 and 2009), and (3) the conclusion of the spring semester (2009 and 2010). Districts also provided information on their use of R-Tech grant funds through TEA's Expenditure Reporting (ER) system.

Regression analyses. The effects of R-Tech services on students' 2010 TAKS testing and 2009 attendance[12] are 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. Results of regression analyses are presented in chapter 5. A detailed discussion of the approach to estimating the effect of R-Tech on TAKS outcomes is presented in Appendix F, and a detailed discussion of analyses of attendance outcomes is presented in Appendix G.

Cost-effectiveness analysis. The cost effectiveness analysis presented in chapter 6 provides information about how R-Tech districts allocated state grant funding over the 2-year grant period. Analyses include calculations of the per-student cost of implementing R-Tech and discuss the project's sustainability after grant funds have expired.

[12]The most current attendance data at the time of the report's writing were for the 2008-09 school year; however, the most current TAKS data were for the 2009-10 school year.

CHAPTER 2

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 technology 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 includes data collected through analysis of R-Tech documents, including grant applications and progress reports; surveys of principals, R-Tech facilitators, and teachers, and site visits to R-Tech districts. In order to gain a more in depth understanding of how districts implemented their R-Tech programs, the chapter relies heavily on information collected during interviews and focus group discussions conducted as part of spring 2010 site visits to a set of six R-Tech districts. Table 2.1 provides an overview of each of the R-Tech programs implemented in site visit districts. The program types identified in the table are discussed in the chapter's next section, and Appendix D provides more information about the districts and site visit activities.

Table 2.1
Overview of R-Tech Site Visit District Programs

District	Grade Levels Served	Program Overview	Program Type
A	6-12	Self-paced remediation across subject areas for middle school students and for high school students at risk of academic failure. Students access resources in a computer lab outside of regularly scheduled classes.	Self-paced instruction/Supplemental
B	6-9	Instructional content loaded on iPods for all students. Students access resources at home as part of homework assignments.	iPods/Supplemental
C	6-8	Instructional content for English language learners (ELLs) loaded on iPods. Students and family members access resources at home.	iPods/Supplemental
D	6-9	Expanded computer lab provides a program providing self-paced TAKS remediation. Students may access resources before or after school or on a free period.	Self-paced instruction/Supplemental
E	6-12	School-wide technology immersion program at both the middle school and high school. Students access resources as part of regular instruction. Students in Grades 11 and 12 may also participate in dual credit coursework using two-way video conferencing and laptops.	Technology immersion and Dual credit/Non-supplemental
F	6-12	All students access a self-paced program providing remediation in English/Language Arts (ELA) as part of regular instruction.	Self-paced instruction/Non-supplemental

Sources: District grant applications and progress reports; site visit data.

Although site visit districts were selected because they represented specific types of programs, readers are cautioned that there may be wide variations in the implementation strategies of districts providing similar types of R-Tech services and that the experiences of site visit districts may not be reflective of all districts included in R-Tech grants.

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), largely to increase student participation. Site visits across implementation years indicate 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. In addition, some districts enrolled students identified for R-Tech services in mandatory R-Tech courses in place of an elective of the students' choice. Across the 63 Cycle 1 R-Tech districts, 38 districts (60%) implemented supplemental programs, and 25 districts (40%) implemented R-Tech as part of the regularly scheduled school day. [13]

The sections that follow provide more information about the types of programs Cycle 1 districts implemented using grant funding, 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 analyses of R-Tech's effects on student TAKS outcomes (chapter 5) and the program's cost effectiveness (chapter 6).

Categories of R-Tech Programs

Table 2.2 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. Seventeen districts (27%) implemented multiple program types. Of these districts, a majority (88%) implemented dual credit programs in addition to another program type. The following sections describe the characteristics of R-Tech programs included in each category.

Table 2.2
Percentage of Cycle 1 R-Tech Districts and Site Visit Districts by Program Type

Types of R-Tech Programs	Districts (N=63)	Districts Participating In Site Visits (N=6)
Self-paced instruction	87.3%	50.0%
Dual credit and/or distance learning	30.1%	16.7%
One-to-one tutoring with online instructional support	3.2%	0.0%
Technology immersion	3.2%	16.7%
iPods with instructional content	3.2%	33.3%

Sources: District grant applications and progress reports.
Note. Percentages will not total to 100; Seventeen districts (27%) offered more than one type of program (e.g., dual credit and/or distance learning in addition to a second program).

[13] Researchers categorized programs as non-supplemental if services were primarily implemented during regular instructional hours. Some schools provided teachers access to upgraded computer labs during the regular school day, but R-Tech services were primarily accessed by targeted student populations outside of regular school hours. These programs were identified as supplemental.

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. (See Table 3.2 in the evaluation's second interim report for more information on R-Tech software packages.) 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., iSucceedMath). 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). Three site visit districts implemented self-paced programs. Of these, two were supplemental programs (Districts A and D) and one incorporated R-Tech resources into regular instruction (District F).

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 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 participated 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 implemented R-Tech as a supplemental tutoring program in which tutors provide students with one-to-one instruction complemented by technology-based instructional support. Both districts contracted services from TxRED and did not serve students during R-Tech's first implementation year. Given that only two districts implemented this type of program and the short implementation period (i.e., 2009-10), neither district was included in spring 2010 site visits.

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. One R-Tech technology immersion district (District E) participated in the evaluation's site visits.

iPods loaded with instructional content. Two Cycle 1 districts (B and C) used R-Tech resources to provide students with iPods loaded with instructional programs. District C targeted its program to ESL students and struggling readers in Grades 6 through 9. District B 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. Given growing interest in the use of iPods as a cost-effective means for delivering technology-based instruction (White, 2010), the evaluation included both iPod districts in spring 2010 site visits as a means to gain a more complete understanding of the ways in which such programs may be implemented.

THE IDENTIFICATION AND TRAINING OF R-TECH FACILITATORS

R-Tech grant applications required that each district designate an individual to facilitate R-Tech implementation. The evaluation's second interim report (winter 2010) found that R-Tech facilitators shouldered considerable responsibility for the effective implementation of most districts' programs, but that there was little consistency across districts in how facilitators were identified and trained. The following section considers how site visit districts identified their facilitators and includes a discussion of survey findings addressing the background and training of R-Tech facilitators updated to include spring 2010 results.

The Identification of R-Tech Facilitators (Site Visit Districts)

Findings from site visits indicate that in all site visit districts except District C, R-Tech facilitators were technology coordinators who provided overarching support for grant implementation and received assistance from computer lab staff (supplemental programs) and from teachers in programs that used resources as part of classroom instruction (non-supplemental programs). Technology coordinators generally had expertise in managing the program's hardware and software requirements, maintaining equipment, and troubleshooting problems that arose in using technology for instruction. Teachers and computer lab staff provided implementation support by monitoring students' academic progress and use of resources. In District B teachers also supported implementation by developing content-related podcasts that students were able to access outside of class using iPods, and in District E, teachers worked to integrate laptops into daily instruction.

District C implemented an iPod program for ELLs and students experiencing reading difficulties. Given the narrow focus of the district's R-Tech implementation, program facilitator responsibilities were assigned to the middle school ELL teacher and reading specialist. These individuals located appropriate content and loaded it on students' iPods, monitored students' academic progress and use of equipment, and maintained equipment.

The Training of R-Tech Facilitators

Across administration periods, evaluation surveys asked R-Tech facilitators to indicate whether they held technology certifications which would support their ability to resolve technical issues during program implementation and provide support to teachers and students using technology resources. Results presented in Table 2.3 indicate that across the grant's 2-year implementation period, most facilitators were not certified in areas related to technology.

Table 2.3
R-Tech Facilitators' Technology Certification, as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Type of Certification	Fall 2008 (N=71)	Spring 2009 (N=61)	Spring 2010 (N=83)
Not certified	84.5%	83.6%	85.5%
Technology applications, Grades 8-12	8.5%	11.5%	6.0%
Technology applications, all levels	2.8%	4.9%	4.8%
Master technology teacher	2.8%	0.0%	2.4%
Computer science, Grades 8-12	1.4%	0.0%	1.2%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Note. The survey did not specify that certification must have been received in Texas. Facilitators may have held technology certification in another state.

The spring 2010 survey asked facilitators to indicate the amount of training they had received during the 2009-10 school year to support R-Tech implementation. On average, facilitators received 10 hours of training with individual responses ranging from 2 to 24 hours. The survey also included an open-ended item asking facilitators to describe the content of their training, and seven facilitators entered written responses. Of these, six reported receiving software-specific training and two participated in general trainings related to instructional technology.[14]

R-TECH IMPLEMENTATION ROLES: PRINCIPALS, FACILITATORS, AND TEACHERS

In response to spring surveys, principals and R-Tech facilitators indicated the degree to which they were involved in R-Tech implementation. The survey provided a list of implementation activities and asked respondents to rate their level of involvement indicating: *no involvement*, *minor involvement*, *moderate involvement*, or *substantial involvement*. Table 2.4 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.)

Consistent with spring 2009 responses, survey results for 2010 indicate that principals had greater involvement in developing R-Tech programs while facilitators participated in tasks required for daily implementation. Across survey administrations, most principals reported having roles in the planning of R-Tech, identifying students for participation and monitoring their use of resources, and communicating with parents. From spring 2009 to spring 2010, the percentage of principals indicating a role in each of these tasks increased, which suggests that principals were more involved during the grant's second year. Relative to principals, larger percentages of facilitators indicated that they monitored student use, participated in training, and provided technical support for R-Tech implementation; however, the percentage of facilitators indicating participation in each of the listed activities dropped across the two

[14]One facilitator participated in both types of training.

administration periods, which may indicate that their roles diminished as R-Tech programs became more established.

Table 2.4
Principals and Facilitators Indicating Moderate or Substantial Involvement in Activities, as a Percentage of Respondents: Spring 2009 and Spring 2010

	Spring 2009		Spring 2010	
Activity	Principals (N=75)	Facilitators (N=61)	Principals (N=90)	Facilitators (N=83)
Planning implementation	69.3%	65.6%	74.5%	59.0%
Identifying students	66.7%	59.0%	76.7%	45.8%
Monitoring students' use	58.6%	70.4%	61.1%	67.2%
Communicating with parents	56.0%	44.2%	68.9%	43.4%
Participating in training	44.0%	68.9%	47.8%	51.8%
Developing personal education plan (PEPs)	44.0%	45.9%	43.4%	30.2%
Providing technical support	36.0%	57.4%	30.0%	53.0%
Other	34.6%	25.0%	25.0%	31.0%

Sources: R-Tech Principal and Facilitator Survey, spring 2009 and spring 2010.
Notes. Summed percentages represent the 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. "Other" roles in 2010 included collecting and analyzing data, completing reporting requirements, and supervising services.

Information collected during spring 2010 interviews in site visit districts provides more nuanced understandings of the roles principals (nine individuals) and R-Tech facilitators (seven individuals) play in implementing R-Tech. The sections that follow summarize site visit findings.

Principals' Roles in Implementing R-Tech

Consistent with results presented in Table 2.4, site visit interview findings indicate that across program types, principals played the largest role in planning and developing R-Tech programs, while facilitators were more involved in day-to-day implementation activities. One interviewed principal said, "We [administrators] were in charge of getting the grant going. We set up vendors… equipment…training, and really rely on our campus facilitators…to run the day-to-day [activities]." Across program types, most interviewed principals (five individuals) described their role as one of "support" for teachers and facilitators who actively implemented programs. Four principals said they communicated expectations that the equipment and services would be used by teachers and students regularly, as one principal explained, "I observe to make sure they're [students and teachers] actually using it [R-Tech resources] and…evaluate the process and the effectiveness of it." Additionally, two principals said they were responsible for managing financial aspects of implementation.

Facilitators' Roles in Implementing R-Tech

In comparison to principals, interviewed facilitators reported responsibility for a greater range of implementation tasks. In fact, four facilitators across districts reported the added responsibilities of R-Tech created substantial challenges in terms of time. One facilitator stated, "It's [acting as a facilitator] a great deal of work," while another indicated that the facilitator role was "almost a full time job." The following sections discuss facilitators' roles.

Ongoing support for the use of instructional technology. Across site visit districts, most R-Tech facilitators reported that their primary role was to help instructional staff (i.e., teachers and computer lab staff) use technology to support student learning. The R-Tech facilitator in District B explained that he tried to minimize implementation challenges for teachers and encourage their use of the iPods, noting "We have tried to make it as easy as possible [for teachers to use the iPods]." The facilitator identified and coordinated professional development for teachers, ordered and configured new iPods and supervised care of iPods. At the end of each week the facilitator collected iPods in order to charge them over the weekend. District B purchased multiple loading docks for students' iPods, which allowed the facilitator to charge and load up to 20 iPods on each dock, reducing the amount of time required to load and charge iPods campus-wide. At the start of each week, the facilitator loaded teachers' content onto iPods and redistributed iPods to students. The facilitator explained:

> We encourage each teacher to find something that they can share via iPods from week to week. The teacher [selects a podcast] and puts it in a folder on our network server. At that point, I go in every Monday…and I develop a playlist based on what they have in the folder…[and load it on the students' iPods].

Similarly, District E hired instructional technologists in the second year of implementation to support teachers' integration of technology into regular classroom instruction. According to the high school principal, the instructional technologists "would be like an instructional dean on another high school campus but their instructional focus is strictly on the implementation of the technology." The principal explained that instructional technologists introduced teachers to "different tools…for the instructional program," and identified individual teachers' areas of weakness that may require additional training. The middle school principal explained, "If [the instructional technologist] says there are some things that all the teachers need to learn, then we'll set it up… or she'll go class period by class period and meet with the teachers to train different parts of technology." The high school principal expressed appreciation for the instructional support, noting, "Each person [teacher] began to start to take an interest in, 'How can I use this [technology] and how can I implement it,' and a lot of that came from the support the instructional technologist has given."

Documentation and reporting requirements. R-Tech facilitators also held responsibility for meeting many of the grant's reporting requirements, including reports of student use in TEA data upload reports and contributing to district progress reports. R-Tech facilitators in some districts also analyzed program use reports to identify students' areas of instructional need (District D) and to ensure that teachers were using resources appropriately (District B).

Teachers' Roles in Implementing R-Tech

The fall 2008, spring 2009, and spring 2010 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 teachers 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 Table B.3 in Appendix B). The percentages of teachers responding that they had *no role* in R-Tech remained fairly constant across the spring 2009 and spring 2010 survey administrations. Table 2.5 presents the summed percentages of teachers who indicated they had a *moderate* or *substantial* role in R-Tech activities across survey administrations. Summed percentages represent the percentage of teachers indicating a *moderate* role *plus* the percentage of teachers indicating a *substantial* role in activities. (Supplemental Table B.3 in Appendix B presents individual percentages by all response categories for each implementation activity across all survey administrations.[15])

Table 2.5
Summed Percentages of Teachers Reporting Moderate or Substantial Involvement in Planning and Implementing R-Tech, as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Teacher Roles	Fall 2008 (N=1,213)	Spring 2009 (N=568)	Spring 2010 (N=1,377)
Planning Roles			
Decision to apply for grant	2.8%	4.2%	NA
Selection of vendors	1.8%	3.7%	NA
Drafting the grant application	0.9%	2.6%	NA
Implementation Roles			
Supervise or monitor students	21.6%	33.4%	24.0%
Identification of students	10.9%	13.4%	15.1%
Monitor Personal Education Plans	15.1%	18.1%	13.8%
Communication with parents	11.2%	15.0%	13.1%
Develop Personal Education Plans	10.6%	13.5%	11.8%
Identify R-Tech professional development topics	5.5%	10.4%	9.3%
Provide technical support	5.2%	8.0%	7.8%
Coordinate vendor services	2.0%	3.4%	3.8%
Provide tutoring to students	20.2%	29.5%	NA
Other	1.6%	4.3%	4.5%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
Notes. Summed percentages represent the 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. “Other” roles in 2010 included: classroom teacher (technology immersion), lab monitor, coordinator, and technical support. NA=Not applicable. Planning roles were not included on the year 2 (spring 2010) survey.

Results presented in Table 2.5 indicate that most teachers had minimal participation in R-Tech across grant years. Fewer than 5% of teachers responding to the fall 2008 and spring 2009 surveys participated in any one program planning role, a third or fewer teachers indicated any one implementation role across survey administration periods, and teachers’ participation in many roles appeared to drop from spring 2009 to spring 2010. However, the fluctuations between survey administrations may reflect the change in teacher response rates, rather than teachers’ roles. Fewer teachers responded to the spring 2009 survey (568 individuals) as compared to the fall 2008 (1,213 individuals) and spring 2010 (1,377 individuals) survey administrations. The larger proportion of teachers reporting participation in various implementation roles in spring 2009, in addition to the smaller number of teachers responding to the survey, suggest that teachers participating in the spring 2009 survey may have been more involved in R-Tech programs than most of their colleagues. Teachers participating in focus groups in spring 2010 provided more information about their role in implementing R-Tech. Focus group responses indicate that teachers’ roles varied based on each campus’s program goals. Not surprisingly, teachers in districts implementing R-Tech programs intended to serve all students (Districts B, D, E, and F) participated at greater levels than teachers in districts serving targeted student populations (Districts A and C). These findings are discussed in the following sections.

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[15]Readers interested in the percentages across all response categories for teachers’ roles in planning activities are directed to Table B.3 in Appendix B of the evaluation’s second interim report (February 2010). Questions addressing planning activities were not included on the spring 2010 survey.

Classroom implementation of R-Tech resources. Districts E and F implemented school-wide programs in which all students used R-Tech resources during regular school hours. Teachers in these districts participated to a greater extent than teachers in districts which provided supplemental programs to targeted student groups. For example, in District E, teachers were responsible for classroom implementation of the district's technology immersion program. Teachers attended training to learn how to integrate laptops into instruction, and most teachers reported using Internet-based resources as part of daily lessons. Teachers assigned research projects that incorporated online resources and teachers also used instructional technology, such as SmartBoards (i.e., digital whiteboards), LCD projectors, and PowerPoint presentations to deliver instruction. District administrators explained that some teachers resisted the integration of technology early in the project and that principals had to clearly establish expectations for technology integration and require that laptops were used for instruction. These requirements "ruffled feathers" in year 1, explained the middle school principal, but "Teachers aren't fighting it [in year 2]. They've embraced it."

Monitoring students' use of resources. Across site visit districts, teachers monitored students' use of R-Tech resources. A middle school principal in a district that implemented R-Tech as part of classroom instruction explained, "Teachers are in charge of their classroom and they are in charge of how students are using the technology… If it's not being used correctly, then they need to take care of it."

District F provided self-paced instructional R-Tech services during students' ELA classes (non-supplemental). ELA teachers scheduled weekly class time in the computer lab for students to use R-Tech resources. Teachers supervised student use of resources, provided technical assistance and answered students' questions, and took grades based upon students' scores on program quizzes.

District D implemented a supplemental program but encouraged all teachers to use R-Tech computer labs and software with all of their students during regular class time. For example, when middle school teachers were reluctant to use the program, the principal developed grading requirements based on R-Tech computer assignments. In a spring 2010 focus group, some of the districts' high school teachers said they took their classes to the labs during class time in order to use R-Tech resources to differentiate instruction. In addition, high school teachers said they identified students needing remediation and worked with facilitators to coordinate assignments and monitor student progress.

Locating and developing content. District B implemented a campus-wide iPod program that required teachers to identify or develop appropriate instructional content for students' iPods. Some teachers developed their own podcasts and others located course-related content that was available on the Internet. A social studies teacher explained.

> It's helped my [instruction] ... I can find videos about countries and every week we have a video that goes with the country that we're studying and it's a lot more effective if they can see it…When they [students] can see what they're telling you about a country…it's much more effective than just reading out of a book.

PRINCIPALS' AND FACILITATORS' PERCEPTIONS OF 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 disagree*, (-5) *disagree*, (0) *unsure*, (5) *agree*, or (10) *strongly agree*. Table 2.6 presents principals' and facilitators' average responses across survey administrations. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Table 2.6
Principals' and Facilitators' Perceptions of R-Tech Goals, as a Mean Rating: Fall 2008, Spring 2009, and Spring 2010

Statement	Fall 2008 (N=153)	Spring 2009 (N=136)	Spring 2010 (N=173)
R-Tech is positively affecting student achievement	5.9	3.9	6.1
Overall, I am pleased with R-Tech services	5.6	4.6	5.6
R-Tech is positively affecting instruction on this campus	4.9	3.9	5.4
Vendor services align with TEKS/TAKS	5.7	4.5	5.3
Vendor services align with campus goals	5.2	4.1	5.0
Goals are clear	5.0	3.8	4.7
Expectations are clear	4.7	3.5	4.6

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
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 disagree*, (-5) *disagree*, (*0) unsure* (5) *agree*, (10) *strongly agree*, with higher ratings indicating greater agreement.

Results presented in Table 2.6 indicate that across survey administrations, principals and R-Tech facilitators generally had high levels of agreement with statements about R-Tech's goals, but that agreement waned somewhat in spring 2009, which is likely the result of implementation challenges experienced during the project's first year (see the discussion included in the next section). Agreement tended to rebound in spring 2010. Across survey items, principals and facilitators indicated they were pleased with R-Tech, noting strong levels of agreement that the program had improved student outcomes and was positively affecting instruction.

CHALLENGES TO R-TECH IMPLEMENTATION

Surveys and site visit interviews also sought to understand the challenges that Cycle 1 districts may have experienced 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 2.7 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.)

Table 2.7
Principals' and Facilitators' Perceptions of the Moderate and Substantial Challenges to R-Tech Implementation, as a Summed Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)	Spring 2010 (N=173)
Project reporting requirements	30.7%	39.7%	26.5%
Communication of R-Tech goals to parents	32.7%	48.5%	26.5%
Insufficient planning time	NA	39.0%	24.1%
Communication of R-Tech goals to staff	20.3%	38.2%	22.9%
Development of students' PEPs	32.7%	36.7%	21.7%
Lack of sufficient staff	NA	25.0%	21.7%
Space limitations	NA	27.9%	21.7%
Monitoring students' progress	24.9%	33.1%	21.7%
Conflicts with other programs	17.7%	24.3%	20.5%
Coordinating training for staff	26.2%	31.7%	20.5%
Communication with vendors	17.0%	25.8%	18.0%
Teacher/staff technical skills	NA	33.5%	15.7%
Identification of R-Tech students	14.4%	25.8%	15.6%
Level of technology resources	19.6%	27.3%	15.7%
Level of technical support	15.7%	23.5%	12.0%
Other	11.3%	18.7%	30.8%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Notes. Summed percentages represent the 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. Only four facilitators provided written responses describing "other" challenges, which included those listed in the table above (e.g., lack of adequate staff [N=1]), as well as other challenges to student participation (e.g., student resistance [N=1], scheduling conflicts with students' extracurricular activities and students' responsibilities [N=2], and transportation barriers [N=2]).

As presented in Table 2.7, the percentage of respondents indicating most aspects of implementation presented *moderate* or *substantial* challenges increased from fall 2008 to spring 2009, but decreased from spring 2009 to spring 2010. Similar to results for principals' and facilitators' perceptions of R-Tech goals discussed in the previous chapter section, this finding suggests that survey respondents confronted challenges in implementing R-Tech in year 1, but by year 2, some challenges may have been overcome. The discussion that follows provides more information about the implementation challenges districts experienced, such as technology challenges, lack of teacher buy-in, and barriers to student participation drawn from spring 2010 interviews and focus group discussions. The next chapter section addresses how districts may have dealt with challenges.

Technology Challenges

Each district participating in spring 2010 site visits experienced implementation challenges in terms of technology resources. These challenges included insufficient infrastructure and computer hardware, software limitations, and damage to technology resources.

Hardware and networks. Two districts (Districts E and F) experienced challenges as a result of broken or slow hardware and network connections. The District E high school experienced substantial network challenges which limited teachers' ability to use technology resources in the classroom. The principal explained:

> You think that the "getting people to use them [laptops] and embrace them and infuse them in their instruction" [part] is going to be the issue, but when they got them and tried to start this, we still didn't have a stable network…You can imagine a teacher who has prepared this lesson and they're all excited…and then they get in front of their kids and it doesn't work because there is…a network issue…I think [we have] a continuing networking problem. It's better, but it's by no means fixed. We have limited bandwidth that we've purchased, and I think it's still not enough.

District F used grant funds to purchase self-paced instructional software, but did not update its computer labs or technology infrastructure to support increased use of computers for instruction. As a result, the district experienced challenges produced by outdated hardware and slow Internet connections. A principal noted, "I don't think we've had a general upgrade technology-wise in a lot of years." According to the principal, campus computers were "very, very antiquated" and Internet connections were slow and could not consistently support the newly purchased self-paced instructional software. Additionally, the principal noted that the condition of the lab and its equipment continued to decline because there was not a lab monitor present when students accessed R-Tech services.

Software. Two site visit districts (Districts A and D) implementing self-paced instructional software experienced challenges with vendor-provided software. In District D, the software program did not accurately record and report data in terms of students' use, which created reporting challenges. "The program was obviously not recording the time accurately," explained the R-Tech facilitator, "I first noticed this in summer school when I was in the room with the students for 4 hours and it [the data] would come up with hardly any time." The facilitator went on to explain that the program only recorded students' use of specific program components and did not record time spent in the program's remediation component. "These kids are at-risk and most of their time is spent in [that component]!"

Middle school teachers in District A expressed frustration with R-Tech software because the program did not align with state Texas Essential Knowledge and Skills (TEKS) or the campus scope and sequence. One teacher explained that when younger students accessed science instruction using the software, their teachers would have to sit with them and help them finish the lesson because the content addressed higher level TEKS that students would not learn until they reached high school. The program allowed teachers to edit lessons and individualize the instruction. The districts' facilitators expressed interest in working with teachers to modify the lessons in order to better support classroom instruction. The middle school principal agreed, "We need time as a faculty to align our scope and sequence with the…[R-Tech software] program."

Damages. Three districts (District B, C, and E) that provided students with personal technology resources (i.e., iPods, laptops) reported increased damage in R-Tech's second implementation year. Principals and facilitators in both districts (B and C) implementing iPod programs reported that damage to machines created challenges. District C reported less damage given the smaller number of students participating, but the school-wide implementation in District B meant that many iPods needed to be replaced. The facilitator explained:

> One of our biggest challenges with them [the iPods] is the newness having worn off and having them [the students] continue to be vigilant about taking care of their equipment… We've had a few more issues with breakage and we've had one or two lost this year…We've had some kids that have come in to the district at the last minute and we've not had equipment [because iPods were lost or damaged]. So, we're at a point…where we're going to have to buy more equipment.

Similarly, a principal in District E indicated that "keeping up with who owes what for repairs" because of "misuse" of school laptops presented "insurmountable" challenges. The principal explained:

> Just about anyone who is given something doesn't necessarily take care of it as well as they would if they had bought it with their own money… Kids act like it's [the laptop] is the same as other books in their backpack and don't realize it's delicate.

Lack of Teacher Buy-In

Several site visit districts implementing supplemental programs (Districts A, B, and D), experienced challenges in terms of teacher buy-in and support for the program. A District D principal reported that "getting…teachers to do it [the program]" was a challenge because a "couple of people [teachers] weren't sold on that particular [software] program." The principal expressed frustration with the lack of buy-in, noting, "I don't want to continue to pay for a program that we're not using." In District B, a facilitator indicated that teachers struggled to implement iPods effectively because "they are not real tech savvy people" and were "frightened" to use the technology. The facilitator also suggested that teachers felt "pressured to perform when it comes to testing" so they overlooked "these kinds of things that are…seen as frills." The middle school principal in District A reported that "teachers were a little unaware" of which students accessed R-Tech services and how. The principal hoped to "get teachers more involved in…monitoring their own students" in subsequent years.

Additionally, the District E high school principal reported challenges in terms of implementing R-Tech services within the regular classroom. Some teachers were reluctant to change their instructional methods and resisted integrating technology into instruction. "With any new thing, there are going to be people who jump on right away, people who resist greatly, and people that are reluctant…and get on halfway through," explained the principal.

Student Barriers

Most site visit districts (A, B, C, and E) experienced barriers to student participation, including transportation challenges and students' lack of interest or motivation. (See chapter 3 for more information regarding barriers to student participation and the challenges students experience participating in R-Tech.)

Transportation. In District A, both the middle school and high school principals reported transportation and scheduling barriers to student participation in the supplemental program. "In a smaller high school…students are very compacted with their schedules," explained a principal. "They're not only doing academics, but…most…kids participate in some kind of…athletics, special programs, band…and all of those are done after school. That competes with what we're trying to do as well." As a means to overcome transportation barriers, some districts implemented services during the regular school day. Notably, a facilitator in District A indicated that the program would have had more success recovering failing students if they "had been able to use it [the program] sometime during the day."

Lack of interest and motivation. Across iPod districts (District B and C), interview participants expressed surprise that the primary challenge to implementing iPods as instructional resources was students' lack of interest. A District C facilitator attributed the lack of interest to students' age. The facilitator explained that older students already had access to iPods and other personal technology resources which could be used for recreational purposes, so they lacked interest in using the school's technology for learning:

> You anticipate that if you give a teenager an iPod, they're going to be pretty excited… That was a challenge. They [older students] were not as excited as the younger students… In retrospect…[younger students] are not to the level where they have [their own] smartphones and the iPhones and stuff, so it's [the iPod] more of a privilege and treat for them, whereas a lot of the high school students already have that technology with them, so it's not quite as special.

In District B, the principal attributed students' lack of interest to the content teachers loaded onto the iPods. "A lot of the time, the kids just don't do the assignments… They're [teachers] just not finding things that are exciting. It's just…a repetition of what's done in class," explained the principal.

OVERCOMING CHALLENGES TO R-TECH IMPLEMENTATION

The evaluation also considered how Cycle 1 districts may have worked to overcome implementation challenges and addressed strategies for overcoming challenges in site visit interviews and spring surveys of principals and administrators. Surveys provided principals and facilitators with a list of common methods for overcoming implementation challenges and asked respondents to indicate the strategies they had used. Table 2.8 presents findings for both survey administrations and indicates that providing additional training, purchasing additional computer hardware, and upgrading technology infrastructure were common approaches to overcoming challenges. The percentage of respondents indicating they used most strategies decreased across implementation years.

Table 2.8
Principals' and Facilitators' Perceptions of the Methods to Overcome Challenges to Implementation, as a Percentage of Respondents: Spring 2009 and Spring 2010

Method	Spring 2009 (N=136)	Spring 2010 (N=173)
Provided training to improve teacher/staff skills	58.8%	52.0%
Purchased additional computer hardware	61.8%	49.1%
Upgraded technology infrastructure	40.4%	47.4%
Held information sessions for teachers and staff	52.9%	46.2%
Purchased additional computer software	51.5%	42.8%
Purchased additional furnishings (e.g., computer tables and chairs)	23.5%	24.9%
Held information sessions for parents and students	19.9%	20.2%
Added staff to manage implementation tasks	24.3%	19.7%
Expanded vendor role in providing support for implementation	20.6%	11.6%
Other	11.0%	9.2%

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
Note. Percentages will not total to 100 because respondents could select more than one method.

The sections that follow present more information about how districts may have addressed challenges and draw on data gathered during spring 2010 site visits to R-Tech districts.

Technology Challenges

Site visit districts addressed technology challenges by improving their infrastructures and developing policies designed to reduce damage and wear on equipment. District E addressed network challenges by adding more wireless access points and purchasing additional bandwidth. The high school principal indicated that network capability had improved, but still presented issues. District E also developed policies to encourage proper care of the laptops and to discourage lost or damaged equipment. The principal said, "I've all but eliminated the problem of students leaving their computers unattended." Staff members confiscated unattended laptops and turned them into the principal. "First offense is a call to parents" to notify them that their children are not caring for the equipment properly and the "next time is a day of ISS [in-school suspension]," said the principal.

As noted in the chapter's previous section, time and student use took their toll on iPods, and District B and C experienced challenges in terms of maintaining equipment and replacing lost or broken machines.

As previously noted, few iPods needed to be replaced in District C, and the district split the cost of replacement machines with families. The principal explained:

> We understand that that's [iPod replacement] very difficult [for the families]… So, the school does a certain portion and the parent has to show some responsibility too…just so that child understands that this [the iPod] is something that they have to take care of.

District B implemented a different policy in its middle school-wide iPod program. If a student lost or damaged an iPod, the district asked "that they [families] pay [full cost] for the replacement or the repair." The district's R-Tech facilitator explained, "We do not hold them [students] to that [policy], except that if they do not replace or repair the equipment, they are not allowed to participate in any other [technology] programs [such as school-provided laptops at the high school]."

Lack of Teacher Buy-in

Principals in District D and E addressed teachers' resistance to R-Tech by clearly communicating expectations and monitoring their use of resources. For example, District D administrators required teachers to take grades from assessments embedded in R-Tech software at least twice every grading period to ensure teachers used the programs. Similarly, District E required that teachers assign students two projects each semester using technology resources. The principal reported that students conducted research projects and created presentations using computer resources. District E administrators also hired an instructional technologist to support teachers' "instructional use and implementation of the computers in the classroom."

Student Barriers

District A planned to use several strategies during the 2010-11 school year to address barriers to student participation. If possible, the district planned to offer a late bus that would enable students to participate in services after school. Campus administrators also planned to provide access to R-Tech during the school day. "I am trying to figure out a way to utilize it…during the school day…for kids that are really in need and have difficulty with transportation," explained one principal.

FACTORS THAT CONTRIBUTE TO SUCCESSFUL IMPLEMENTATION

The spring surveys of principals and program facilitators contained an open-ended item asking what contributed most to their school's ability to implement R-Tech, and 69% of respondents (119 individuals) entered written comments. Researchers reviewed written comments, categorizing responses by common themes. Table 2.9 presents the factors cited by at least 5% of respondents sorted in terms of relative percentages reported on the spring 2010 survey.

Table 2.9
Principals' and Facilitators' Perceptions of the Factors That Contributed to R-Tech Implementation, as a Percentage of Respondents: Spring 2009 and Spring 2010

Factor	Spring 2009 (N=90)	Spring 2010 (N=119)
Strong administrative support	20.0%	63.0%
Existing resources	7.7%	28.6%
Staff buy-in and support	16.6%	23.5%
Technical support	NA	15.1%
Focus on meeting student needs	NA	12.6%
Designated R-Tech facilitator	7.7%	6.7%
Additional funding	20.0%	6.7%
Added computer hardware and software	13.3%	5.0%

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
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 and some respondents provided more than one answer. NA=not applicable. These themes were not addressed in responses to spring 2009 surveys.

As presented in Table 2.9, relative to spring 2009, a substantially larger proportion of respondents (63% vs. 20%) cited strong administrative support as the factor that contributed most to R-Tech implementation. Spring 2010 results also indicate increases in the proportion of respondents noting existing resources (29% vs. 8% in spring 2009) and staff buy-in and support (24% vs. 17%) as important factors in implementing the program. Spring 2010 respondents also pointed to the importance of technical support and a dedicated focus on meeting student needs as factors. Notably, across both survey administrations few respondents highlighted the importance of having a designated R-Tech facilitator, which, as discussed in a section that follows, may reflect confusion with the survey's terminology.[16] The proportions of respondents indicating that additional funding and the addition of new hardware and software decreased during the grant's second year, which is likely a reflection of spending patterns identified in the evaluation's second interim report. That is, many districts accessed most or all of their funding during the grant's first year in order to purchase the computer hardware and software needed to implement R-Tech. Given this trend in spending, it is likely that spring 2010 survey respondents would be less focused on the equipment purchased using funds received early in the grant period. The sections that follow supplement information presented in Table 2.9 drawing from information collected during spring 2010 site visits.

Factors That Contribute to R-Tech Implementation

Principals and facilitators participating in site visit interviews also described factors which contributed to successful implementation. These discussions provide a more in-depth understanding of the processes and factors that contribute to the implementation of R-Tech, such as dedicated program facilitators, strong leadership, staff support, and the selection of technology resources.

Designated program facilitators. Across all R-Tech districts participating in site visits (Districts A, B, C, D, E, and F), interview and focus group respondents identified a designated program facilitator as a necessary factor in successfully implementing R-Tech, which is notably different from the responses included in Table 2.9. While the reason for this result is unclear, it may reflect differences in how respondents' understood terms. For example, researchers were able to clarify who served as program

[16]R-Tech campuses may have used a variety of terms to for R-Tech facilitators, given the wide range of individuals who served in these roles (e.g., grant coordinators, technology coordinators, computer lab monitors, teachers).

facilitators in site visit interviews and focus groups; however, no such clarification was available for survey respondents.

In District D, focus group teachers said they did not experience any challenges using R-Tech resources because a district facilitator "shield[ed]" them from the time-consuming coordination and project reporting activities. The district's high school principal agreed, noting the facilitator was "*absolutely* a key part of this [program]." Interview participants in Districts A and F expressed similar views about program facilitators. A principal in District A noted that the campus' R-Tech facilitators "have been the strongest aspect of the program." In response to an interview question probing the factors that contribute to implementation, a facilitator in District C said, "The willingness of me to do it [implement the program]. We had to get somebody willing to do it because it does take quite a bit of time—it does."

Strong leadership. As previously noted, strong leadership and clearly established expectations about the classroom use of resources were important components in ensuring technology resources were used for instruction in Districts D and E. Across interviews conducted in both districts, respondents pointed to the importance of administrative leadership in the program. Similarly, the District B middle school principal plans to communicate expectations to teachers, provide additional funding for training, and increase classroom monitoring in 2010-11 to ensure teachers continue to use iPods to support their instruction.

Staff support. Noting the methodological shift required for teachers to begin integrating technology into regular classroom instruction, a District E principal emphasized the role of teachers in supporting one another. Several classroom teachers received additional technology training and provided instructional and technical support to their struggling colleagues. Teachers also presented at district-wide professional development sessions, modeling successful lessons using technology in the classroom. Additionally, some teachers, who were identified as "savvy," helped identify and publicize the ways students' secretly used technology inappropriately (i.e. finding new ways to communicate with their friends during class using what appear to be appropriate websites and programs). The middle school principal indicated that some teachers were still resistant to the program, noting the differences among school staff. "I have a large group [of teachers] that is excited and willing to take a chance," explained the principal. "I have another group that's willing to try, and I have a few that are still kind of watching from the sidelines."

Selection of technology resources. Interview and focus group participants across both iPod districts (Districts B and C) pointed to the low cost of iPods, as well as its ease of access and use as important components in their R-Tech implementation. In District C, a facilitator said the "low cost of the medium [iPods] itself," was key to the district's decision to implement iPods over laptops or other more expensive technology resources. The R-Tech facilitator said the cost-effectiveness of iPods extended beyond the machines, noting that teachers could create or locate their own instructional podcasts at no cost to the district. "I am continually amazed that people create good content and that it's free," explained the facilitator. Interview and focus group participants also reported limited barriers to student participation in programs using iPods, since the machines are easily portable and do not require internet access for use at home. Participants also described unexpected outcomes as a result of students' use of iPods at home. An ancillary effect of the ESL iPod program was that students' parents also had access to lessons, which according to school administrators, has improved parents' language skills.

SUMMARY

The findings presented in this chapter indicated that implementation generally improved over the 2-year grant period. In surveys and interviews, respondents indicated fewer implementation challenges and reduced roles for R-Tech facilitators during R-Tech's second implementation year. This is not surprising. During the grant's first year many survey respondents to the evaluation's surveys and site visit interviews indicated they were working to negotiate relationships with R-Tech vendors, purchase and install new hardware and software, provide needed training, and to overcome barriers to student participation. In year 2, it appears that many respondents had overcome these challenges. R-Tech facilitators and teachers indicated greater comfort using resources, and many respondents indicated their districts had addressed student participation barriers by including R-Tech as part of instruction offered during the school day.

Although results for spring surveys (see Table 2.9) suggest that a dedicated R-Tech facilitator is not a central component of implementation, other survey results as well as findings from site visits suggest otherwise. Teachers, principals, and facilitators themselves, noted the importance of assigning responsibility for implementation to an individual or team focused on the project. Although facilitator responsibilities varied across districts and types of program implementation, facilitators generally were knowledgeable about R-Tech hardware and software, had a clear understanding of program goals, and facilitated relationships with other stakeholders, including teachers and school administrators.

In addition to effective program facilitators, R-Tech implementation benefitted from strong administrators who supported the program and its goals, ensured clear communication about the grant, and encouraged teacher and student buy-in and support. In site visit districts, it also was clear that administrators who worked with R-Tech facilitators to identify strategies to overcoming barriers to student participation were key components of effective implementation.

CHAPTER 3
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) across the 2-year grant period (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 5 addresses how participation in R-Tech may have affected students' TAKS outcomes.

DATA SOURCES

This 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 for the summer 2009, fall 2009, and spring 2010 reporting periods, as well as from PEIMS. The chapter incorporates findings from the fall 2008, spring 2009, and spring 2010 surveys of R-Tech facilitators and principals, teachers on R-Tech campuses, and spring 2009 and spring 2010 surveys of students who participated in R-Tech services.

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.[17] The chapter also includes qualitative data collected during site visits to a sample of six R-Tech districts in May 2010. 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 2009-10 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 2009, FALL 2009, AND SPRING 2010

The sections that follow present information about students' participation in R-Tech during Cycle 1 grantees' 2-year implementation period (May 2008 through May 2010). Participation information includes the number of students receiving R-Tech services and the amount of time students spent using R-Tech-provided resources.

[17] 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.

District, Campus, and Student Participation in R-Tech

During R-Tech's second implementation year, 114 campuses from 63 Cycle 1 districts participated in the program. As discussed in chapter 1, R-Tech districts are required to track student participation in grant services and to provide reports to TEA through a data upload system hosted by the agency. For each grant year, student upload data were submitted to TEA for the summer, fall, and spring reporting periods.

Table 3.1 presents information about the number and percentage of campuses and districts submitting student upload data to TEA for each reporting period included in years 1 and 2, as well as campus-level statistics describing the level of student participation for each reporting period. Results indicate that nearly two-thirds of R-Tech Cycle 1 districts (63%) and about one-half of campuses (47%) reported students participating in R-Tech during the summer of 2009. This was an increase from 47% of districts and 32% of campuses reporting students receiving R-Tech services in summer 2008. In year 2, 89% of districts and 79% of campuses reported serving students in the fall of 2009, and 90% of districts and 93% of campuses served students in the spring of 2010. (These levels of participation were similar to year 1.) The number of students receiving R-Tech services increased across reporting periods. In the summer of 2009, campuses reported serving an average of 61 students, in the fall of 2009 the average number of students served increased to 145, and campuses served an average of 152 students in the spring of 2010. Across campuses, the range of students served by R-Tech varied from 2 to 1,174 in the summer of 2009, from 1 to 1,173 in the fall of 2009, and from 5 to 1,172 in the spring of 2010. As one might expect, the total number of students participating in R-Tech by reporting period increased from 3,292 in the summer of 2009, to 13,033 in the fall of 2009, to 14,089 in the spring of 2010. Each of these numbers is greater than the comparable numbers from year 1 when 1,370 participated in the summer of 2008, 8,795 in the fall of 2008, and 12,736 in the spring of 2009.

Table 3.1
R-Tech District, Campus, and Student Participation: Summer 2008, Fall 2008, Spring 2009, Summer 2009, Fall 2009, and Spring 2010

Data Upload Characteristic	Summer	Fall	Spring
Year 2 (June 2009-May 2010)			
Number (percentage) of districts reporting (N=63)	40 (63%)	56 (89%)	57 (90%)
Number (percentage) of campuses reporting (N=114)	54 (47%)	90 (79%)	93 (82%)
Average number of participants per reporting campus	61.0	144.8	151.5
Median number of participants per reporting campus	18.5	94.0	108.0
Minimum number of reported participants per campus	2.0	1.0	5.0
Maximum number of reported participants per campus	1,174.0	1,173.0	1,172.0
Total Number of Year 2 Participants	**3,292**	**13,033**	**14,089**
Year 1 (June 2008-May 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 Year 1 Participants	**1,370**	**8,795**	**12,736**

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010.

Figure 3.1 presents the percentage of students receiving R-Tech services across the campuses that participated in R-Tech during the program's first and second implementation years. 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, 7% of students in Grade 6 through 12 participated in R-Tech in summer 2009 (compared with 3% in summer 2008), 29% participated in fall 2009 (compared with 21% in fall 2008), and 31% participated in spring 2010 (compared with 30% in spring 2009). Twenty-five percent of students participated in R-Tech in both the fall 2009 and spring 2010 (compared with 17% in both fall 2008 and spring 2009), and 5% of students received services across all three periods (compared with 1% across comparable periods in year 1).

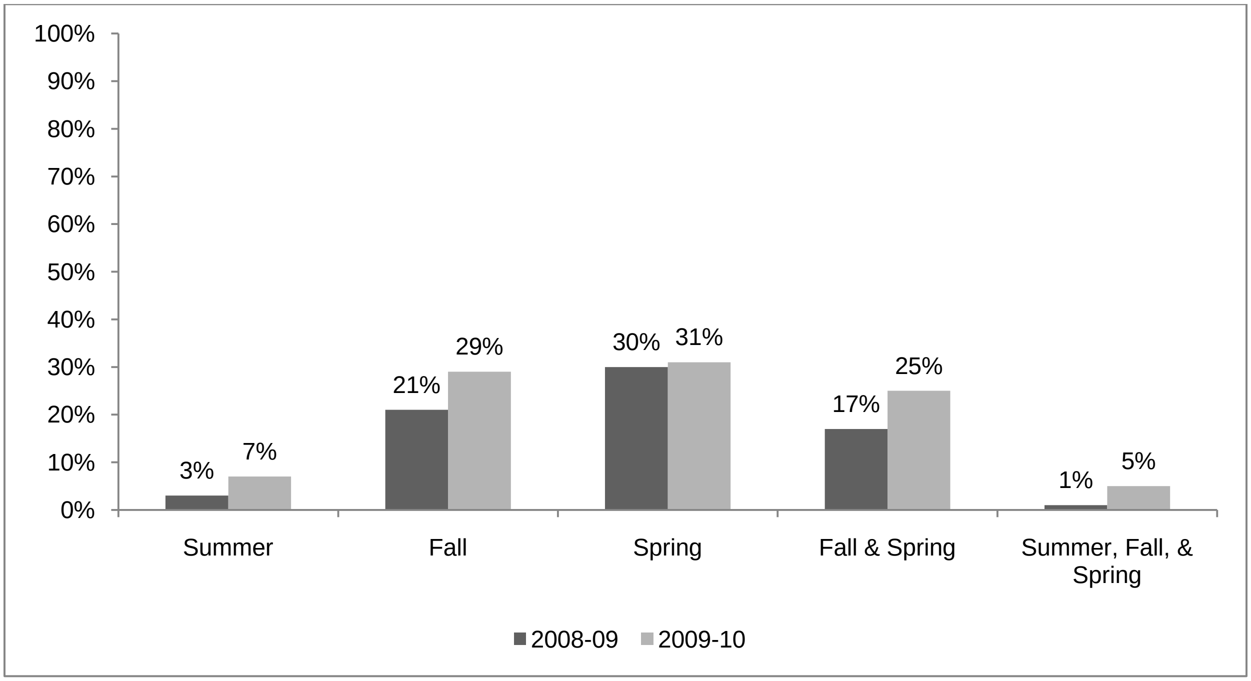

Figure 3.1. Percentages of students participating in R-Tech services by year and reporting period.
Sources: Public Education Information Management System (PEIMS) fall 2008, fall 2009, and fall 2010 snapshot data for the students attending the participating campuses; Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010.
Notes. 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 (N=43,680). 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 (N=42,931).
The summer 2009 percentage was based on the number of students in Grades 6 through 12 in the 114 R-Tech campuses as of the fall 2008 snapshot (N=44,556). Fall 2009 and spring 2010 percentages were based on the number of students in Grades 6 through 12 in the 114 R-Tech campuses as of the fall 2009 snapshot (N=44,939).

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 3.2 presents statistics about the extent of year 1 and year 2 student participation in R-Tech services across implementation periods, including the average and median[18] number of hours students received services each week, as well as the minimum and maximum number of weekly hours reported in student data uploads for each reporting period. Results indicate that R-Tech participation was most intense during summer school, with students receiving services for 4.2 hours on average each week in year 2 and 8.5

[18]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.

hours on average each week in year 1, relative to fall and spring participation that ranged from 2.6 to 3.8 average weekly hours. In all reporting periods except summer 2008, 50% of participants reported 2 or fewer instructional hours per week.

R-Tech participation levels were greater in year 1. For example, during summer 2008, students received services for 8.5 hours on average each week (compared to 4.2 hours each week in year 2). In fall 2008 and spring 2009, the average number of instructional hours were 3.7 and 3.8, respectively (compared with 2.8 and 2.6 hours each week in year 2).

Table 3.2
The Extent of Student Participation[a] in R-Tech Activities: Summer 2008, Fall 2008, Spring 2009, Summer 2009, Fall 2009, and Spring 2010

Participation Characteristic	Summer 2009 (N=3,292[b])	Fall 2009 (N=13,033[b])	Spring 2010 (N=14,089[b])
Year 2 (June 2009-May 2010)			
Average Number of Primary Instructional Hours	4.17	2.82	2.57
Median Number of Primary Instructional Hours	2.00	2.00	2.00
Minimum Number of Primary Instructional Hours	0.03	0.01	0.01
Maximum Number of Primary Instructional Hours[c]	> 20.00	> 20.00	20.00
Year 1 (June 2008-May 2009)	Summer 2008 (N=1,370[b])	Fall 2008 (N=8,795[b])	Spring 2009 (N=12,736)
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[c]	> 20.00	> 20.00	> 20.00

Source: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010.
[a]Extent of participation was based on the primary instructional hours reported in the student uploads.
[b]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[c]The number of reported instructional hours per week for some students exceeded 20 (1.1% of students in summer 2008, 0.6% in fall 2008, 2.3% in spring 2009, 0.03% of students in summer 2009, 0.07% in fall 2009, and 0.0% in spring 2010). These cases were likely reporting errors and were omitted from the computations presented in the table.

STUDENT IDENTIFICATION FOR R-TECH SERVICES

The fall 2008, spring 2009, and spring 2010 surveys of principals and R-Tech facilitators asked respondents how students were identified for R-Tech services. Survey results presented in Table 3.3 indicate that weak academic performance was the primary reason students participated in R-Tech, on average. Consistent with previous survey administrations, more than half of spring 2010 survey respondents indicated that students were identified for R-Tech because of poor TAKS performance (73%) or grades (64%), teacher referrals (55%), and performance on other tests (50%).

Table 3.3
Principals' and Facilitators' Perceptions of the Methods of Student Identification for R-Tech Services, as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Identifier	Fall 2008 Respondents (N=153)	Spring 2009 Respondents (N=136)	Spring 2010 Respondents (N=173)
Poor TAKS performance	82.4%	68.4%	72.8%
Poor grades	73.2%	58.1%	63.6%
Teacher referral	63.4%	55.9%	54.9%
Performance on other tests	46.4%	42.6%	50.3%
Parent/student interest	54.9%	33.1%	44.5%
Curricular need	26.1%	20.6%	23.7%
First-generation college student	5.2%	6.6%	9.2%
Other	15.7%	16.2%	13.3%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Notes. Percentages will not total to 100 because principals and facilitators were able to select more than one method of student identification. "Other" identification methods used in 2009-10 include: at-risk students, ESL students, or all students participate.

Similar to survey findings, R-Tech facilitators participating in interviews conducted as part of spring 2010 site visits in two districts indicated students were identified for R-Tech services based on academic performance, including low TAKS scores and failing grades. A facilitator in one district said, "We will take anybody and work with them," but clarified that if students "fail the TAKS test…[or] if they are failing at three weeks, then they are put into [R-Tech] tutoring…. It's practically mandatory." R-Tech facilitators in the second district reported that academic failure and the need for credit recovery were the primary reasons students were identified for R-Tech services.

However, not all site visit districts had programs targeted to at-risk students. One district identified ESL students for services and three districts had school-wide implementations, in which all students participated in R-Tech. As discussed in chapter 2, one district implemented a technology immersion program which provided laptops to all students and integrated technology resources into regular classroom instruction. Another district provided iPods to all students to supplement classroom instruction with videos and podcasts, and another district implemented a self-paced reading software program that all students accessed regularly in ELA classes.

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 second year. Results are presented separately for the 2009 summer session, and for the fall 2009 and spring 2010 semesters. Analyses consider the demographic characteristics of students who received R-Tech services, as well as participation by grade level.[19] Results compare students participating in R-Tech services to non-participants. Non-participants attended Grades 6 through 12 in the 114 campuses in the 63 districts that participated in the R-Tech program in 2008-09, but were not identified as actually participating in R-Tech services during the specified period. Comparable findings for year 1 are discussed in the sections that follow and are presented in tabular format in the evaluation's second interim report.

[19]Comparisons of student achievement data are included in chapter 5.

Summer 2009

Table 3.4 presents information about the characteristics of students who participated in R-Tech services, relative to students who did not, during summer 2009.[20] Relative to students who did not participate in R-Tech, summer 2009 participants were somewhat more likely to be White (66% vs. 62%), somewhat less likely to be Hispanic (24% vs. 28%), and less likely to be from economically disadvantaged backgrounds (36% vs. 48%). This is in marked contrast to year 1 summer participants. In year 1, relative to students who did not participate in 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%). The reason for this shift in participation in R-Tech services provided as part of summer school was not clear at the time of the report's writing.

Table 3.4
Characteristics of R-Tech Participants and Non-Participants: Summer 2009

Student Group	Participants[a,b] (N=2,992)	Non-Participants[c] (N=41,898)
African American	9.3%	9.3%
Hispanic	23.9%	27.5%
White	65.9%	62.1%
Other	0.9%	1.0%
Female	46.9%	48.4%
Male	53.1%	51.6%
Economically disadvantaged	35.8%	47.6%
Special education	10.4%	12.4%
Limited English proficient	2.6%	2.5%

Sources: Public Education Information Management System (PEIMS) fall 2008 snapshot data for the students attending the 114 participating campuses; Texas Education Agency (TEA) R-Tech student upload data: summer 2009.
[a]Students were considered to be participating if their reported primary instructional hours were greater than 0.
[b]There were 300 of the 3,292 summer 2009 participants who had missing demographic information. The percentages in the table were based on the 2,992 participants who had demographic information.
[c]Non-participants attended Grades 6 through 12 in the 114 campuses in the 63 districts that participated in the R-Tech program in 2008-09, but were not identified as actually participating in R-Tech activities in the summer 2009 data upload.

Fall 2009 and Spring 2010

Table 3.5 presents the characteristics of students who received R-Tech services, relative to those who did not, for the fall 2009 and spring 2010 reporting periods.[21] The characteristics of students participating in R-Tech during the regular school year were largely the same as non-participants. A small difference between participants and non-participants was a slightly larger percentage of economically disadvantaged students among participants. The characteristics of students participating during the regular school year (e.g., fall and spring semesters) in 2009-10 mirror the characteristics of students who participated during the regular school year in 2008-09 (see Table 4.5 in the evaluation's second interim report).

[20]Percentages of participants and non-participants were based on 2008-09 Grades 6 through 12 enrollments in the 114 participating campuses.
[21]Percentages of participants and non-participants were based on 2009-10 Grades 6 through 12 enrollments in the 114 participating campuses.

Table 3.5
The Characteristics of R-Tech Participants and Non-Participants: Fall 2009 and Spring 2010

Student Group	Fall 2009		Spring 2010	
	Participants[a,c] (N=13,033)	Non-Participants[b] (N=34,855)	Participants[a,d] (N=14,089)	Non-Participants[b] (N=33,881)
African American	8.1%	9.7%	9.0%	9.5%
Hispanic	25.1%	28.0%	27.3%	27.4%
White	65.0%	61.2%	61.9%	62.1%
Other	1.7%	1.0%	1.8%	1.0%
Female	47.2%	48.7%	47.4%	48.6%
Male	52.8%	51.3%	52.6%	51.4%
Economically disadvantaged	49.3%	46.9%	50.2%	46.5%
Special education	12.7%	12.2%	12.5%	12.2%
Limited English proficient	2.8%	2.4%	3.1%	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 114 campuses in the 63 districts that participated in the R-Tech program in 2009-10, but were not identified as actually participating in R-Tech activities in the data uploads.
[c]There were 190 of the 13,033 fall 2009 participants who had missing demographic information. The percentages in the table were based on the 12,843 participants who had demographic information.
[d]There were 357 of the 14,089 spring 2010 participants who had missing demographic information. The percentages in the table were based on the 13,732 participants who had demographic information.

Grade Levels Served by R-Tech

Table 3.6 presents information about the percentages of students participating in R-Tech by grade level and implementation period during the grant's second year (i.e., summer 2009, fall 2009, and spring 2010). For the most part, variations in the percentage of student participants by grade were minor across R-Tech's second year. Differences included proportionately more eighth graders than sixth graders participating. This was likely a function of districts' efforts to provide remediation and support to students transitioning to high school and to reduce middle school retention rates.

However, there were marked differences in year 1 and year 2 summer participation. In the second year, proportionately fewer middle school than high school students (39% vs. 61%) participated in the summer session. This was in marked contrast to year 1 when proportionately more middle school than high school students (65% vs. 35%) participated. Again, the reason for the shift in the types of students participating in R-Tech as part of summer school across implementation years is not clear.

Table 3.6
The Percentage of Students Participating in R-Tech by Grade: Summer 2009, Fall 2009, and Spring 2010

Grade Level	Summer 2009 (N=3,292[a])	Fall 2009 (N=13,033[a])	Spring 2010 (N=14,089[a])
6	5.6%	11.7%	10.3%
7	14.7%	16.0%	14.6%
8	18.7%	17.7%	15.9%
9	16.7%	15.0%	15.9%
10	15.7%	14.5%	16.3%
11	14.7%	13.4%	15.4%
12	13.9%	11.6%	11.5%
Total	**100.0%**	**100.0%**	**100.0%**

Sources: Public Education Information Management System (PEIMS) fall 2009 snapshot data for the students attending the 114 participating campuses; Texas Education Agency (TEA) R-Tech student upload data: summer 2009, fall 2009, and spring 2010.
[a]Students were considered to be participating if their reported primary instructional hours were greater than 0.

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

The sections that follow describe 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 and spring 2010 survey of students, the fall 2008, spring 2009, and spring 2010 survey of principals and R-Tech facilitators, student data uploads, as well as from information collected during spring 2010 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 surveys 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. Students responded *never*, *rarely*, *sometimes*, *often*, or *almost daily*. Table 3.7 presents students' spring 2009 and spring 2010 summed responses, sorted in terms of the "Spring 2010" column. Summed responses present the percentage of students responding *sometimes*, plus the percentage of students responding *often*, plus the percentage of students responding *almost daily* to given survey items.

Results indicate that across grant years, most surveyed students (78% in 2009 and 80% in 2010) accessed R-Tech services during regular class time, and more than a third of students in both survey administrations reported accessing services during regular class time *almost daily* (see Table C.3 in Appendix C). Many students also accessed R-Tech services at home using a home computer (71% in 2009 and 70% in 2010) and at school during a free period (49% in 2009 and 56% in 2010). Smaller proportions of students used R-Tech programs before (40% in 2009 and 37% in 2010) or after school (36% in 2009 and 39% in 2010), and were considerably less likely to use programs at these times *almost daily* (see Table C.3 in Appendix C). This may indicate that students experienced transportation barriers or scheduling conflicts which limited their use of resources before and after school.

Table 3.7
Students' Self-Reported Access to R-Tech Services, as a Summed Percentage: Spring 2009 and Spring 2010

Location and Time	Spring 2009 Respondents (N=2,993)	Spring 2010 Respondents (N=4,411)
At school during regular class time	78.0%	79.7%
At home using a home computer	71.1%	69.8%
At school during a free period	48.7%	55.5%
At school after classes are over	36.0%	39.3%
At school before classes begin	40.1%	37.3%
At school during lunch	21.6%	23.2%
At home using a school computer (laptop)	17.3%	20.5%
At a public library	16.6%	18.4%
Other	27.4%	27.6%

Sources: R-Tech Student Survey, spring 2009 and spring 2010.
Notes. Summed percentages consist of the percentage of students accessing services at the given time and place *sometimes* plus the percentage of students accessing services at the given time and place *often* plus the percentage of students accessing services *almost daily*. "Other" places and times students accessed R-Tech services included: at someone else's house, accessing the internet on a cell phone, at home, at another public building, often, using flip cameras or iPods, never, or on the bus.

What Students Study Using R-Tech Resources

As presented in Figure 3.2, the subject areas students studied using R-Tech resources remained largely consistent across grant years. In both years, the largest proportions of surveyed students studied math and reading/ELA; roughly similar proportions of students studied science, social studies and other subject areas (e.g., computer science); and relatively few students studied languages other than English using R-Tech resources.

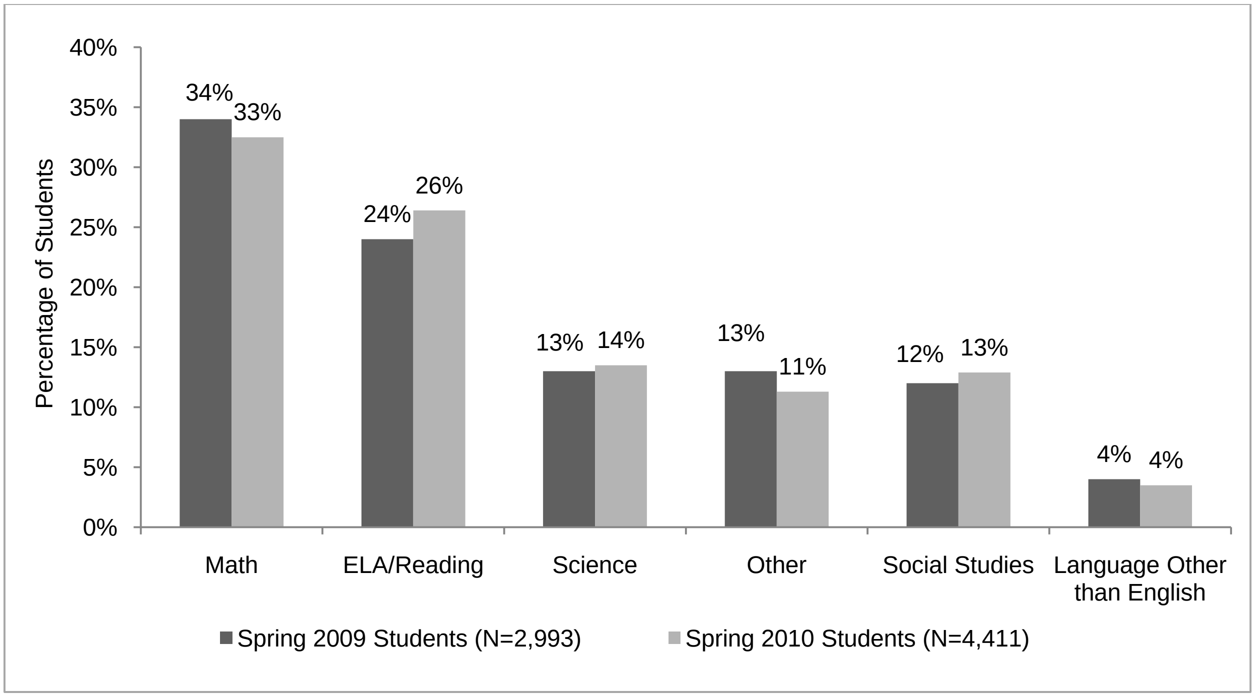

Figure 3.2. The subject areas students study using R-Tech resources, as a percentage of survey respondents: spring 2009 and spring 2010.
Sources: R-Tech Student Survey, spring 2009 and spring 2010.
Note. "Other" subjects included electives, technology courses, advanced or specific subject area courses, all courses, remedial courses, and health.

FACILITATING STUDENT PARTICIPATION IN R-TECH

As noted in previous sections, programs which overcame barriers to student participation by increasing the accessibility of R-Tech services during the school day or at home experienced greater levels of student participation. 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, spring 2009, and spring 2010 survey of principals and R-Tech facilitators.

Barriers to Student Participation

The fall 2008, spring 2009, and spring 2010 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 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 3.8 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.)

Across survey administrations, respondents indicated that student resistance, transportation challenges, and conflicts with other activities, such as athletic and extra-curricular programs and students' home and work responsibilities, created the greatest barriers to participation in R-Tech. Some barriers related to conflicting activities appear to have diminished over time, which may reflect a trend toward implementing R-Tech as part of regular instruction in some districts (see Figure 3.3 below). Increased implementation of R-Tech during the regular school day may also explain the reduction in parent resistance from fall 2008 to spring 2010. As noted in the evaluation's second interim report, some parents objected to R-Tech as a supplemental program because of the transportation and childcare challenges created when students were unable to take buses home or were unavailable to care for younger siblings after school.

Table 3.8
Principals' and Facilitators' Perceptions of the Moderate and Substantial Barriers to Student Participation in R-Tech Services, as a Summed Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Moderate/Substantial Barriers (summed percentages)	Fall 2008 Respondents (N=153)	Spring 2009 Respondents (N=136)	Spring 2010 Respondents (N=173)
Student resistance	30.7%	35.3%	34.9%
Transportation	31.4%	27.2%	31.4%
Conflicts with athletic programs	24.2%	30.9%	22.9%
Conflicts with student employment	24.2%	20.6%	19.3%
Conflicts with school-sponsored extra-curricular activities	23.6%	26.5%	15.6%
Conflicts with students' responsibilities at home	NA	NA	14.4%
Conflicts with non-school extra-curricular activities	12.4%	20.6%	13.2%
Parent resistance	11.2%	8.0%	8.4%
Students' lack of technology proficiency	NA	NA	8.4%
Other	24.0%	36.3%	16.7%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Notes. 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. "Other" barriers include student maturity, lack of access to technology at home, and items listed above (i.e. transportation and student responsibilities). NA=Not applicable. This item was not included on the fall 2008 or spring 2009 surveys.

Overcoming Barriers

The spring 2009 and 2010 surveys of principals and R-Tech facilitators also asked how schools overcame barriers to student participation and provided respondents with a list of possible strategies for overcoming barriers. Figure 3.3 presents the percentage of survey respondents indicating that each strategy was used. Across both survey administrations, the largest percentages of respondents indicated that schools expanded available times and locations for student access and required participation of some students. In response to findings from spring 2009 surveys,[22] the item asking whether R-Tech was implemented as part of regular instruction was added to the spring 2010 survey. Nearly half (47%) of spring 2010 respondents indicated that R-Tech was included as part of classroom instruction as a means to increase student participation.

[22]Many respondents to spring 2009 surveys indicated that R-Tech was implemented in regular classroom instruction in open-ended survey items in which respondents entered written comments.

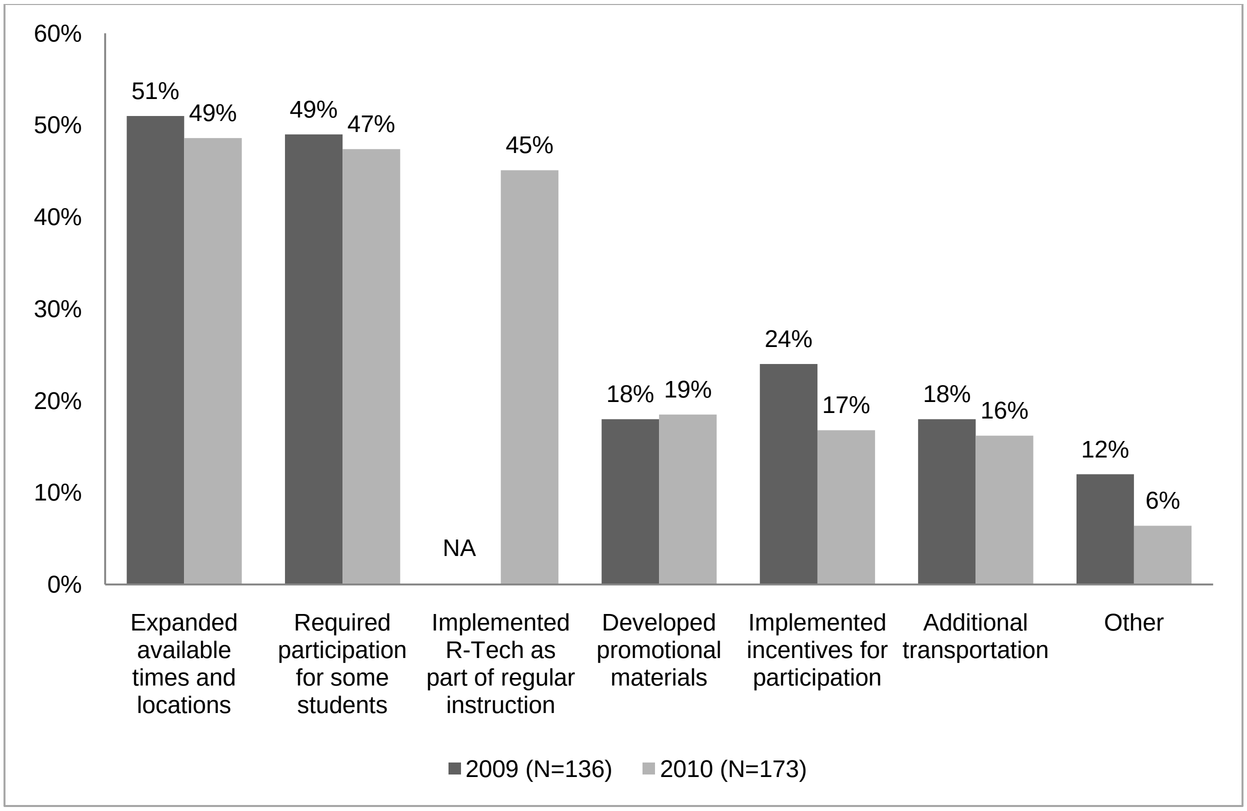

Figure 3.3. Strategies for overcoming barriers to student participation: spring 2009 and spring 2010.

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.

Notes. Percentages will not total to 100; respondents were able to indicate multiple strategies. NA=Not Applicable. The item "Implemented R-Tech as part of regular instruction" was added to the spring 2010 survey, so responses are not available for spring 2009. "Other" strategies included those listed above (i.e. expanding available times and developing promotional materials), acquiring additional resources to increase interest, and strategies to overcome technical challenges.

Few participants in interviews and focus group discussions conducted as part of spring 2010 site visits noted barriers to student participation. Notably, two site visit districts implemented R-Tech services during regular class instruction. Another two districts implemented R-Tech using iPods to provide instructional content that students could access anywhere. However, one site visit district that implemented a self-paced remediation program offered before and after school experienced limited student participation because bus schedules precluded many students from arriving early or staying late. To offset transportation challenges, the district planned to incorporate R-Tech into the regular school day in the future.

THE BENEFITS OF STUDENT PARTICIPATION IN R-TECH

Students participating in spring surveys 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 disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), and *strongly agree* (10) as a means to clearly illustrate variations in students' levels of agreement. Table 3.9 presents students' mean responses, sorted in terms of the "Spring 2010" column. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Results presented in Table 3.9 indicate students experienced a range of benefits from R-Tech participation. In both spring 2009 and spring 2010, students reported the highest levels of agreement with the statements indicating that technology allowed them to work at their own pace, made learning more interesting, and enabled them to learn more, and focus on areas of need. Across survey administrations, students consistently had the lowest levels of agreement with statements indicating participation in R-Tech improved their grades and enabled them to make up missed coursework or to participate in distance learning opportunities.

Table 3.9
Students' Level of Agreement with Statements about the Benefits of R-Tech Participation, as a Mean of Respondents: Spring 2009 and Spring 2010

Statement	Spring 2009 Respondents (N=2,993)	Spring 2010 Respondents (N=4,411)
Technology resources allow me to work at my own pace.	4.2	4.5
Technology resources make learning more interesting.	3.5	4.2
I learn more when I use technology resources.	3.4	3.6
Technology resources allow me to focus on the areas where I need extra help.	3.0	3.3
I feel more confident about my school work since I started using technology resources to help me learn.	2.1	2.6
When I use computers to learn, I know right away whether I got a question right or wrong.	1.7	2.1
My grades have improved since I began using technology resources for learning.	1.4	1.7
Technology resources have allowed me to make up coursework I have missed.	0.7	1.2
Technology resources allow me to take classes taught by teachers who are not at my school.	-1.1	-1.2

Sources: R-Tech Student Survey, spring 2009 and spring 2010.
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.

The student survey also included an open-ended item in which students could enter comments describing what they liked most about learning with technology resources, and 90% of students (3,692 individuals) participating in the spring 2010 survey provided written comments. The sections that follow summarize common themes in students' written comments, focusing first on benefits included in Table 3.9 and then on other benefits described by students.

Self-Paced Programs

Many students (11% of open-ended comments) pointed to the individualized pace and instruction of R-Tech programs as a primary benefit of participation. One student explained, "It's on an individual basis. Most teachers can [try to] focus on individuals, but it's hard to keep up with their specific talents and needs. Technology can do those things." Similarly, another student wrote, "I like that I do not have to sit and listen to the teacher try to talk to everyone at once. With technology resources, I can get the one-on-one help that I need." Several students reported that individualized programs minimized the influence of other students' rushed or slow learning pace. "It's better than having someone…moving on when they think is best," wrote one student. The ability to "go back and relearn a lesson" at an individualized pace also increased some students' confidence. One student noted, "You can be on a computer instead of [answering] out loud and being made fun of if you don't have the right answer."

Interesting Programs

Consistent with findings presented in Table 3.9, many students entering written comments (14%) described R-Tech programs as an "interesting" and "fun" way to learn. One student reported, "[Technology resources] taught me that learning can actually be fun, exciting, and easy." A student participating in a self-paced, online R-Tech program appreciated the gaming format of instructional practice, writing, "They [the software] make the problems…like a game and it is really fun to do the work when they put it that way." According to another student, fun programs kept students focused and helped them "pay attention to the task at hand." One student attributed students' increased interest and focus to a generational culture of technology. "Kids my age relate better to technology because they have grown up around it," the student wrote. "We pay attention better when we use technology because we like it."

Improved Learning

Many students (16%) reported they learned "better" when using technology resources. One respondent noted that technology helped students "visualize more things than paper is able to do." Other students commented that technology resources helped them focus and concentrate better than regular classroom instruction, which improved their level of understanding. Some students using self-paced online programs indicated that the software explained concepts in a new way and introduced "easier learning methods than…teachers do." Students receiving laptops as part of technology immersion programs reported that they were able to learn more because they had greater access to informational sources online and software loaded on the computers allowed students to practice objectives and present what they had learned in new and interesting ways. One student wrote, "I like how technology resources have allowed us to expand what we can do and learn at school." Another student noted, "What I like best about technology resources is that you get to experience things that you wouldn't normally experience just by doing book-work or worksheets." Some students felt that technology resources allowed students to explore "different strategies for learning" and "new techniques for finding out the answers."

Focus on Areas of Instructional Need

Nine percent of students providing written responses noted that R-Tech instruction allowed them to receive additional instruction and practice on areas of need. For example, one student wrote, "It helps me…in the class where I need the most help…. I get more help in the subject that I am not very strong in. It is kind of like my own little teacher on the computer!" Another student appreciated the additional instruction as well, writing, "What I like best about using technology resources is that it gives me extra help on something I didn't understand when it was taught by the teacher [in the classroom]. It helps me understand things better."

Other Benefits of R-Tech Participation

In addition to the benefits listed in Table 3.9 and described above, students' written comments identified other benefits of R-Tech including expanded access to information, convenience, and new approaches to learning. These benefits are discussed in the sections that follow.

Expanded access to information. The largest proportion of students' written comments (21%) cited expanded access to information as the primary benefit to learning with technology resources. One student wrote, "What I like best about using these computers is that it helps you broaden your horizon on a lot of things." Another student agreed, writing "Technology makes me feel more connected to the world and important information." Students appreciated using "unlimited," resources that enabled them to access information beyond what was presented in class or that was more current than what was provided in textbooks. Many responses aligned with the feelings of a student who wrote, "I like that in just a matter of minutes—even seconds, you can find out almost anything you have ever wanted to know. Internet and computers have brought us closer to the world and people around us."

Convenience. Many students (19%), particularly those participating in technology immersion programs, liked the convenience that technology afforded, including typing papers and notes instead of hand-writing them, carrying fewer textbooks and school supplies to class, and easily organizing assignments on laptops. One student explained:

> I like the fact that I never have to get a hand cramp again because a lot of our work can now be done on the computer—if not all of it. It [the laptop] helps me keep things organized because I no longer have a million papers to keep up with—It's all on my laptop hardrive.

THE CHALLENGES STUDENTS EXPERIENCE PARTICIPATING IN R-TECH

The student surveys also asked about the challenges students may have experienced participating in R-Tech and contained a list of challenges students may have encountered in using technology for instruction. Researchers used the same approach to illustrate students' level of agreement, coding responses: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), and *strongly agree* (10). Table 3.10 presents students' average responses, sorted in terms of the "Spring 2010" column. Again, values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement. The survey also included an open-ended item asking students what they liked least about using technology for learning, and many students addressed challenges in their comments.

On average, students *disagreed* that they experienced challenges using technology for learning. Across survey administrations, students expressed the strongest disagreement with statements indicating that using technology interfered with extra-curricular activities, was boring, or challenging because teachers were not able to address problems. Students also disagreed that they experienced challenges participating in technology-based instruction offered before and after school. Although the information provided by principals and R-Tech facilitators in chapter 2 (see Table 2.7) indicate that conflicts with extra-curricular activities and students' inability or unwillingness to participate in services offered before or after school were barriers to implementation, students' responses may reflect the increasing tendency of districts to overcome these barriers by implementing R-Tech during the school day. However, it is also possible that students responding to the survey received services in schools that were effective in overcoming barriers. As discussed in Appendix C, just over a quarter (26%) of students who participated in services during R-Tech's second implementation year responded to spring 2010 surveys. It is likely that non-respondents may have experienced challenges that districts were not able to overcome.

Table 3.10
Students' Level of Agreement with Statements about the Challenges of R-Tech Participation, as a Mean of Respondents: Spring 2009 and Spring 2010

Challenges	Spring 2009 Respondents (N=2,993)	Spring 2010 Respondents (N=4,411)
Computer and other technology resources at my school are often slow or broken.	-0.1	0.1
My school's Internet connections are too slow or are often not working.	-0.5	-0.4
I have difficulty arranging to come to school early or to stay after school to use technology resources.	-0.7	-1.0
My teacher can't fix things when something is wrong with the technology resources I use for learning.	-1.4	-1.5
I am bored by the school work I do using technology resources.	-1.4	-1.9
Using my school's technology resources sometimes interferes with my extra-curricular activities.	-2.0	-2.3
The programs I need are not on the computer.	-2.8	-2.8
I have trouble getting my questions answered when I use technology resources.	-3.0	-3.3

Sources: R-Tech Student Survey, spring 2009 and spring 2010.
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.

Although averaged responses indicate that most students did not experience challenges participating in R-Tech, 71% of students (3,143 individuals) responding to the spring 2010 survey provided written comments describing challenges they experienced using technology for learning, including system challenges, lack of technical experience, software challenges, general disinterest, and dissatisfaction with instruction. The sections that follow summarize students' comments.

System Challenges

Although responses presented in Table 3.10 indicate that students generally had mixed levels of agreement and disagreement (means are close to 0) with statements describing slow and broken technology resources, the largest proportion of students' written comments describing what they disliked about using technology resources (38%) addressed system challenges. One student described school computers as "prehistoric" and many students across campuses reported that computers and other technology resources were often broken. In addition, students indicated that school Internet connections were incapable of handling the increased traffic R-Tech services demanded. Several students felt that technology was not "trustworthy" and one student wrote, "You cannot really depend on technology because you never know when it will work or quit working."

Many students participating in technology immersion programs expressed frustration that the unreliable technology negatively affected their ability to complete assignments. For example, one student wrote:

> We only have limited time in each class, and when the technology we're using is the cause of why I can't finish or find the answers quick enough, it makes me just want to put my computer away and use a textbook so I can at least try and finish what I'm working on.

Students noted that the inability to finish assignments not only affected their ability to learn the required content, but also affected their grades. "Sometimes the network loads slowly and by the time you get to start the [assigned] assessment, the class is over and you receive a zero for the day," explained a student. Another student reported that teachers' dependence on unreliable technology often resulted in wasted instructional time. "My least favorite thing about the technology resources is when things break and we have nothing to do because the teachers have all their lesson plans revolving around the technology." A student using a laptop as part of a technology immersion program disliked the responsibility and liability of paying for damages required when schools integrate technology into classroom instruction. The student wrote:

> I don't like when it [the laptop] is really slow and starts messing up and you have to take it down to the lab and they tell you something is wrong with it and it's going to cost you $250 just to get it fixed. I mean a lot of people don't have that kind of money just to get a computer fixed for school when we could still be using books.

Lack of Experience Using Technology

About 10% of students providing open-ended comments lacked experience with technology and many described schools' newly acquired hardware as "confusing." One such student wrote that the computers had "too many buttons." Another inexperienced student explained, "Sometimes it's confusing what, or how, to use the new or modern technology that we have in today's world." A student in a laptop immersion program wrote, "It [school-provided laptop with Internet access] has too many things you have to go in. [It] gets me confused sometimes—big words that I have never heard and devices I have never seen." Students lacking experience with the Internet expressed frustration with the "tons of choices [sites] to choose from" and, as one student explained, "You don't know which one to pick." Another student warned of the "wide variety of false or misleading information that can be displayed as accurate [on the Internet]." Several students wrote that their inexperience affected their ability to focus on instruction and learn. "Your mind is on how to run technology and learning," wrote one student, "In the classroom, without computers, your mind is on learning all the time."

Challenges Using R-Tech Software

Some students (about 8%) wrote that they disliked software programs implemented as part of R-Tech, particularly programs that focused on providing tutoring and support for TAKS. Several students reported frustration because the programs' questions and test-taking processes did not mirror those of the TAKS test. For example, one student wrote, "I don't like the fact that you can't go back and change your answer like you can on TAKS." Another student was frustrated by short-answer question formats on the software program. Unlike the TAKS test, the questions required students to accurately spell the answer in order to get credit. "When you put in an answer, it has to be the exact word," the student wrote. Another student wrote:

> I completely dislike how they [software] have the algebra set up. It's hard to learn math the way they have it…[Also,] I wish the program could tell you which ones [problems] you got wrong so I can figure out where the problem is instead of having to search, and redo every problem.

General Disinterest

Some students entering written responses (about 7%) described R-Tech programs as "boring." One student participating in an online, self-paced program disliked "doing the same thing everyday" because it "gets really, really old." In addition, 6% of respondents (178 students) indicated they liked using technology but disliked using it as an instructional tool. A student using a laptop as part of a technology immersion program wrote, "It [the laptop] makes it harder for me to stay on task because it just makes you want to look at your photos or take photos with your friends [using software loaded on the computer]." Similarly, another student wrote, "I cannot concentrate 100%" and admitted to "sneak[ing] out to [his/her] friends' blogs and stuff" instead of focusing on instruction.

Ineffective Instruction

Notably, about 5% of students providing written responses disliked learning with technology. Many such students missed the personal attention and interaction provided by teachers. “[I dislike] the lack of person-to-person contact,” wrote one student. “I believe I understand the material better when I have a teacher helping me along.” Several students felt isolated using self-paced, online software programs. One student explained:

> I am more [of a] teacher-taught [person], rather than a “Here you go, do it yourself [person.]” It has to be hands-on for me. I don’t comprehend as much [using the programs] as I would if I was being taught [in a regular classroom].

Another student felt that it was impossible for a computer program to know what content and instructional style “would be best for you,” the way a teacher who has created personal relationships with students could, and another wrote that students “have to teach [themselves] how to do the work.” “ I do not like that once we start doing things on the computer that is all we do,” noted yet another student, “I still like…traditional learning.”

SUMMARY

This chapter’s results indicated that student participation in R-Tech services increased over the 2-year grant period, but that the amount of time students spent accessing resources decreased across implementation years. Responses to the spring 2010 survey indicated that principals and R-Tech facilitators attempted to reduce barriers that limited students’ access to R-Tech services by expanding available access times and locations and by incorporating R-Tech into regular classroom instruction. Students participating in R-Tech programs described numerous benefits. Students appreciated the ability to access a broad range of resources and to connect with places and people beyond their rural communities. Students also indicated that technology resources were interesting and helped them learn more than traditional instruction. In addition, struggling students reported that self-paced, online programs provided individualized instruction which focused on their areas of need.

Although students indicated they experienced fewer challenges participating in R-Tech as compared to the first year of implementation, many students indicated that slow or broken hardware and Internet connections still hindered their ability to access services or complete assignments in 2010. Students also cited lack of experience with technology, dissatisfaction with software programs, and general disinterest as challenges to learning with technology resources. Notably, some students described technology resources as ineffective tools for instruction and expressed an interest in maintaining traditional classroom instruction.

CHAPTER 4
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 across the 2-year grant period 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, spring 2009, and spring 2010 online surveys of teachers and principals in R-Tech districts, as well as information gathered through site visit interviews with principals and focus group discussions with teachers conducted in six R-Tech districts in spring 2010 (the conclusion of the grant period). 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.

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

The 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 survey items in fall 2008 (18% of principals), 40 entered responses in spring 2009 (35%), and 51 entered responses in spring 2010 (44%). The sections that follow summarize principals' responses. Note that the percentages of principals indicating particular themes for each survey administration will not total to 100 because many principals included multiple themes within a single response.

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 survey, responses to the spring 2009 survey reflected an increased understanding of the R-Tech program and an increased focus on student outcomes. A third of principals responding in spring 2009 (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 suggested 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.[23] Principals also cited improved student achievement outcomes (55%) and classroom observations (18%) as indicators that goals had been achieved.

Spring 2010

In spring 2010, principals expressed interest in integrating technology into classroom instruction (44%) and using technology resources to improve the quality of instruction (34%). One principal wrote, "[I want R-Tech] to make the teachers more aware of…how technology can enhance their teaching." Some principals noted that they expected R-Tech to improve teachers' ability to meet students' needs (37%), differentiate and individualize instruction (12%), and increase student achievement (7%). Principals wrote that R-Tech should "help [teachers] identify student weaknesses and provide remediation," "assist…with intervention and re-teach opportunities," and "provide students more opportunities for differentiated instruction."

Many principals (69%) intended to measure R-Tech's effectiveness in meeting goals through the evaluation of student achievement data, including program reports, classroom grades, and TAKS data. Principals also cited classroom observations and walk-throughs (55%) as the means by which they would know teacher goals had been met, and 24% of principals reported they would evaluate teachers' lesson plans.

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[23]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, fall, and spring of each grant year.

Principals' responses to open-ended items across survey administration periods reflect increasing awareness of the grant, its goals, and its potential to improve academic outcomes. Principals' comments also suggest that more principals expected teachers to incorporate technology resources into their instruction, which may reflect the tendency of some districts to incorporate R-Tech into classroom instruction in order to improve student participation in grant-provided services. Similar to findings reported in the evaluation's second interim report, principals considered student achievement outcomes, including TAKS scores, as the primary indicators of R-Tech effectiveness.

Teacher Awareness of the R-Tech Program and Its Goals

The R-Tech teacher surveys (fall 2008, spring 2009, and spring 2010) included items that gauged teachers' awareness of the R-Tech program and its goals. Researchers coded their responses: *strongly disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), and *strongly agree* (10) as a means to clearly illustrate variations in teachers' levels of agreement. Table 4.1 presents teachers' mean responses, sorted in terms of the "Spring 2010" column. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

As presented in Table 4.1, across survey administrations, teachers expressed low levels of agreement with statements about R-Tech's goals, which may indicate that most teachers lacked familiarity with the grant. Response patterns across survey administrations point to the impact of greater response rates in fall 2008 and spring 2010. That is, teachers' responses in spring 2010 tend to mirror those of fall 2008. In contrast, the notably smaller number of teachers responding in spring 2009 reported somewhat higher levels of agreement with all statements. This pattern may indicate that the group of teachers who responded in spring 2009 was more involved in the R-Tech program on their campuses. This reasoning is supported by results presented in Table B.4 in Appendix B that indicate that relative to spring 2009 respondents teachers participating in fall 2008 and spring 2010 surveys were more likely to indicate that they "didn't know" their level of agreement with each statement included in Table 4.1.

Despite differences in levels of agreement, the ranking of responses in terms of strength of agreement remained constant across survey periods. Across survey administrations, teachers had the highest levels of agreement with statements indicating satisfaction with R-Tech services and that the program positively affected students and the lowest levels of agreement with statements indicating goals were clearly communicated and that teachers considered students' Personal Education Plans when planning classroom instruction.

Table 4.1
Teachers' Levels of Agreement: R-Tech Goals and Outcomes, as a Mean of Respondents: Fall 2008, Spring 2009, and Spring 2010

Statements about Goals	Fall 2008 Respondents (N=1,213)	Spring 2009 Respondents (N=568)	Spring 2010 Respondents (N=1,377)
Overall, I am pleased with the services provided by R-Tech.	2.1	2.8	2.4
R-Tech is positively affecting student achievement on campus.	2.1	2.8	2.3
Vendor services are aligned with the TEKS/TAKS.	2.1	2.6	2.1
Vendor services are aligned with our campus goals.	1.9	2.2	1.7
Goals are clearly communicated.	1.0	1.4	1.0
I use information from students' Personal Education Plans when I plan classroom instruction.	0.1	0.2	0.1

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
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.

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.[24] Teachers participating in evaluation surveys indicated whether they participated in training related to R-Tech services. Relative to year 1 a smaller proportion of surveyed teachers (28% in spring 2010 vs. 38% in spring 2009) reported participation in R-Tech training in year 2, which may indicate that training was concentrated in the grant's first year.

Types of R-Tech Professional Development Offered

Only 28% of teachers (392 individuals) responding to the survey reported that they had participated in R-Tech training during the 2009-10 school year, while 39% of teachers were unsure. These findings support results presented in Table 4.1, indicating teachers' limited awareness and participation in the R-Tech program. Teachers responding to the survey who had participated in R-Tech training identified the professional development content they received during the school year. As presented in Table 4.2, most respondents participated in training related to TEKS/TAKS preparation (69%), using instructional hardware (68%), working with at-risk students (67%), integrating technology in instruction (53%), and aligning curriculum (52%).

Responding teachers who participated in R-Tech training (392 individuals) also described the format of professional development opportunities, indicating whether the trainings were conducted *onsite, offsite,* or *online*. A majority of teachers (86%) participated in *onsite, in person* training (see Table B.5 in Appendix B).

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[24]For more information on the types of professional development included in district grant applications, please see the evaluation's second interim report (p. 72).

Table 4.2
Content of Professional Development, as a Percentage of Teachers Participating in R-Tech Professional Development: Spring 2009 and Spring 2010

Professional Development	Spring 2009 Respondents (N=215)	Spring 2010 Respondents (N=392)
TEKS/TAKS preparation	68.4%	69.1%
Using instructional technology hardware	58.9%	68.1%
Serving at-risk students	65.4%	67.1%
Facilitating technology-based instruction	64.4%	53.1%
Curricular alignment	53.9%	52.3%
Introduction to software	67.2%	29.3%
College readiness preparation	19.1%	18.1%
Study groups	24.2%	18.1%
Online training	21.0%	10.7%
Course for college credit	7.7%	9.4%
Visiting another district	17.5%	7.1%

Sources: R-Tech Teacher Survey, spring 2009 and spring 2010.
Note. Percentages will not total to 100. Teachers indicated multiple topics for R-Tech professional development.

Teachers' Perceptions of R-Tech Professional Development

In response to the spring 2010 survey, teachers who indicated they had received R-Tech professional development were provided with space to enter written comments describing the aspects of the training that they felt were *most* and *least* useful. Researchers coded written entries to identify common themes across responses and calculated the percentage of responses by theme (see Tables 4.3 and 4.4). 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 392 teachers who reported participating in R-Tech training in spring 2010, 54% (212 teachers) entered written responses describing the aspects of training that they felt were most useful. Table 4.3 presents teachers' responses for spring 2010 along with teachers' responses to the spring 2009 survey. Results for spring 2010 indicate that similar proportions of teachers found introductions to R-Tech software (26%) and new hardware (23%), as well as learning how to integrate new technology into classroom instruction (22%) to be the most useful R-Tech training. These findings are largely consistent with teachers' 2009 responses.

Table 4.3
Teachers' Perceptions of the Most Useful Aspects of R-Tech Professional Development, as a Percentage of Respondents: Spring 2009 and Spring 2010

Most Useful Aspect	Spring 2009 Respondents (N=147)	Spring 2010 Respondents (N=212)
Becoming acquainted with the program/software	25.9%	25.5%
Learning to use new hardware	17.0%	23.1%
Learning how to integrate technology into instruction	28.6%	22.2%
Hands-on practice	12.2%	19.8%
Recognizing the benefits for students	11.6%	11.3%
Receiving new information: program/system updates, new instructional techniques, etc	NA	10.0%
Face-to-face assistance with trainers and other teachers	10.2%	9.0%
How to use reports and data to monitor students' progress	4.8%	NA
How to relate programs to TAKS	4.1%	NA
Learning about the R-Tech pilot	3.4%	NA

Sources: R-Tech Teacher Survey, spring 2009 and spring 2010.
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. NA indicates that no teacher responses addressed the theme in the specified survey administration period.

During focus group discussions conducted as part of spring 2010 site visits, teachers provided more information about what they found useful about training. Teachers working in two districts implementing self-paced programs appreciated refresher courses providing information about software updates. One teacher said, "[The training] keeps us up on anything new—any changes that are made." Another teacher agreed that review sessions were helpful because teachers often forgot information as the year progressed. At another school, teachers appreciated learning how software could monitor student progress and discourage cheating. Teachers working in two districts integrating R-Tech resources in classroom instruction commented that content-specific training that was applicable to instruction was the most useful aspect of training. One teacher said the "practical, hands-on ideas that [teachers] could actually use in [the] classroom with…students" was the most valuable aspect of training. Another teacher agreed, "You got to pick what you knew you were going to use [in your classroom] and experiment with it, and they [the vendors] were there to help you with it."

The least useful aspects of R-Tech professional development. Only 29% of teachers who reported participating in R-Tech professional development during the 2009-10 school year (115 individuals) entered written comments describing the least useful aspect of training. The largest proportion of these teachers (37%) wrote that all aspects of training were useful. One such teacher explained, "I found both meetings [training sessions] useful and could not criticize any aspect of the format, content, or presenters." About 11% of teachers wrote that the training did not apply to their subject area. About 10% of teachers noted that time constraints and scheduling challenges made it difficult to participate in training. Teachers attending trainings at three schools described the time of year as a barrier to successful training. One teacher participating in training prior to the start of the school year noted that it was difficult to "recall how to implement the program" later in the year.

Table 4.4
Teachers' Perceptions of the Least Useful Aspects of R-Tech Professional Development, as a Percentage of Respondents: Spring 2009 and Spring 2010

Least Useful Aspect	Spring 2009 Respondents (N=67)	Spring 2010 Respondents (N=115)
Nothing; all training was useful	NA	37.4%
Content not relevant to field of instruction	26.9%	11.3%
Time; schedule	NA	10.4%
Not enough practice/hands-on opportunities	4.5%	7.8%
Hardware problems hindered practicing with program	4.5%	6.1%
Program glitches or not content with program	7.4%	5.2%
Not enough in-depth information	19.4%	5.2%
Already familiar with the program	6.0%	4.3%
No follow-up	6.0%	4.3%
Want more general technology instruction; not program-specific	NA	4.3%
Techniques to integrate technology in classroom instruction	NA	3.5%
Too much material in a short period of time	11.9%	0.8%

Sources: R-Tech Teacher Survey, spring 2009 and spring 2010.
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. NA indicates that no teacher responses addressed the theme in the specified survey administration period.

Teachers participating in spring 2010 focus groups provided responses consistent with results presented in Table 4.4. Across campuses, most teachers found R-Tech training to be useful, but teachers working in two districts noted that the training was provided too early in the year, and many teachers forgot what they learned. One teacher explained, "[The training was] right at the beginning of the school year…. The reason I don't remember it is because at the beginning of the school year, you are trying to get ready for classes…and that [R-Tech training] is not one of your priorities." Another teacher agreed, stating, "If I don't use it fairly quickly, then I am going to have to go get help to do it [later in the year]."

R-TECH EFFECTS ON TEACHERS

Across survey administrations, teachers responded to an item asking how R-Tech may have affected their professional growth and instruction. The survey included a list of statements about the effects of R-Tech and asked teachers 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 disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), and *strongly agree* (10) as a means to illustrate variations in teachers' levels of agreement. Table 4.5 presents teachers' mean responses. Values closer to 10 indicate higher levels of agreement and values closer to -10 indicate higher levels of disagreement.

Results presented in Table 4.5 indicates that teachers generally had the highest levels of agreement with statements indicating they had greater awareness of technology-based instruction and opportunities to participate in professional development. Teachers had lower levels of agreement with statements indicating that R-Tech affected teaching and lesson planning. As noted earlier in this chapter, the higher rates of agreement for teachers in spring 2009 is likely the result of a smaller number of teachers responding to the survey and greater familiarity with R-Tech among spring 2009 respondents. This thinking is supported by results presented in table B.6 in Appendix B that indicate that across statements included in Table 4.5, larger proportions of fall 2008 and spring 2010 respondents "didn't know" if they had experienced the effect relative to spring 2009 respondents.

Table 4.5
Effects of R-Tech Implementation on Teachers, as a Mean of Respondents by Semester: Fall 2008, Spring 2009, and Spring 2010

Effects	Fall 2008 Respondents (N=1,213)	Spring 2009 Respondents (N=568)	Spring 2010 Respondents (N=1,377)
I have a greater awareness of technology-based learning opportunities for students.	2.6	3.3	3.0
I have the opportunity to participate in technology-based professional development.	2.6	2.8	2.7
My technical skills and abilities have improved.	2.1	2.7	2.5
I have a better understanding of the needs of at-risk students.	1.8	2.3	2.2
My teaching has improved.	1.7	2.2	2.0
My lesson plans have improved.	1.4	1.8	1.6

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
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.

The survey also included an open-ended item in which teachers may have entered written comments describing the effects of R-Tech. Only 5% of teachers responding to the survey (71 individuals) entered written comments. Of these, 18% indicated there were no effects for teachers and 15% cited challenges created due to program participation. However, 20% of teachers providing written comments (14 individuals) noted that student engagement increased when instruction included technology resources.

Additional Opportunities for Teachers

Teachers participating in site visit focus groups provided comments addressing additional opportunities and benefits created by R-Tech participation. According to responses, R-Tech provided teachers increased access to technology and the ability to engage students, individualize instruction, monitor data, and enhance classroom instruction.

Increased access to technology. During the first year of implementation, many schools used grant funds to upgrade their instructional technology and furnish new computer labs. Some teachers participating in 2009 focus group discussions indicated that technology in their schools prior to the grant was "antiquated" and cited increased access to modern, working technology as a primary benefit to their school's participation in the R-Tech grant (see page 77 in the evaluation's second interim report). In 2010, focus group participants were less likely to cite new hardware as a benefit provided by R-Tech participation, likely because they had grown accustomed to the resources. Instead, 2010 focus group participants were more likely to describe the professional growth resulting from increased access to technology. One high school teacher participating in a technology immersion program reported that teachers were "a little bit more literate with the use of technology." Another teacher agreed, noting, "[Teachers] learn how to use technology…when we're forced to."

Increased student engagement. As previously mentioned, the largest proportion of teachers (20%) responding to an open-ended survey item described increased student engagement as the primary benefit to R-Tech participation. Consistent with these results, teachers participating in two 2010 focus group discussions experienced increased student engagement using instructional technology. One middle school teacher stated, "So many times [during regular classroom instruction], we lose them. This [instructional technology] allows us that opportunity for a different approach." A high school teacher agreed, reporting, "You really open the door for students who [consider] computers…their thing."

Increased ability to individualize instruction. Teachers participating in four focus group discussions reported that self-paced, online programs allowed them to differentiate instruction because each student could access individualized lessons on a computer at the same time. One high school teacher stated, "In a classroom, it is *impossible* to deal with every student individually. Using [program name], I am able to actually devise an individual program." A middle school teacher reported, "We can target [each student's] core areas of need." Additionally, another middle school teacher indicated that the online program addressed some students' learning styles more effectively than regular classroom instruction. "A lot of times, doing it [a lesson] paper-and-pencil doesn't help my kids, so taking them to the computer lab and having a different way of looking at it helps some of them," the teacher said.

Increased ability to monitor student data and progress. Teachers attributed their ability to individualize instruction to the monitoring and reporting processes the self-paced, online programs provided. A middle school teacher stated, "It [program reports] made it to where you can track the growth…of the individual student."

Increased ability to enhance classroom instruction. Teachers participating in two focus group discussions indicated that integrating technology into regular classroom instruction allowed teachers to enhance their lessons. One high school teacher participating in a technology immersion program reported, "I think you can sometimes show things [with technology] that you could never show before. There's ways to enhance your curriculum that a flat page in a book can't do." A geography teacher at the same school agreed, "I like the instant access. In geography, we can go to GoogleEarth and look at any place we want instantly." Teachers participating in an R-Tech program which provided iPods to all district students noted that the technology allowed students to view videos which supported classroom instruction and "visualize things…they couldn't [without the iPods]." Since the iPods do not require an internet connection, teachers also assigned videos outside of class. "I love that I don't have to spend a class day showing a video… I don't have to waste class time. They [students] can still see that video and get what I want [them to] out of it," said one teacher.

SUMMARY

Principals responding to the spring 2010 survey indicated that they expected teachers to integrate technology resources as a means to improve classroom instruction. However, survey results suggest that teachers had limited participation in the R-Tech programs implemented on their campuses. Teachers reported they were unaware of R-Tech goals and services, on average, and few surveyed teachers participated in R-Tech professional development. In addition, teachers felt that R-Tech had a limited impact on classroom instruction.

Most teachers who participated in R-Tech professional development activities indicated that training focused on preparing students for TAKS, using technology resources for instruction, and serving at-risk students. Teachers reported that training improved their ability to use technology for instruction and that they appreciated the opportunity to get hands-on practice with R-Tech resources. Teachers who were dissatisfied with R-Tech professional development opportunities reported that training content did not match their teaching fields or that training provided at the beginning of the school year was often forgotten as the year progressed.

CHAPTER 5
R-TECH STUDENT OUTCOMES

A central consideration of the evaluation is whether R-Tech services affect student outcomes, including performance on standardized tests and attendance rates (Research Question 4). 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. Recognizing this limitation, the evaluation also considers the effect of R-Tech on attendance rates because there is a well established positive relationship between attendance and academic outcomes. That is, students who have better attendance also tend to have higher achievement levels (see e.g., Roby, 2003). As discussed later in this chapter, there are some variations in the evaluation's approaches to assessing R-Tech's effects on student testing and attendance outcomes, but both analyses seek to answer the following questions:

- Is there a relationship between supplemental and non-supplemental access to resources and student outcomes?
- Is there a relationship between R-Tech program configurations and student outcomes?
- Is there a relationship between the amount of time spent using R-Tech resources and student outcomes?

The chapter begins with a discussion of data sources and their limitations. It then presents descriptive information that compares the TAKS outcomes of students who participated in R-Tech (participants) to students who did not receive R-Tech services (non-participants), followed by the results of analyses assessing R-Tech's effects on students' TAKS scores and attendance rates. The chapter also considers R-Tech's relationship to students' advanced course completions, including dual credit and AP courses.

DATA SOURCES AND LIMITATIONS

The chapter incorporates a range of quantitative data sources. Analyses draw on students' testing outcomes, attendance rates, and demographic data included in PEIMS, as well as information included in district-provided student usage data. Recall that R-Tech districts submitted information on students' program participation for the fall and spring semesters during the 2008-09 and 2009-10 school years, as well as for the 2008 and 2009 summer sessions through a system of data uploads hosted by TEA. District reports included whether or not students participated in R-Tech, the primary methods or programs (e.g., self-paced instruction focused on remediation, dual credit/distance learning, etc.) students used to access R-Tech resources, and the primary academic area (e.g., reading/ELA, mathematics, social studies, science) students studied. Results from the evaluation's second interim report indicated that R-Tech was implemented somewhat differently during summer sessions. That is, many students, particularly at the middle school level, received intensive services in summer school as a means to ensure that they were able to matriculate to the next grade level in the subsequent school year. Because of differences in how R-Tech may have been implemented in summer school, the analyses presented in this chapter consider only those students who participated in R-Tech during the fall and/or spring semesters during the 2008-09 and/or 2009-10 school years. The sections that follow discuss some of the limitations of the chapter's data sources.

Availability of Student Outcome Data

Given variations in collection and reporting timelines for education data in Texas, the chapter's analyses of the effect of R-Tech on testing (i.e., TAKS) and attendance outcomes rely on information for different school years. The TAKS is administered in the spring of each school year, and testing results generally are available in the summer of each testing year. This means that the analyses of students' TAKS outcomes reported in this chapter use testing data for the 2009-10 school year and consider the full 2-year implementation period for R-Tech. Unlike testing information, attendance and course completion data for a given school year become available in the fall of the subsequent school year. At the time of this report's writing (summer 2010), the attendance and course completion data for the 2008-09 school year were the most current data available,[25] which means that the chapter's analyses of attendance and course completion outcomes are limited to R-Tech's first implementation year. Readers are asked to consider these differences when interpreting this chapter's findings.

TAKS Data: The Use of Scale Scores and *T* Scores

The TAKS is Texas' criterion-referenced assessment that measures students' mastery of the state's content standards, the TEKS, and while the evaluation benefits from having testing data for R-Tech's full 2-year implementation period, the use of TAKS data introduces some limitations that arise from the use of test scores.

Scale scores. Standardized testing outcomes are generally reported in scale scores. A scale score is a conversion of a student's raw score on a test and is used to control for variations in different versions of tests that may be administered. For example, multiple forms of the same test may be given in order to limit the likelihood of cheating. Scale scores are useful for "horizontal" comparisons of outcomes across students within the same grade (e.g., comparing the 2009 math outcomes of fifth grade students across a set of schools or districts) or the same grade across different testing years (e.g., comparing fifth grade math outcomes in 2008-09 and 2009-10). Sections of this chapter that describe students' progress toward meeting grade-level standards and make horizontal comparisons between R-Tech participants and non-participants in a particular grade level rely on TAKS scale sores.

***T* scores.** However, many scale scores are not useful for "vertical" comparisons of student outcomes (e.g., comparing the 2009 math outcomes of sixth grade students to the 2008 math outcomes of the same group of students when they were in the fifth grade) because performance standards on many tests differ from grade to grade. That is, tests are not vertically equated.[26] As a means to enable vertical comparisons of testing outcomes that are not vertically aligned, researchers often derive standardized scores that use standard deviation[27] units to compare outcomes across tests with differing performance standards. The HLM analyses of the effect of R-Tech on students' TAKS outcomes presented later in this chapter use a standardized score known as a *T* score. The transformation of TAKS scale scores to *T* scores provides a common metric for comparing the effect of R-Tech on students' testing outcomes across grade levels. [28]

Missing Data

The chapter's analyses of the effects of R-Tech on students' TAKS and attendance outcomes experience some additional limitations that arise because of missing data. For example, varying numbers of students identified for analyses were missing demographic information (e.g., gender, ethnicity, economic status, and LEP status), TAKS scores, and attendance data, and information about supplemental status and program type. (See Appendix F for a detailed description of the missing data issue for analyses of TAKS

[25]Attendance and course completion data for the 2009-10 school year will become available in fall 2010.
[26]TEA is in the process of vertically equating TAKS. In 2010, vertical scale scores were implemented for TAKS reading and mathematics at Grades 3-8. However, vertical scale scores were not implemented for TAKS writing at Grades 4 and 7, science at Grades 5, 8, 10, and 11, social studies at Grades 8, 10, and 11, reading/ELA at Grades 9, 10, and 11, and mathematics at Grades 9, 10, and 11.
[27]A standard deviation is a common measure of variability within a distribution. Generally speaking, the standard deviation represents the extent to which scores vary from their mean.
[28]The *T*-score distribution has a mean of 50 and a standard deviation of 10. On any given test, a student who scores at the state average will have a *T* score of 50. A student with a *T* score of 60 will be one standard deviation above the state average, while a student with a *T* score of 40 will be one standard deviation below the state average.

outcomes and Appendix G for a description of missing data for analyses of attendance outcomes). In recognition of this limitation, the chapter sections that present findings respective to each analysis include discussions of how missing data may affect the interpretation of outcomes.

PROGRESS IN MEETING TAKS STANDARDS

One approach to assessing the relationship between R-Tech and students' testing outcomes is to consider differences in students' progress toward meeting TAKS standards. The sections that follow compare the percentages of R-Tech participants and non-participants who have met (1) TAKS passing and (2) TAKS commended performance standards.[29] Students who have *met (or somewhat exceeded) TAKS standards* for a given test have a sufficient understanding of the knowledge and skills measured at the grade level and have demonstrated satisfactory performance. Students who have *met commended performance standards* on a given test have demonstrated high academic achievement by scoring well above the established passing standard. Achieving the commended performance standard is recognized as an indicator of college readiness in Texas.

The percentages of R-Tech participants and non-participants meeting each TAKS standard are presented at three points in time: (1) spring of 2008 (the baseline measure immediately prior to R-Tech instruction), (2) spring of 2009 (after 1 year of R-Tech implementation), and (3) spring of 2010 (after 2 years of R-Tech implementation). Presentations of outcomes also include the difference (measured in percentage points) between the students meeting each standard after 2 years of R-Tech implementation (2010) and the evaluation's baseline year (2008). The sections present results for each subject area at each grade level tested. These include:

- TAKS reading/ELA and mathematics at Grades 6, 7, 8, 9, 10, and 11;
- TAKS science and social studies at Grades 8, 10, and 11; and
- TAKS writing at Grade 7.

TAKS Reading/ELA

Table 5.1 presents results for TAKS reading/ELA outcomes for R-Tech participants and non-participants. In all but one case (Grade 10 in 2008), students who participated in R-Tech had lower TAKS reading/ELA passing rates than students who did not participate in R-Tech. The overall 2008 to 2010 passing rate change was similar for participants and non-participants (-1.0 percentage point vs. -0.8 percentage point). Participants had more positive 2008 to 2010 changes at Grades 7, 9, and 11. Non-participants had more positive 2008 to 2010 changes at Grades 6, 8, and 10.

R-Tech participants also had lower commended performance rates than non-participants across all 3 years and at all grade levels. The 2008 to 2010 commended performance rate change favored non-participants (a loss of -4.2 percentage points for participants vs. a loss of -0.7 percentage points for non-participants). Participants had more positive commended performance rate changes than non-participants at Grades 6 and 9, but less positive rate changes at Grades 7, 8, 10, and 11.

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[29]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.

Table 5.1
Percentages of R-Tech Participants and Non-Participants Meeting TAKS Passing and Commended Performance Standards for Reading/ELA

Standard/Test Level	Group	2008		2009		2010		2008-10 Difference
		N	%	N	%	N	%	
Met Passing Standard								
Grade 6	Participants	1,835	90.2	2,058	86.8	1,643	80.2	-10.0
	Non-Participants	1,732	96.2	1,760	94.0	2,274	88.8	-7.4
Grade 7	Participants	2,526	81.9	2,877	79.3	2,603	82.4	0.5
	Non-Participants	2,172	92.4	2,143	91.5	2,281	89.6	-2.8
Grade 8	Participants	2,203	92.9	3,009	89.1	2,793	88.0	-4.9
	Non-Participants	2,406	96.3	2,126	94.9	2,159	94.5	-1.8
Grade 9	Participants	3,120	88.1	3,193	86.9	3,072	93.0	4.9
	Non-Participants	3,868	89.2	3,868	90.1	3,963	93.1	3.9
Grade 10	Participants	2,556	90.8	3,256	86.5	2,856	88.1	-2.7
	Non-Participants	3,504	89.6	3,352	88.5	3,516	91.7	2.1
Grade 11	Participants	1,225	91.0	2,596	91.6	2,879	91.2	0.2
	Non-Participants	4,170	94.7	3,021	93.2	2,966	92.3	-2.4
All Grades	Participants	13,465	88.8	16,989	86.6	15,846	87.8	-1.0
	Non-Participants	17,852	92.6	16,271	91.6	17,159	91.8	-0.8
Met Commended Performance Standard								
Grade 6	Participants	1,853	37.4	2,058	30.3	1,643	19.9	-17.5
	Non-Participants	1,732	54.7	1,760	48.0	2,274	33.8	-20.9
Grade 7	Participants	2,526	24.5	2,877	20.7	2,603	22.9	-1.6
	Non-Participants	2,172	36.4	2,143	35.1	2,281	36.9	0.5
Grade 8	Participants	2,203	45.5	3,009	37.0	2,793	37.6	-7.9
	Non-Participants	2,406	56.7	2,126	54.1	2,159	55.1	-1.6
Grade 9	Participants	3,120	31.0	3,193	18.3	3,072	25.8	-5.2
	Non-Participants	3,868	32.8	3,869	22.7	3,963	27.4	-5.4
Grade 10	Participants	2,556	15.3	3,256	15.2	2,856	12.9	-2.4
	Non-Participants	3,504	16.6	3,352	17.6	3,516	16.9	0.3
Grade 11	Participants	1,226	15.8	2,596	25.3	2,879	26.1	10.3
	Non-Participants	4,173	18.6	3,021	29.1	2,966	30.9	12.3
All Grades	Participants	13,466	28.7	16,989	23.9	15,846	24.5	-4.2
	Non-Participants	17,855	32.1	16,271	31.3	17,159	31.4	-0.7

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008, 2009, and 2010 individual student data from TEA.
Note. All students attended a campus reporting students in at least one data upload (summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, or spring 2010). Participants took part in R-Tech instructional activities at one of the reporting campuses. Non-participants attended an R-Tech reporting campus but did not take part in R-Tech instructional activities.

TAKS Mathematics

Table 5.2 compares the TAKS mathematics performance of participating and non-participating students in R-Tech schools from 2008 through 2010. Similar to TAKS reading/ELA, these data represent two groups of students (participants and non-participants) at three points in time (spring 2008, spring 2009, and spring 2010). The table shows that students participating in R-Tech had markedly lower mathematics passing rates than non-participants. However, passing rate gains favored participating students. The overall gains were 8.1 percentage points for participants and 3.7 percentage points for non-participants. Participants had larger gains than non-participants at all grade levels except Grade 10.

Overall, students had greater difficulty meeting commended performance standards for mathematics compared to reading/ELA. As with TAKS reading/ELA, participants had lower commended performance rates than non-participants. The overall commended performance rate change favored non-participants (1.3 percentage points compared with 0.1 percentage points). At Grades 6 and 11, participants had more positive rate changes, while non-participants had more positive rate changes at Grades 7, 8, 9, and 10.

Table 5.2
Percentages of R-Tech Participants and Non-Participants Meeting TAKS Passing and Commended Performance Standards for Mathematics

Standard/Test Level	Group	2008		2009		2010		2008-10
		N	%	N	%	N	%	Difference
Met Passing Standard								
Grade 6	Participants	1,837	76.0	2,060	69.1	1,642	77.3	1.3
	Non-Participants	1,736	89.7	1,765	86.8	2,278	84.6	-5.1
Grade 7	Participants	2,520	71.9	2,878	71.3	2,603	76.5	4.6
	Non-Participants	2,164	87.3	2,146	85.8	2,281	86.8	-0.5
Grade 8	Participants	2,200	72.5	3,027	71.3	2,797	77.0	4.5
	Non-Participants	2,393	83.1	2,121	86.9	2,157	87.3	4.2
Grade 9	Participants	3,130	58.2	3,115	59.8	3,028	67.5	9.3
	Non-Participants	3,806	65.7	3,800	72.1	3,950	71.2	5.5
Grade 10	Participants	2,523	60.8	3,245	56.8	2,825	69.9	9.1
	Non-Participants	3,399	67.3	3,305	66.5	3,475	77.6	10.3
Grade 11	Participants	1,225	71.8	2,552	76.3	2,851	85.4	13.6
	Non-Participants	4,098	84.6	2,970	83.0	2,952	89.0	4.4
All Grades	Participants	13,435	67.3	16,877	66.9	15,746	75.4	8.1
	Non-Participants	17,596	77.8	16,107	78.3	17,093	81.5	3.7
Met Commended Performance Standard								
Grade 6	Participants	1,837	25.2	2,060	21.0	1,642	17.3	-7.9
	Non-Participants	1,736	44.2	1,765	42.0	2,278	29.1	-15.1
Grade 7	Participants	2,520	13.3	2,878	12.3	2,603	15.9	2.6
	Non-Participants	2,164	21.0	2,146	22.9	2,281	27.3	6.3
Grade 8	Participants	2,200	14.4	3,027	17.0	2,797	16.9	2.5
	Non-Participants	2,393	21.4	2,121	27.3	2,157	27.6	6.2
Grade 9	Participants	3,130	17.0	3,115	16.6	3,028	18.1	1.1
	Non-Participants	3,806	19.2	3,800	23.8	3,950	22.6	3.4
Grade 10	Participants	2,523	12.6	3,245	9.6	2,825	12.0	-0.6
	Non-Participants	3,399	15.6	3,305	12.5	3,475	17.4	1.8
Grade 11	Participants	1,229	17.9	2,552	21.0	2,851	18.4	0.5
	Non-Participants	4,106	23.4	2,970	27.1	2,952	23.5	0.1
All Grades	Participants	13,439	16.3	16,877	15.8	15,746	16.4	0.1
	Non-Participants	17,604	22.5	16,107	24.4	17,093	23.8	1.3

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008, 2009, and 2010 individual student data from TEA.
Note. All students attended a campus reporting students in at least one data upload (summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, or spring 2010). Participants took part in R-Tech instructional activities at one of the reporting campuses. Non-participants attended an R-Tech reporting campus but did not take part in R-Tech instructional activities.

TAKS Science

In Table 5.3, 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. However, the 2008 to 2010 change in passing rates was positive and greater for participants than for non-participants (10.9 percentage points for participants vs. 6.2 percentage points for non-participants). Participants had larger science passing rate gains at Grades 8 and 11, but not at Grade 10. The 2008 to 2010 gain in commended performance rates was slightly higher for the non-participants (5.9 percentage points for vs. 5.2 percentage points). Participants had larger science commended performance rate gains at Grade 11, while non-participants had larger gains at Grades 8 and 10.

Table 5.3
Percentages of R-Tech Participants and Non-Participants Meeting TAKS Passing and Commended Performance Standards for Science

Standard/Test Level	Group	2008		2009		2010		2008-10 Difference
		N	%	N	%	N	%	
Met Passing Standard								
Grade 8	Participants	2,182	64.1	2,989	66.5	2,774	73.3	9.2
	Non-Participants	2,364	76.1	2,095	81.9	2,146	85.2	9.1
Grade 10	Participants	2,515	63.9	3,208	61.2	2,805	69.4	5.5
	Non-Participants	3,386	69.8	3,285	69.7	3,457	78.5	8.7
Grade 11	Participants	1,223	76.0	2,557	81.1	2,853	89.1	13.1
	Non-Participants	4,106	86.1	2,995	88.2	2,952	90.5	4.4
All Grades	Participants	5,920	66.5	8,754	68.8	8,432	77.4	10.9
	Non-Participants	9,856	78.1	8,375	79.4	8,555	84.3	6.2
Met Commended Performance Standard								
Grade 8	Participants	2,182	16.2	2,989	17.8	2,774	24.7	8.5
	Non-Participants	2,364	23.3	2,095	29.1	2,146	33.5	10.2
Grade 10	Participants	2,515	11.6	3,208	10.3	2,805	13.4	1.8
	Non-Participants	3,386	12.6	3,285	11.6	3,457	16.7	4.1
Grade 11	Participants	1,223	9.1	2,557	15.5	2,853	16.1	7.0
	Non-Participants	4,115	11.9	2,995	17.6	2,952	16.4	4.5
All Grades	Participants	5,920	12.8	8,754	14.4	8,432	18.0	5.2
	Non-Participants	9,865	14.9	8,375	18.1	8,555	20.8	5.9

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008, 2009, and 2010 individual student data from TEA.
Note. All students attended a campus reporting students in at least one data upload (summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, or spring 2010). Participants took part in R-Tech instructional activities at one of the reporting campuses. Non-participants attended an R-Tech reporting campus but did not take part in R-Tech instructional activities.

TAKS Social Studies

Results for TAKS social studies in Table 5.4 show that, once again, participants had mostly lower passing rates and commended performance rates than non-participants. The 2008 to 2010 change in passing rates was somewhat more positive for participating students (2.1 percentage points vs. 0.6 percentage points). Participating students had a more positive passing rate change at Grade 11, while non-participating students had more positive passing rate changes at Grades 8 and 10. The 2008 to 2010 change in commended performance rates was more positive for non-participating students (11.5 percentage points vs. 5.9 percentage points). Non-participating students had more positive commended performance rate changes at Grades 8, 10, and 11.

Table 5.4
Percentages of R-Tech Participants and Non-Participants Meeting TAKS Passing and Commended Performance Standards for Social Studies

Standard/Test Level	Group	2008		2009		2010		2008-10 Difference
		N	%	N	%	N	%	
Met Passing Standard								
Grade 8	Participants	2,172	89.1	2,786	86.6	2,765	92.3	3.2
	Non-Participants	2,355	93.2	1,992	94.8	2,140	96.9	3.7
Grade 10	Participants	2,520	89.1	3,055	88.2	2,793	90.0	0.9
	Non-Participants	3,381	91.3	3,105	92.2	3,451	92.8	1.5
Grade 11	Participants	1,226	96.1	2,585	95.8	2,847	95.8	-0.3
	Non-Participants	4,139	97.1	3,009	97.4	2,954	95.6	-1.5
All Grades	Participants	5,918	90.6	8,426	90.0	8,405	92.7	2.1
	Non-Participants	9,875	94.2	8,106	94.8	8,545	94.8	0.6
Met Commended Performance Standard								
Grade 8	Participants	2,172	29.4	2,786	29.8	2,765	30.0	0.6
	Non-Participants	2,355	35.3	1,992	47.0	2,140	44.7	9.4
Grade 10	Participants	2,520	27.2	3,055	32.2	2,793	30.6	3.4
	Non-Participants	3,381	31.6	3,105	39.5	3,451	40.8	9.2
Grade 11	Participants	1,227	29.2	2,585	37.4	2,847	42.2	13.0
	Non-Participants	4,140	32.3	3,009	44.7	2,954	48.1	15.8
All Grades	Participants	5,919	28.4	8,426	33.0	8,405	34.3	5.9
	Non-Participants	9,876	32.8	8,106	43.3	8,545	44.3	11.5

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008, 2009, and 2010 individual student data from TEA.
Note. All students attended a campus reporting students in at least one data upload (summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, or spring 2010). Participants took part in R-Tech instructional activities at one of the reporting campuses. Non-participants attended an R-Tech reporting campus but did not take part in R-Tech instructional activities.

TAKS Writing

Table 5.5 shows that R-Tech participants had somewhat lower TAKS writing passing rates and considerably lower commended performance rates than non-participants for each testing period. Passing rate changes between 2008 and 2010 were more positive for participating students, but commended performance rate changes were more positive for non-participating students.

Table 5.5
Percentages of R-Tech Participants and Non-Participants Meeting TAKS Passing and Commended Performance Standards for Writing

Standard/Test Level	Group	2008		2009		2010		2008-10 Difference
		N	%	N	%	N	%	
Met Passing Standard								
Grade 7	Participants	2,505	91.3	2,681	90.3	2,590	92.5	1.2
	Non-Participants	2,146	95.3	2,066	95.9	2,276	95.7	0.4
Met Commended Performance Standard								
Grade 7	Participants	2,505	28.6	2,681	26.6	2,590	26.9	-1.7
	Non-Participants	2,146	40.5	2,066	44.0	2,276	42.5	2.0

Sources: Texas Education Agency (TEA) R-Tech student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008, 2009, and 2010 individual student data from TEA.
Note. All students attended a campus reporting students in at least one data upload (summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, or spring 2010). Participants took part in R-Tech instructional activities at one of the reporting campuses. Non-participants attended an R-Tech reporting campus but did not take part in R-Tech instructional activities.

Summary of the Descriptive Analysis of TAKS Achievement

These data show that, descriptively, R-Tech participants had TAKS reading/ELA, social studies, and writing passing rates that were from 2 to 6 percentage points lower than non-participants. Participants had TAKS mathematics and science passing rates that were from 6 to 12 percentage points lower than non-participants. Compared to non-participants, participants had TAKS science and reading/ELA commended performance rates that were from 2 to 7 percentage points lower, TAKS social studies and mathematics commended performance rates that were from 4 to 10 percentage points lower, and TAKS writing commended performance rates that were from 12 to 17 percentage points lower. Quite clearly, achievement gaps exist between R-Tech participants and non-participants. Note that these results corroborate findings from R-Tech surveys of principals and facilitators. When asked how students were identified for R-Tech services, principals and facilitators said that weak academic performance was the primary reason students participated in R-Tech. Weak academic performance included poor TAKS performance, poor grades, and poor performance on other tests.

The baseline to 2010 passing and commended performance rate changes showed mixed results. Overall passing rate changes favored R-Tech participants, while overall commended performance rate changes favored non-participants. Because participants scored lower than non-participants, one would expect participants to have larger gains just because they had lower baseline scores.[30] Yet, participants did not

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[30]Because of imperfect (less than 1.0 but greater than 0) TAKS score correlations across years, regression to the mean occurs. Thus, irrespective of any improvement in student learning, relatively low baseline scores tend to be associated with relatively higher gains, and relatively high baseline scores tend to be associated with relatively lower gains. Simply put, one would expect participants to have larger gains than non-participants just because participants had lower baseline scores and non-participants had higher baseline scores.

consistently have larger gains than non-participants. However, these changes are difficult to interpret because participants and non-participants differed on initial levels of achievement and also differed on socioeconomic background variables related to achievement. (There were slightly larger percentages of economically disadvantaged students among participants than non-participants in both year 1 and year 2.)

THE EFFECT OF R-TECH ON STUDENTS' TAKS AND ATTENDANCE OUTCOMES

While descriptive analyses of students' progress in meeting TAKS standards provide useful information about the relationships that may exist between R-Tech implementation and TAKS outcomes, a more sophisticated approach is needed to assess how R-Tech may have *affected* outcomes after controlling for other factors that may have influenced outcomes. HLM is a statistical method that allows researchers to control for factors that affect observed outcomes at multiple levels. HLM is particularly useful in analyses of the effects of educational interventions because it allows researchers to control for student-level characteristics, such as prior achievement and demographic characteristics, as well as school-level factors, such as overall levels of student achievement, that may affect educational outcomes. In so doing, HLM permits researchers to identify the effects of a specific educational intervention, such as R-Tech.

The analyses presented in the following sections use HLM to analyze the effects of R-Tech on students' TAKS and attendance outcomes and examine the relationship between:

1. Supplemental and non-supplemental access to resources and student outcomes,
2. R-Tech program configurations and student outcomes, and
3. The amount of time spent accessing R-Tech services and student outcomes.

Analyses that consider the effect of R-Tech program configurations are limited to self-paced instructional programs and dual credit or distance learning[31] because the remaining program types[32] were implemented in only two districts each. Methodological limitations inherent to HLM preclude the inclusion of programs that are implemented in so few districts in analyses. In the analyses of program types presented in the following sections, comparisons are made between students participated in the designated program type (e.g., self-paced programs) and *all* other programs types (e.g., dual credit, one-to-one tutoring, technology immersion, and iPod programs). More detailed information on the HLM methods used to estimate outcomes may be found in Appendix F (analyses of TAKS outcomes) and Appendix G (analyses of attendance outcomes).

TAKS Outcomes[33]

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 baseline year (2008) TAKS test in HLM models, analyses of the effect of R-Tech on testing outcomes are limited to Grades 6 through 11 in mathematics and reading/ELA and to Grade 10 in both science and social studies. Also, as noted in the discussion of limitations presented earlier in this chapter, the analyses of TAKS outcomes are limited because some students are omitted from analyses because of missing data. Comparisons of students included in analyses (i.e., the partial sample) to the original population of students revealed small

[31]Program types were identified from an analysis of student upload information, district grant applications, and progress reports. Chapter 2 provides a detailed discussion of each program type.
[32]These program types were (1) one-to-one tutoring and online instructional support, (2) school-wide technology immersion, and (3) use of iPods to deliver content.
[33]The analysis of R-Tech's effects on TAKS outcomes included controls for students' testing outcomes in prior years (i.e., vertical comparisons); therefore, the analyses presented in this section incorporate TAKS scale scores that have been transformed to *T* scores.

differences (from less than 1% to about 3%) across characteristics related to students' gender and ethnicity, as well as economic and LEP status. However, the percentages of special education students were from 8% to 12% lower in the partial samples. Thus, the primary difference between the original population and the partial sample was a lower percentage of special education students in the partial samples included in analyses (see Table F.13 in Appendix F).

In estimating the effect of R-Tech on TAKS outcomes, the evaluation formulated two sets of HLM regressions. 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, controlling for school- and student-level characteristics, and the second set of models examined whether program type had an effect on students' TAKS scores. Both sets of models included a variable indicating the amount of time students spent accessing R-Tech resources across the grant's 2-year implementation period. This variable was constructed using the number of semesters during the regular school year (i.e., fall or spring) a student was included in student upload data and may have ranged from one to four semesters. The details of analyses are reported in Appendix F (see Tables F.1 through F.12).

Supplemental vs. non-supplemental access to R-Tech resources. Results from this analysis indicated that students who participated in R-Tech as part of the regular school day (i.e., non-supplemental programs) scored significantly higher on TAKS reading/ELA and mathematics than students participating in R-Tech outside of regular school hours. The analyses did not find a relationship between non-supplemental programs and science and social studies outcomes. Despite the lack of effect on science and social studies, there is evidence that, all else equal, offering R-Tech services during regular instructional hours or during elective periods may support improved math and ELA achievement relative to services offered outside regular instructional hours. Data collected from surveys and site visits and presented earlier in this report (see chapters 2, 3, and 4) support this finding. Survey and site visit data indicated that there were a variety of barriers to student participation in R-Tech services offered outside of the regular school day (i.e., supplemental programs). Barriers included transportation issues, conflicts with athletic programs, employment, extra-curricular activities, and responsibilities at home, and even parent resistance. On the other hand, teachers participating in focus groups indicated that integrating technology into classroom instruction during regular school hours allowed them to support and enhance their lessons.

R-Tech program configurations. The analysis of the effect of R-Tech program configurations found that R-Tech programs implemented as self-paced instructional programs did not have a significant relationship to students' TAKS outcomes in science and social studies. However, students participating in self-paced programs scored significantly lower on TAKS reading/ELA and mathematics than students participating in all other types of R-Tech programs. Analyses did not find a significant relationship between dual credit or distance learning programs and students' TAKS outcomes.

Student access time. As discussed earlier in this section, the regressions estimating outcomes for both supplemental/non-supplemental status and R-Tech program configurations included a variable measuring student access time. Results from both analyses indicated that more time spent with R-Tech services was not necessarily related to higher achievement. Students who spent four semesters in R-Tech had significantly lower reading/ELA and social studies TAKS outcomes than students who only spent one semester in R-Tech. However, it is important to note that students who spent more time in R-Tech may have differed from students who spent less time in R-Tech. For example, students with increased participation may have been at greater academic risk, they may have been less motivated, or they may have differed on other characteristics that affect TAKS scores and were not controlled for by regression models.

Attendance Outcomes

As noted earlier in this chapter, the most current attendance data available at the time of this report's writing were for the 2008-09 school year. Therefore, analyses of R-Tech's effects on attendance outcomes are limited to program's first implementation year and do not consider the full 2-year grant period. Before considering attendance outcomes related to the characteristics of R-Tech implementation (i.e., supplemental vs. non-supplemental status, program configurations, and access time), the evaluation considered whether participation in R-Tech was related to attendance outcomes. Details related to this set of analyses are presented in Appendix G.

R-Tech and attendance. The analysis of R-Tech's effect on student attendance included both R-Tech participants and non-participants during the 2008-09 school year and considered whether R-Tech participation predicted higher 2009 student attendance rates after controlling for students' 2008 attendance, 2008 TAKs scores,[34] student demographic characteristics, and campus achievement. Results indicated that participation in R-Tech did not have a significant relationship to attendance. That is, holding other variables constant, students who participated in R-Tech did not differ from non-participants in terms of their attendance during the 2008-09 school year.[35] (See Table G.2 in Appendix G.)

R-Tech program characteristics. The analyses of the effects of R-Tech program characteristics on attendance also are limited to only those students who received R-Tech services during the 2008-09 school year. As with the analyses of TAKS outcomes, the evaluation formulated two sets of HLM regressions: the first considered the effects of supplemental vs. non-supplemental status on attendance and the second considered the effects of R-Tech program type on attendance. Both regressions included a variable measuring the amount of time students spent receiving R-Tech services. In models estimating TAKS outcomes, access time was measured as the number of semesters during the regular school year (i.e., fall and spring) that a student may have participated in R-Tech services and may have ranged from one to four semesters across the grant's 2-year implementation period, depending on the number of semesters in which a student was included in upload data submitted to TEA. However, the variable measuring access time included in attendance outcomes models was constructed differently. Because only one year of attendance data (i.e., 2008-09) was available for the R-Tech implementation period, analyses of attendance outcomes relied on a variable that measured student access time using the average number of hours per week each student spent accessing R-Tech resources as recorded in student data uploads for the fall 2008 and spring 2009 semesters.[36]

Supplemental vs. non-supplemental access to R-Tech resources. The evaluation considered whether R-Tech programs implemented during the school day (i.e., non-supplemental programs) had different effects on student attendance than supplemental programs implemented outside of the school day (e.g., before or after school) and controlled for students' 2008 attendance, prior achievement, student demographic characteristics, and campus-wide achievement levels. Results indicated that supplemental status was a significant negative predictor of student attendance. (See Appendix G Table G.4.) That is,

[34]The spring 2008 TAKS composite *T* score was average of the spring 2008 TAKS reading *T* score and the spring 2008 TAKS mathematics *T* score.
[35]A similar analysis comparing TAKS outcomes between R-Tech participants and non-participants is not appropriate because most students were identified for R-Tech services because of poor test scores. In such an analysis, the dependent variable (TAKS outcomes) is not distinct from the independent variable indicating whether a student is a participant or non-participant.
[36]For these analyses, a student was considered to be participating in R-Tech activities if he or she was in the fall 2008 or spring 2009 data upload, and if his or her primary R-Tech instructional hours per week were greater than 0 but less than or equal to 20. Upload data entries indicating that students spent more than 20 hours per week, on average, using R-Tech resources during the regular school year were likely reporting errors and were omitted from analyses.

holding other factors constant, students who participated in R-Tech as a supplemental program had reduced attendance outcomes relative to students who participated in R-Tech as part of the regular school day. Similar to the achievement analyses, there is evidence that offering R-Tech services during regular instructional hours or during elective periods may support improved attendance.

R-Tech program configurations. A similar model was used to estimate the effects of R-Tech program configurations on students' attendance outcomes. However, R-Tech programs that emphasized self-paced computer software or dual credit or distance learning did not demonstrate a significant relationship to attendance rates. (See Appendix G Table G.5.)

Student access time. As noted earlier in this section, the models estimating the effects of supplemental/non-supplemental status and R-Tech program configurations included a variable representing the average number of hours students spent accessing R-Tech instructional resources each week. Results of both models indicated that the number of hours spent accessing R-Tech resources was not significantly related to students' 2009 attendance rates.

R-TECH AND DUAL CREDIT, DISTANCE LEARNING, AND ADVANCED PLACEMENT COURSES

In addition to analyses of R-Tech's effects on students' testing and attendance outcomes, the evaluation also considered whether R-Tech implementation was associated with increased percentages of students passing dual credit, distance learning, and AP courses. Student enrollment in dual credit and AP courses is generally limited to students in Grades 11 and 12, and analyses of course passing rates were limited to these grade levels. Analysis of distance learning opportunities was limited to students in Grades 9 through 12 because distance learning courses generally are offered only at the high school level.[37] Similar to results for attendance outcomes, course completion data for the full 2-year R-Tech implementation period were not available at the time of the report's writing, and analyses are limited to the program's first implementation year.

Table 5.6 presents the number and percentage of all students, R-Tech participants and non-participants, who passed at least one dual credit, distance learning, or AP course during the 2007-08 school year (i.e., the year prior to R-Tech implementation) and during the 2008-09 school year (i.e., R-Tech's first implementation year), and includes results of z-tests indicating whether differences are statistically significant.[38] Results indicate that implementation of R-Tech is significantly related to increased numbers of students passing both dual credit and distance learning courses, but is unrelated to AP passing rates. This finding aligns with R-Tech guidelines, which specify that R-Tech grants may be used to fund technology-based distance learning and dual credit opportunities for rural students.

[37] Students may participate in pre-AP coursework at the middle school level.
[38] Similar to a t-test, a z-test is a statistical method to determine whether observed differences in samples are statistically significant.

Table 5.6
Number and Percentage of Students at R-Tech Campuses Passing at Least One Dual Credit, or Distance Learning, or Advanced Placement Course: 2007-08 and 2008-09

Type of Course	2007-08 Baseline Year		2008-09 After One Year		*z*-value
	N	%	N	%	
Dual credit courses[a]	1,616	13.9%	1,779[b]	15.2%	2.78**
Distance learning courses[c]	632	2.3%	891[d]	3.3%	6.58***
Advanced Placement courses[a]	2,140	18.4%	2,120[e]	18.1%	-0.63

**p>.01; ***p < .001.
Notes. Independent samples z-test for comparing percentages passing each type of course at R-Tech campuses in 2007-08 and 2008-09. N= number of students passing each type of course.
[a]Students in Grades 11 and 12 only.
[b]576 or 32.4% were R-Tech participants in fall 2008 and/or spring 2009.
[c]Students in Grades 9 through 12.
[d]299 or 33.6% were R-Tech participants in fall 2008 and/or spring 2009.
[e]299 or 20.3% were R-Tech participants in fall 2008 and/or spring 2009.

SUMMARY

TAKS scores as well as survey data showed that the academic performance of R-Tech participants was lower than the performance of non-participants at the same campus. Survey responses from principals and R-Tech facilitators indicated that students were chosen for R-Tech participation primarily because of low test scores. Indeed, in all tested areas, R-Tech participants had lower TAKS passing rates and commended performance rates than non-participants. However, across the 2-year R-Tech implementation period, changes in the percentages of students who met TAKS passing standards tended to favor R-Tech participants. In contrast, changes in the percentages of student who met TAKS commended performance levels tended to favor non-participants.

This chapter’s findings indicated that students who participated in R-Tech during regular school hours scored higher on TAKS reading/ELA and mathematics and tended to have better attendance than students participating in R-Tech outside of regular school hours. Everything else being equal, offering R-Tech services during regular instructional hours or during elective periods demonstrated a stronger relationship to improved student outcomes than offering services outside regular instructional hours. These findings are substantiated by evaluation data collected through surveys and site visits, indicating that students participating in supplemental programs faced a variety of logistical barriers. These barriers included transportation issues, conflicts with extra-curricular activities, conflicts with after school employment, and even parent resistance. On the other hand, students participating during regular school hours benefited from teachers being able to integrate technology into classroom instruction allowing the teachers to support and enhance their lessons.

The chapter also showed that students participating in self-paced instructional programs scored significantly lower on TAKS reading/ELA and mathematics than students participating in all other types of R-Tech programs. In addition, students who spent longer in R-Tech (four semesters) had significantly lower reading/ELA and social studies TAKS scores than students who spent less time (one semester) in R-Tech. Note, however, that students who used self-paced computer software (programs that typically focused on tutoring, remediation, or credit-recovery) as well as students who spent more time in R-Tech may have been weaker academically than other R-Tech students who used different programs or who spent less time in R-Tech. In addition, these students could have been less motivated, or they could have differed on other characteristics that affect TAKS scores and were not controlled in our analyses.

CHAPTER 6
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 the 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 teacher effectiveness and 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 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, fall, and spring reporting periods across the grant’s 2-year implementation period (May 2008 through May 2010). In addition, the chapter incorporates information drawn from document analysis of R-Tech grant applications and progress reports, interviews with principals in six R-Tech districts, as well as spring 2009 and spring 2010 surveys of principals in all Cycle 1 districts.[39]

Results presented in chapter 5 indicated that districts’ implementation strategies may have affected students’ TAKS outcomes. In particular, the chapter’s findings indicated that students that participated in R-Tech programs implemented as part of the school day (i.e., non-supplemental programs) experienced improved reading/ELA and math outcomes relative to students participating in supplemental programs and that students in self-paced instructional programs experienced reduced reading/ELA and math test scores relative to students in all other types of R-Tech programs. Results presented in this chapter supplement these findings by considering the per-student costs of R-Tech and comparing the cost-effectiveness of varying district implementation strategies.

Before considering the estimated per-student costs of R-Tech program types, this chapter provides an overview of R-Tech grant funding and discusses how Cycle 1districts used their program funding across the 2-year grant period. The chapter begins with a discussion of the limitations of the data used for analyses.

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[39]Information about the principal surveys, 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.

LIMITATIONS OF THE ANALYSIS

The analyses presented in this chapter encounter substantial limitations that arise from the available data sources, incomplete data, from differences in districts' budgeting practices, and lack of detail in financial reports. The sections that follow discuss 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 during R-Tech's 2-year grant period, but the equipment also will be used in years to come, which overstates their costs for R-Tech implementation and understates their costs in subsequent years (pp. 45-46).[40]

Incomplete Expenditure Reporting (ER) and Upload Data

ER data. The analyses of district financial data included in this chapter are based on information submitted through TEA's ER system through July 2010; however, not all districts had submitted final expenditure reports at this time, which means that the chapter's analyses are based on incomplete data. For example, TEA's ER data indicated that only 31 Cycle 1 districts had accessed 100% of their total grant funding. Districts that had not accessed all of their R-Tech funds had accessed 71% of grant funding, on average. In addition, only 39 districts had reported cost share, or matching funds, information in July 2010. Across districts reporting cost share contributions, the average amount of matching funds reported was $73,468, and funding amounts ranged from $2,000 to $234,246. The chapter's analyses disaggregate information by state-provided grant funds and district-provided cost share funding. Recognizing that R-Tech financial data were incomplete at the time of the report's writing, readers are urged to use caution when interpreting results, particularly with respect to cost share funding.

Upload data. In addition to incomplete financial data, the analysis of per-student costs of R-Tech implementation suffers from incomplete data on student participation in grant-provided services. As presented in Table 3.1 in chapter 3, the percentage of districts and campuses that provided student upload data varied widely across grant reporting periods. For example, the percentage of districts reporting upload data ranged from a low of 47% in summer 2008 to a high of 92% in spring 2009. Further, campus-level submission rates were even lower, ranging from 32% in summer 2008 to 86% in spring 2009, which indicates that district submitted data were often incomplete and some districts may not have included all participating campuses in their upload submissions. The incomplete upload data affects the evaluation's

[40]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.

ability to accurately assess the per-student costs of R-Tech because without complete data, it is not clear how many students may have received grant-provided services.

The problem of incomplete data is of greatest concern in the analysis of the per-student cost share, or district matching funds, because some districts did not provide information on both cost share contributions and student participation (i.e., upload data). Recognizing this issue, this chapter presents per-student cost share information but limits the discussion of the per-student costs to expenditures incurred in terms of state-provided revenue. That said, the discussion of per-student costs in terms of state-provided revenue is also limited by the incomplete reporting of financial data and incomplete student upload data. Tables presenting incomplete data include footnotes indicating how many districts were included in calculations, which may help guide readers' understandings; however, readers are urged to use considerable caution when interpreting these results.

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, but do not require that districts provide detailed item-level reports of how they plan to allocate grant expenditures. The analysis of districts' grant application budgets indicated that 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 ER data also do not include item-level reports of expenditures. The lack of detail about districts' expenditures in grant applications and in ER reports limited the evaluation's ability to accurately classify expenditures in terms of budget categories.

OVERVIEW OF R-TECH FUNDING

As discussed in chapter 1, TEA awarded about $6.3 million in funding to R-Tech Cycle 1 grantees. Cycle 1 districts received $200 per school year in state grant funding for each student receiving R-Tech services and were required to provide at least $100 per participating student per school year in matching funds. Matching funds could consist of local or private funding or 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 extended from May 1, 2008, to May 31, 2010, and districts were required to budget their use of R-Tech funds within these dates. Permissible grant expenditures may have included 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.

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 was 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 6.1 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. TEA 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 Cycle 1 grant award was about $100,393.

Table 6.1
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.

DISTRICT ALLOCATION OF R-TECH FUNDS

The evaluation 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*, *administrative costs,* and *total state costs* (program costs *plus* administrative costs), as well as *shared costs* and *total costs* (total state costs *plus* shared 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 generally are used for administrative costs *directly* related to R-Tech, including salaries for staff who supervise R-Tech; however, some R-Tech funds were also allocated to indirect grant costs. Such costs may have included salaries for persons indirectly related to grant activities (e.g., district supervisors). Shared costs represent district matching funds. As noted earlier in this chapter, districts receiving R-Tech grants are required to provide $100 in matching funds for each student receiving services in each grant year.

Total R-Tech Expenditures by Budget Category

Table 6.2 presents the total expenditures for R-Tech districts as reported in TEA's ER system in July 2010. Findings are disaggregated by state grant funds (i.e., "Total State Costs"), which include program and administrative costs, and by district-provided shared costs, or matching funds. Recall that about half (31) of Cycle 1 districts had accessed their complete grant awards and only 62% of districts (39) had reported cost share information at the time of the report's writing. Results indicate that districts had spent about $8.5 million implementing R-Tech across the 2-year grant period. Of this, about $5.6 million (66.2%) was state funding and about $2.9 million (33.8%) was provided in local matching funds, which aligns with the funding specifications for R-Tech described earlier in this chapter. Results indicate that most R-Tech funds (about $4.6 million) were used to purchase supplies and materials for the grant. Smaller amounts of funding were used for payroll costs (about $2 million), professional and contracted services (about $1 million), and capital outlay (about $530,000). The sections that follow provide information about the types of expenditures included in each cost category, and Figure 6.1 presents the percentage of expenditures districts reported by ER category.

Table 6.2
Total District Grant Expenditures by R-Tech Funding Categories: July 2010

Cost Category	Program Costs	Administrative Costs	Total State Costs[a]	Shared Costs (District-Matching)[b]	**Total Costs[c]**
Payroll costs	$1,007,917.82	$10,079.21	$1,017,997.03	$1,123,108.59	**$2,141,105.62**
Professional and contracted services	$909,791.87	$2,966.00	$912,757.87	$214,740.83	**$1,127,498.70**
Supplies and materials	$3,184,256.14	$0.00	$3,184,256.14	$1,400,579.18	**$4,584,835.32**
Other operating costs	$58,249.82	$0.00	$58,249.82	$36,400.00	**$94,649.82**
Capital outlay	$440,008.00	$0.00	$440,008.00	$90,461.33	**$530,469.33**
Indirect costs	$0.00	$7,813.56	$7,813.56	$0.00	**$7,813.56**
Total costs	**$5,600,223.65**	**$20,858.77**	**$5,621,082.42**	**$2,865,289.93**	**$8,486,372.35**

Source: Texas Education Agency Expenditure Reporting system data, July 2010.
Note. N=63.
[a]Values in “Total State Costs” represent the sum of “Program Costs” and “Administrative Costs.”
[b]Only 62% of districts had reported shared cost expenditures in July 2010 (n=39).
[c]Values in “Total Costs” represent the sum of “Total State Costs” and “Shared Costs.”

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. Across project years, 25% of all R-Tech funding was used to cover payroll costs related to the grant. Across districts, payroll expenditures ranged from $0 to $233,883.

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. About 13% of R-Tech funding was used for professional and contracted services, with expenditures ranging from $0 to $114,302 across districts.

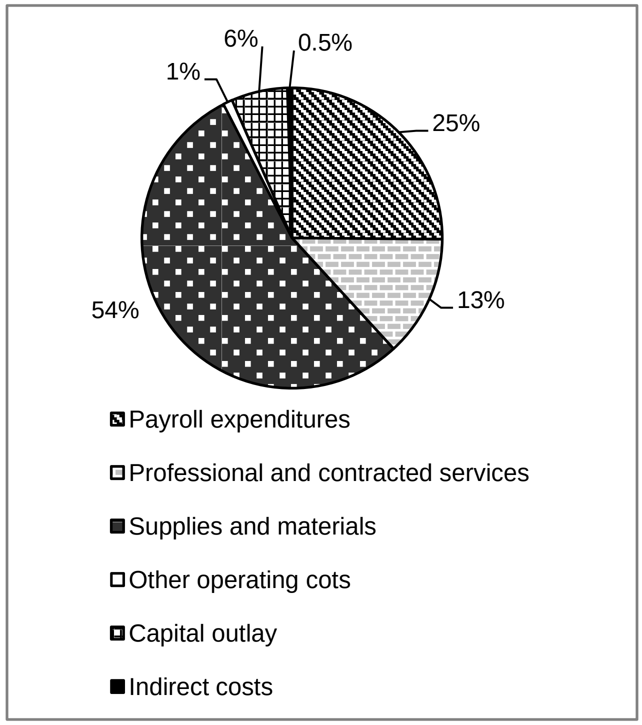

Figure 6.1. Percentage of R-Tech expenditures by reporting category
Source: Texas Education Agency Expenditure Reporting system data, July 2010.
Note. N=63.

Supplies and materials. More than half (54%) of all R-Tech expenditures were spent on supplies and materials. Funds included in this budget category were 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 $340,689.

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. Across project years, about 1% of funding was spent on other operating costs, with expenditures ranging from $0 to $37,456 across districts.

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 6% of R-Tech expenditures were recorded as capital outlay, and expenditures ranged from $0 to $98,497 across districts.

Indirect costs. Funds spent on indirect costs are generally allocated to the salaries of personnel who fill roles indirectly related to grant activities. For example, the salaries of administrative staff (e.g., superintendents) who oversee activities but are not directly involved in implementing the grant. Districts spent a very small amount of funding (less than 0.5%) on indirect project costs. Across districts, these costs ranged from $0 to $1,688.

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

Table 6.3 presents average expenditures across all Cycle 1 districts in terms of program and administrative costs, total state costs, shared costs or matching funds, and total grant expenditures (i.e., total state costs *plus* shared costs). Similar to results for districts' total grant expenditures presented in Table 6.2, results for districts' average expenditures indicate that the largest share of revenue were spent on supplies and materials ($72,775), followed by payroll costs ($33,985) and professional and contracted services ($17,896). Notably smaller average amounts of grant funding were allocated to capital outlay ($8,420), other operating costs ($1,502), and indirect costs ($124).

Table 6.3
Average District Grant Expenditures by R-Tech Funding Categories: July 2010

Cost Category	Average Program Costs	Average Administrative Costs	Average Total State Costs[a]	Average Shared Costs (District-Matching)[b]	**Average Total Costs[c]**
Payroll costs	$15,998.70	$159.98	$16,158.68	$17,827.12	**$33,985.80**
Professional and contracted services	$14,441.14	$47.08	$14,488.22	$3,408.59	**$17,896.80**
Supplies and materials	$50,543.75	$0.00	$50,543.75	$22,231.42	**$72,775.16**
Other operating costs	$924.60	$0.00	$924.60	$577.78	**$1,502.38**
Capital outlay	$6,984.25	$0.00	$6,984.25	$1,435.89	**$8,420.15**
Indirect costs	$0.00	$124.02	$124.02	$0.00	**$124.03**

Source: Texas Education Agency Expenditure Reporting system data, July 2010.
Note. N=63.
[a]Values in "Total State Costs" represent the sum of "Program Costs" and "Administrative Costs."
[b]Only 62% of districts had reported shared cost expenditures in July 2010 (n=39).
[c]Values in "Total Costs" represent the sum of "Total State Costs" and "Shared Costs."

The sections that follow examine districts' average expenditures across cost categories and by the program types discussed in chapter 2 and include values included in the "Average Total Costs" column of Table 6.3 as a benchmark for understanding whether expenditures by a particular program type are above or below average relative to all R-Tech programs.

Types of instructional programs. As discussed in chapter 2, researchers examined district grant applications and progress reports in order to categorize the types of instructional programs offered through R-Tech and identified five categories of programs: (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 instructional support. 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 6.4 presents the average of districts' total costs (state and shared costs) by each of the five R-Tech program categories identified by the evaluation. 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 supplies and materials by districts implementing technology immersion programs, as well as the amounts spent on professional and contracted services for districts implementing one-to-one tutoring and support and districts implementing dual credit/distance learning programs.

Table 6.4
R-Tech Average District Expenditures by Program Type and Funding Categories: July 2010

Program Type	Number of Districts in Category	Average Payroll Costs	Average Professional and Contracted Services	Average Supplies and Materials	Average Other Operating Costs	Average Capital Outlay	Average Indirect Costs	**Average Total Costs**
Self-paced software	55[a]	$37,723.87	$16,755.49	$75,140.05	$1,720.91	$9,495.18	$142.06	**$140,977.56**
Dual credit/distance learning	17[b]	$29,855.33	$26,810.64	$51,058.25	$16.88	$6,828.20	$187.78	**$114,757.08**
One-to-one tutoring and online instructional support	2[c]	$2,020.00	$90,476.50	$0.00	$0.00	$0.00	$0.00	**$92,496.50**
School-wide Technology immersion	2	$8,650.00	$9,260.00	$163,990.00	$0.00	$0.00	$0.00	**$181,900.00**
iPods	2[d]	$1,843.50	$3,237.00	$14,525.50	$0.00	$0.00	$0.00	**$19,605.50**
All district programs	**63[e]**	**$33,985.80**	**$17,896.80**	**$72,775.16**	**$1,502.38**	**$8,420.15**	**$124.03**	**$134,704.32**

Sources: Texas Education Agency Expenditure Reporting system data, July 2010; district grant applications and progress reports.
Note. Values represent average expenditures reported across categories for districts reporting state and shared cost funding in TEA's ER system. The number of districts in each category will not total to 63 because districts may have offered more than one type of program.
[a]Of the 55 districts implementing self-paced programs, only 33 provided cost share data.
[b]Of the 17 districts implementing dual credit programs, only 8 provided cost share data.
[c]Of the two districts implementing one-to-one tutoring, only one provided cost share data.
[d]Of the two districts implementing iPod programs, only one provided cost share data.
[e]Of the 63 Cycle 1 R-Tech districts, only 39 provided cost share data.

On average, districts that implemented R-Tech as a school-wide technology immersion program spent nearly twice the program average on supplies and materials ($163,990 vs. $72,775). This result is attributable to districts' heavy investments in laptop computers and other technology resources needed to support one-to-one laptop immersion programs. Districts implementing dual credit and distance learning programs included the costs for college tuition and fees in professional and contracted services. In addition, some districts 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 5 times as much on contracted services relative to the average for all R-Tech programs ($90,476 vs. $17,897). Both districts implementing this type of program contracted with TxRED to provide R-Tech services.[41] 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. The districts had spent an average of $92,496 for TxRED services through July 2010, although neither district reported student participation through the TEA's data upload system for the 2-year grant period.[42]

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 Cycle 1 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 labs. 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).

Table 6.5 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 (i.e., non-supplemental programs). Results indicate that relative to R-Tech programs implemented as part of the school day, supplemental programs spent more resources on professional and contracted services ($19,638 vs. $15,251) and indirect costs ($160 vs. $69), which likely reflects a greater reliance on services contracted from project vendors. In contrast, districts that provided R-Tech as part of classroom instruction spent notably more on supplies and materials ($107,035 vs. $50,236), payroll costs ($45,307 vs. $26,574), and capital outlay ($10,851 vs. $6,821). These differences are likely the result of increased purchases of technology resources (e.g., computers, software, infrastructure) needed to implement R-Tech services more broadly, as well as the costs of personnel dedicated to supporting classroom use of technology (e.g., technology coordinators). It is also likely that districts implementing R-Tech as part of the regular school day served larger numbers of students, and therefore, needed to purchase considerably more resources than districts that implemented supplemental programs. As reported in chapter 5, R-Tech programs that provided services as part of the regular school day experienced improved academic outcomes relative to supplemental programs, which may indicate that the increased resources devoted to non-supplemental programs were better spent. These findings are explored in more detail in the chapter's next section.

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[41]For more information about TxRED, visit the Consortium's web site at http://txred.org.
[42]It is likely that these districts served students using TxRED's services; however, they did not submit upload reports documenting student use.

Table 6.5
R-Tech Average District Expenditures by Supplemental and Non-Supplemental Implementation and Funding Categories: July 2010

Program Type	Number of Districts in Category	Average Payroll Costs	Average Professional and Contracted Services	Average Supplies and Materials	Average Other Operating Costs	Average Capital Outlay	Average Indirect Costs	**Average Total Costs**
Supplemental programs	38[a]	$26,573.86	$19,637.71	$50,235.57	$1,337.60	$6,820.57	$160.30	**$104,765.61**
Non-supplemental programs	25[b]	$45,306.68	$15,250.62	$107,035.30	$1,752.84	$10,851.51	$68.88	**$180,265.83**
All district programs	**63**[c]	**$33,985.80**	**$17,896.80**	**$72,775.16**	**$1,502.38**	**$8,420.15**	**$124.03**	**$134,704.32**

Sources: Expenditure Reporting system data, July 2010; district grant applications and progress reports.
Note. Values represent average expenditures reported across categories for districts reporting state and shared cost funding in TEA's ER system.
[a]Of the 38 districts offering supplemental R-Tech programs, only 19 provided cost share data.
[b]Of the 25 districts offering non-supplemental R-Tech programs, only 20 provided cost share data.
[c]Of the 63 Cycle 1 R-Tech districts, only 39 provided cost share data.

THE COST EFFECTIVENESS OF R-TECH FUNDING

The following sections explore the per-student costs of implementing R-Tech in terms of state-provided grant funds and district-provided matching funds. As discussed earlier in this chapter, districts varied in their reporting of ER expenditures at the time of this report's writing. About half of Cycle 1 districts had accessed their full grant award, and remaining districts had accessed, on average, about 71% of their total awards. In addition, only 62% of districts had reported cost share, or matching funds.

The cost-effectiveness findings presented in the sections that follow present 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. Results are disaggregated by state-provided grant funds and district-provided cost share funds. The discussion of results, however, focuses on state expenditures because more than a third of Cycle 1 districts had not reported cost share information at the time of the report's writing. The student counts used in analyses are the number of unique students served by R-Tech by grant year: year 1(summer 2008, fall 2008, and spring 2009) and year 2 (summer 2009, fall 2009, and spring 2010). Students who received services across multiple periods in a single year are included only once in annual counts. Students who participated in R-Tech during both grant years are counted as participants in both funding years and are included twice in student counts because grant funds were awarded for the number of students served in each grant year. As noted earlier in this chapter, districts' reports of student upload data were incomplete across all reporting periods and readers are urged to use caution when interpreting per-student estimates of R-Tech costs.

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 cost 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 6.6 presents information about the average number of students served; average expenditures, both state and shared cost (i.e., district-provided); as well as average per student costs in terms of state and cost share expenditures across districts grouped by scale of implementation. The table presents findings broken out by the total number of students districts reported serving in R-Tech programs, categorized by program size: 0 students, 1 to 99 students, 100 to 249 students, and so on.

Table 6.6
Average Per-Student R-Tech Expenditure Calculations by State and Shared Cost Expenditures: July 2010

Students Served[a]	Number of Districts in Category	Average Number of Students Served	Average State Expenditures	Average State Expenditures per Student	Average Shared Costs (District-Matching)	Average Shared Costs per Student (District-Matching)
0	3[b]	Undefined	$56,933.33	Undefined	$14,193.00[c]	Undefined
1-99	8	58.4	$23,882.66	$773.96	$9,081.67[d]	$155.30[d]
100-249	16	157.1	$40,978.12	$262.55	$25,114.57[e]	$152.91[e]
250-499	11	327.5	$91,954.99	$289.36	$58,173.96[f]	$181.63[f]
500-999	14	669.8	$117,444.40	$178.57	$103,409.50[g]	$139.92[g]
1,000 or more	11	1,318.0	$177,076.80	$140.98	$126,224.30[h]	$104.03[h]
Total	**63**	**483.5**	**$89,223.53**	**$293.77[h]**	**$73,468.97[i]**	**$146.80[j]**

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 year 1 (summer 2008, fall 2008, and spring 2009) and/or year 2 (summer 2009, fall 2009, and spring 2010). Students receiving services across multiple periods within a given year are counted only once in the analysis. Students receiving services in both years are counted twice because districts received funding for the number of students served each grant year.
[b]These districts did not report student participation in R-Tech services in TEA's data upload system for the 2-year grant period.
[c]Only one district in this category reported cost share information (n=1).
[d]Three districts in this category reported cost share information (n=3).
[e]Seven districts in this category reported cost share information (n=7).
[f]Nine districts in this category reported cost share information (n=9).
[g]Twelve districts in this category reported cost share information (n=12).
[g]Seven districts in this category reported cost share information (n=7).
[h]Total average expenditures per student were calculated using only those districts that had data included in student upload data for the 2-year grant period (n=60).
[i]Value is based on the 39 districts providing cost share information (n=39).
[j]Average is based on the 38 districts providing cost share information and reporting students in TEA's data upload for the 2-year grant period (n=38).

Recall that R-Tech grants provided districts with $200 per student per year in terms of state-provided funding and that districts were required to provide $100 per student in terms of district-provided cost share, or matching, funds. Results presented in Table 6.6 indicate that the average per-student cost of implementing R-Tech across all districts was about $294 in state-provided grant funding and about $147 in terms of cost share funding for the 62% of districts providing information about matching costs. Levin's assertions about the economies of scale that exist for programs that enroll more students are evident across per-student expenditures calculated in terms of state and cost share expenditures. That is, districts that served larger numbers of students using R-Tech resources experienced reduced per-student costs. Districts serving 1,000 or more students had the highest average costs in terms of state expenditures ($177,076), but experienced average per-student state costs that were less than half that of all districts ($141 vs. $294). Correspondingly, districts serving less than 100 students spent the least in terms of state-provided grant funds ($23,883), but experienced per-student costs that were more than double the average of all Cycle 1 districts ($774 vs. $294). Similar patterns are evident across per-student cost share expenditures.

Per-Student Costs by Type of Instructional Program

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 6.7 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 for the 2-year grant period. Average per-student expenditures are presented for state-provided grant funds as well as for district-provided shared cost, or matching, funds.

Table 6.7
Average Per-Student R-Tech Expenditure Calculations by Program Type and State and Shared Cost Expenditures: July 2010

Program Type	Number of Districts in Category	Average Number of Students Served	Average State Expenditures	Average State Expenditures per Student	Average Shared Costs (District-Matching)	Average Shared Costs per Student (District-Matching)
Self-paced software	55	522.1	$92,077.24	$296.01[a]	$81,500.52[b]	$153.39[b]
Dual credit/distance learning	17	345.6	$82,114.00	$489.80[c]	$69,366.52[d]	$223.18[e]
One-to-one tutoring and online instructional support[f]	2	Undefined	$85,400.00	Undefined	$14,193.00[g]	Undefined
Technology immersion	2	586.0	$120,000.00	$236.17	$61,900.00	$119.93
iPods	2	117.5	$16,256.00	$247.25	$6,700.00[h]	$34.01[h]
Total	**63**	**483.5**	**$89,223.53**	**$293.77[i]**	**$73,468.97[j]**	**$146.80[k]**

Sources: Texas Education Agency (TEA) Expenditure Reporting system data, July 2010; TEA student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010; 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]One district providing self-paced programming did not report student participation in TEA's data upload for the 2-year grant period (n=54).

[b]Thirty three districts providing self-paced programming reported cost share information (n=33).

[c]Two districts offering dual credit instruction did not report student participation in TEA's data upload for the 2-year grant period (n=15).

[d]Eight districts offering dual credit instruction reported cost share information (n=8).

[e]One district offering dual credit instruction and reporting cost share information did not report student participation in TEA's data upload for the 2-year grant period (n=7).

[f]No district offering one-to-one tutoring and online instructional support reported student participation in R-Tech services in TEA's data upload system for the 2-year grant period.

[g]One district offering one-to-one tutoring and online instructional support reported cost share information (n=1).

[h]One district offering an iPod program reported cost share information (n=1).

[i]Average state expenditures per student were calculated using only those districts that had data included in student upload data for the 2-year grant period (n=60).

[j]Value is based on the 39 districts providing cost share information (n=39).

[k]Average is based on the 38 districts providing cost share information *and* reporting students in TEA's data upload for the 2-year grant period (n=38).

Results indicate that the per-student costs of implementing R-Tech programs varied widely across the 2-year grant period. Across all districts, the average per-student cost of implementing R-Tech was about $294 in state grant funding. Districts offering dual credit and distance learning opportunities had the highest average per-student expenditures in terms of grant funding ($490). As discussed in Appendix E, districts providing dual credit instruction were required to pay the costs of tuition and text books for students participating in college courses in addition to costs for technology resources used to implement distance learning programs. Unlike technology resources that may be purchased once and used across the duration of the grant, tuition and textbook fees must be paid each semester for each student participating in dual credit coursework, which is likely the source of the high per-student costs of implementing dual credit programs. Results presented in Table 6.4 indicate that immersion districts spent, on average more than twice the average of all Cycle 1 districts on supplies and materials in support of R-Tech ($163,990 vs. $72,775), which likely reflects the large investment these districts made in purchasing laptop computers and other technology resources needed to implement immersion programs. While immersion districts received the largest average share of state grant funding ($120,000), average expenditures in terms of state funding were less than the average for all districts ($236 vs. $294) because immersion districts served substantially more students, on average, using R-Tech resources (586 vs. 484 for all districts). Because neither of the districts offering one-to-one tutoring and online support reported serving students during the 2-year grant period, the average per-student cost for this program category is undefined.

Notably, districts implementing self-paced instructional programs using R-Tech funds had marginally higher average per-student costs in terms of state funding than the average for all districts ($296 vs. $294). Results presented in chapter 5 indicated that students who participated in R-Tech self-paced programs experienced reduced TAKS reading/ELA and math outcomes relative to students in other types of programs. Although it is possible that such students faced greater academic challenges than students participating in other program types (e.g., dual credit, technology immersion), the poor academic outcomes coupled with higher than average costs for self-paced programs suggests that funds may be spent more effectively on other types of R-Tech programs.

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 6.8 presents information about the average number of students served, average expenditures, and average expenditures per-student for both state-provided grant funding and for district-provided matching funds for districts offering supplemental and non-supplemental instruction. Results for all districts are presented for purposes of comparison.

Table 6.8
Average Per-Student R-Tech Expenditure Calculations by Supplemental and Non-Supplemental Program and State and Shared Cost Expenditures: July 2010

Program Type	Number of Districts in Category	Average Number of Students Served	Average State Expenditures	Average State Expenditures per Student	Average Shared Costs (District-Matching)	Average Shared Costs per Student (District-Matching)
Supplemental programs	38	346.0	$72,674.01	$352.49[a]	$64,111.20[b]	$145.02[c]
Non-supplemental programs	25	692.4	$114,378.80	$211.57	$65,887.08[d]	$118.72[d]
Total	**63**	**483.5**	**$89,223.53**	**$293.77**[e]	**$73,468.97**[f]	**$146.80**[g]

Sources: Texas Education Agency (TEA) Expenditure Reporting system data, July 2010; TEA student upload data: summer 2008, fall 2008, spring 2009, summer 2009, fall 2009, and spring 2010; district grant applications and progress reports.

[a]Three districts providing supplemental programs did not report student participation in TEA's data upload for the 2-year grant period (n=35).

[b]Nineteen districts providing supplemental R-Tech programs reported cost share information (n=19).

[c]One district providing a supplemental R-Tech program and reporting cost share information did not report student participation in TEA's data upload for the 2-year grant period (n=18).

[d]Five districts providing non-supplemental R-Tech programs did not report cost share information (n=20).

[e]Average state expenditures per student were calculated using only those districts that had data included in student upload data for the 2-year grant period (n=60).

[f]Value is based on the 39 districts providing cost share information (n=39).

[g]Average is based on the 38 districts providing cost share information *and* reporting students in TEA's data upload for the 2-year grant period (n=38).

Findings presented in Table 6.8 indicate that districts that implemented R-Tech as part of the regular school day (i.e., non-supplemental programs) experienced lower per-student costs in terms of state-provided grant funding relative to districts that implemented supplemental programs ($212 vs. $353), as well as to R-Tech districts overall ($212 vs. $294). 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 692 students across the 2-year grant period. In contrast, districts offering supplemental programs served an average of 346 students. This finding is particularly noteworthy given results presented in chapter 5 indicating that students who accessed R-Tech services as part of non-supplemental programs experienced better TAKS reading/ELA and math outcomes relative to students receiving services in supplemental programs. This suggests that districts that implemented R-Tech as part of regular instruction made more cost-effective use of R-Tech resources. Although these districts spent more in terms of average state funding, they were able to serve more students with funds and they experienced better testing outcomes relative to districts implementing supplemental programs.

SUSTAINABILITY

A central evaluation question is whether districts will continue to provide R-Tech services after grant funds have expired in the spring 2010. The spring surveys 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 six R-Tech districts in May 2010. Principals' responses are presented in the following sections.

Barriers to Sustainability

The evaluation's spring surveys 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. Table 6.9 presents the summed percentages of principals who considered each challenge to be a *moderate* or *substantial* barrier sorted in terms of the "Spring 2010" column. Summed percentages are the percentage of respondents who indicated *moderate* barriers plus the percentage of respondents who indicated *substantial* barriers. (See Table A.8 in Appendix A for percentages by each response category for each survey item across both survey administrations).

Table 6.9
Principals' Perceptions: Moderate to Substantial Barriers to Sustaining R-Tech After Grant Funds Expire: Spring 2009 and Spring 2010

Barrier	Spring 2009 (N=75)	Spring 2010 (N=90)
Insufficient financial resources	48.0%	57.8%
Insufficient technology resources (e.g., hardware and software)	26.6%	35.5%
Insufficient technical support	22.7%	18.9%
Lack of student interest	28.0%	16.7%
Lack of staff interest	20.0%	10.0%
Other	12.0%	2.2%

Source: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
Note. Percentages will not total to 100. Principals could respond to more than one category.

Results presented in Table 6.9 indicate that principals' concerns about lack of funding and sufficient technology resources increased over the 2-year grant period. This result likely reflects the absence of grant funding beyond May 2010 and concerns about aging technology resources. In contrast, concerns about inadequate technical support and student and staff interest in the program decreased across grant years, which supports findings reported in chapter 2 that indicate districts were able to overcome many implementation barriers in R-Tech's second year.

Overcoming Barriers

The spring surveys also asked principals about the methods by which their schools may address sustainability barriers. Table 6.10 presents principals' responses for both survey administrations sorted in terms of the "Spring 2010" column. Results indicate differences in principals' views of strategies across administration periods. While a somewhat larger percentage of spring 2010 principals indicated they would seek additional funding to sustain R-Tech than in spring 2009 (60% vs. 53%), a notably smaller percentage indicated that they would incorporate R-Tech into regular classroom instruction (31% vs. 55%) in spring 2010. Evidence from the evaluation's second interim report (winter, 2010) indicated that many schools were changing their implementation strategies to include R-Tech as part of classroom instruction in order to overcome barriers to student participation, such as transportation challenges and conflicts with other activities. The reduced percentage of principals indicating that they would implement R-Tech as part of classroom instruction as a sustainability strategy may indicate that more schools implemented R-Tech as part of classroom instruction during their second implementation year. That is, principals did not view classroom use of R-Tech resources as an approach to sustaining the project—they simply viewed it as an implementation strategy.

Table 6.10
Principals' Strategies to Overcoming Barriers to Sustainability, as a Percentage of Respondents: Spring 2009 and Spring 2010

Strategy	Spring 2009 (N=75)	Spring 2010 (N=90)
Seek additional funding	53.3%	59.7%
Incorporate R-Tech services into regular classroom instruction	54.7%	31.1%
Incorporate R-Tech services into an alternative education program	25.3%	18.8%
Discontinue R-Tech services	10.7%	13.3%
My school will not encounter barriers to sustaining R-Tech	NA	9.0%
Other	9.3%	3.3%

Source: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
Notes. Percentages will not total to 100. Principals could respond to more than one category. NA=Not applicable. This strategy was not included on the spring 2009 survey.

Site visit interviews with nine principals in six R-Tech districts provide more detailed information about the barriers principals confront in continuing R-Tech services once the grant expires. Although several principals (seven individuals) indicated that sustaining R-Tech services would create financial challenges, only one principal reported they would discontinue their program after the grant's end.

Additional funding. Four principals said they would seek additional funding to continue their R-Tech programs once grant funds expire. One principal, satisfied with increased TAKS scores and student achievement, noted that the campus had "already committed to do it [implement the program in 2010-11]." The principal intended to present TAKS data to the school board in order to gain financial support for continuing R-Tech in 2010-11. Another principal also intended to seek local funding to replace hardware purchased at the beginning of the grant. "We now have 3-year-old machines and have to replace the ones that have been broken and damaged," the principal explained.

Two principals reported that they did not expect to face sustainability barriers, but intended to seek additional funding in order to expand their current programs. For example, a principal implementing an iPod program planned on replacing broken equipment and purchasing "pre-made" podcasts in order to overcome teachers' implementation challenges (i.e., time searching for content). In addition, the principal hoped to add a technology course, taught by the district instructional technologist as a means to increase students' access to and effective use of the equipment.

Selective implementation. One principal reported plans to selectively continue some components of R-Tech services once grant funds expired. The principal anticipated expanding access to software programs during regular instruction and cutting some additional services that required paid staff. "We will continue to have the online program…," explained the principal. "I don't know about my before and after school program. That's probably very unlikely, but summer school we will have to continue. It'll be just year by year to see what I can do [afford]." In addition, the principal noted that staff would be held accountable if the school was going to "continue to fund a five—six thousand dollar software program." "They have to be *made* to use it," the principal said.

No barriers. Two principals reported that they did not anticipate barriers to sustainability because their initial investments in technology resources would sustain services beyond the grant period. For example, one district provided English language instruction to a small number of students via podcasts on iPods. The district coordinator noted that the program did not require additional funding after the initial purchase of equipment (i.e., students' iPods) because free podcasts were available online. Similarly, a principal in another district said, "We have our equipment and our software—all of that is in place… That's going to allow us to continue." The principal also said that the district had not accessed a large sum of grant funding, so staff learned to be creative when addressing financial challenges. "We didn't have much money to start with, which forced us to be creative… That's going to allow us to continue."

SUMMARY

This chapter's findings indicate that districts spent the largest share of R-Tech funding on supplies and materials in support of the grant, but that spending varied by program type. For example, districts implementing dual credit programs tended to spend more on contracted services because of their need to pay the tuition and fees of colleges and universities providing dual credit coursework, while districts implementing technology immersion programs tended to invest more heavily in supplies and equipment in support of the grant.

Results from this chapter indicate that districts that provided students access to R-Tech services during the regular school day (non-supplemental programs) had reduced per-student implementation costs. Despite greater expenditures on technology resources than supplemental R-Tech programs, non-supplemental programs achieved lower per-student costs because more students were able to access resources when services were offered during the regular school day. This result, combined with findings presented in chapter 5 indicating that students who participated in R-Tech as part of the regular school day experienced better testing outcomes, suggests that districts implementing non-supplemental programs made more cost-effective use of resources relative to districts that adhered to the grant's intent and offered supplemental R-Tech services.

Principals' responses to surveys and site visit interviews raise questions as to whether R-Tech will be sustained after grant funds have expired. More than half of principals surveyed in spring 2010 indicated that lack of funding would be a *moderate* or *substantial* barrier continuing services; however, most principals indicated they would seek additional funding to support ongoing implementation.

CHAPTER 7
SUMMARY OF FINDINGS AND DISCUSSION

The R-Tech evaluation sought to understand how districts implemented R-Tech grants, the effects of implementation on student and teacher outcomes, as well as the cost effectiveness and sustainability of R-Tech. This chapter summarizes the evaluations findings and presents responses to the evaluation's research questions drawn from information collected during R-Tech's 2- year implementation period. Because research questions are broad in scope, each question includes sub-questions that address specific aspects of the program's implementation and effectiveness.

RESEARCH QUESTION 1: HOW IS R-TECH IMPLEMENTED ACROSS GRANTEE DISTRICTS AND SCHOOLS?

The following sections describe the types of programs districts implemented using R-Tech funds, the barriers to implementation, and how barriers were overcome.

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. Program types are not discrete. That is, districts may have operated more than one type of program. For example, some R-Tech districts offered dual credit instruction at the high school and implemented a self-paced program focused on TAKS remediation at the middle school. Program types include:

1. Self-paced instructional software providing remediation, tutoring, and credit-recovery (87% of districts)
2. Dual credit and distance learning programs that allow students to earn college credit for courses that also fulfill high school requirements (30% of districts);
3. One-to-one tutoring with online instructional support (3% of districts);
4. Technology immersion programs (3% of districts); and
5. iPods loaded with instructional content (3% of districts).

In addition, researchers also categorized R-Tech programs as *supplemental* or *non-supplemental* depending on when students accessed 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. Overall, 40% of Cycle 1 districts offered non-supplemental programs in which students primarily accessed R-Tech resources as part of regular class instruction.

What barriers limited the implementation of R-Tech programs and how were barriers overcome?

Data collected across R-Tech's 2-year grant period indicate that most barriers to implementing R-Tech diminished as the program became more established. R-Tech facilitators participating in spring 2010 surveys reported having reduced roles in program implementation during the grant's second year; however, principals took on a greater role, particularly in communicating information about the grant to students and staff. The sections that follow discuss the key implementation barriers described by project stakeholders, and provide information about how barriers may have been overcome.

Student participation barriers. In spring 2009 interviews and surveys, principals and R-Tech facilitators identified barriers to student participation as the primary challenges to implementing R-Tech.

R-Tech facilitators and principals noted that transportation barriers limited student participation in services offered outside of regular school hours because many students relied on buses to get home and bus schedules did not permit students to arrive early or stay after school. In addition, conflicts with extracurricular activities and student work schedules limited participation for some students. In spring 2010, surveyed facilitators and principals indicated they had overcome these challenges by expanding access to R-Tech services during the regular school day. Principals and facilitators indicated that schools expanded available times and locations for student access to R-Tech services and required participation of some students during the school day. For example, some districts enrolled students in non-credit R-Tech courses during an elective period. Additionally, almost half of spring 2010 respondents reported that campus teachers implemented R-Tech services during regular classroom instruction as a means to increase student participation.

Beyond challenges to participating in instruction offered outside of the school day, some students reported barriers to participating in R-Tech caused by schools' poor technology infrastructure and outdated computer equipment, as well as students' lack of technology skills. In addition, some students reported that they were easily bored using software programs that focused on remediation and test preparation.

Communication barriers. Principals and R-Tech facilitators also indicated that communication barriers created challenges to implementation, particularly in the first implementation year. In many districts, campus-level staff did not participate in grant application processes and were unaware of grant requirements. 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. During the project's second year, communication barriers were reduced, in part because teachers and staff became more familiar with grant goals and activities as R-Tech was more fully implemented. However, strong administrative leadership contributed to improved communication in many districts. In some districts, administrators held R-Tech information sessions for staff, parents, and students. Strong leaders also ensured teacher participation in professional development activities and created policies for students' use of technology, including responsibility for damages. Notably, a majority of principals and facilitators responding to the spring 2010 survey (63%) identified strong administrative support as the factor that contributed most to successful implementation of R-Tech.

Technology challenges. Many districts reported challenges caused by outdated computer hardware and software and inadequate infrastructure to support R-Tech, including slow Internet connections. While some districts were able to overcome these challenges by upgrading their technology resources, results from surveys and interviews conducted in spring 2010 indicate that these challenges persisted for many respondents. Further, some districts experienced greater challenges in year 2 because of damage to equipment from increased usage and wear. In interviews conducted in spring 2010, some principals explained that the ongoing costs of maintaining or replacing equipment were a barrier to sustaining R-Tech when grant funds expired.

Teacher buy-in. In some districts, teachers were reluctant to use technology resources to support instruction. Resistance to using R-Tech resources resulted from teachers' inexperience using technology and district software purchases that did not align with curriculum standards or testing requirements. In addition, some teachers felt pressure to improve TAKS outcomes and perceived R-Tech as an instructional "frill" that was ancillary to testing goals. In site visit interviews, principals said they overcame teacher resistance to using R-Tech resources by clearly communicating expectations that resources would be used, creating requirements for use, and providing additional training and support for teachers who were unfamiliar with technology-based instructional tools.

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 implementation periods. In R-Tech's first 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. In year 2, approximately 3,300 students participated in summer 2009, about 13,000 participated in fall 2009, and nearly 14,000 participated in spring 2010. Campuses reported serving an average of 61 students in the summer of 2009, 145 students in the fall of 2009, and 152 students in the spring of 2010. The increase in students served by R-Tech reflects more complete implementation during the project's second year, as well as reduced barriers to student participation.

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. Consistent with 2008-09 findings, results from spring 2010 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 academic failures. Several districts targeted R-Tech services to specific student groups, including services designed to help ESL students improve their English language acquisition.

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

During R-Tech's first implementation year, the demographic characteristics of students who received R-Tech services in fall 2008 and spring 2009 largely mirrored those who did not participate, but the characteristics of students receiving summer R-Tech services were notably different. Specifically, R-Tech students accessing services during summer 2008 were more likely to be low income, minority middle school students compared to their peers who did not participate in R-Tech during summer school. This finding suggests that in summer of 2008, R-Tech campuses largely used summer school to support at-risk students during their transition to high school.

Similarly, demographic characteristics of students receiving R-Tech services in the fall 2009 and spring 2010 reporting periods were consistent with those of students who did not participate in R-Tech. However, students participating in R-Tech during the 2009 summer session were less likely to be identified as a minority or low income than summer 2008 participants. This shift likely reflects the broader implementation of R-Tech in summer 2009, and the inclusion of more students who were not academically at risk.

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

R-Tech districts were required to report the average number of hours students participated in R-Tech services, and to submit student use reports to TEA for the summer, fall and spring implementation periods in each grant year. As noted earlier in this chapter, the number of students included in district reports increased across reporting periods, suggesting that implementation expanded over time. Although the number of students receiving R-Tech services increased, the average amount of time students participated in services decreased across reporting periods. For example, students accessed R-Tech services for an average of 4.2 hours each week during the 2009 summer session, but students participating in R-Tech in summer 2008 spent an average of 7.5 hours each week accessing resources. Similarly, students used R-Tech resources about 2.8 hours each week in fall 2009 compared to 3.7 hours in fall 2008, and students spent about 2.6 hours each week receiving R-Tech services in spring 2010 compared to 3.8 hours in spring 2009.

This pattern suggests that R-Tech services were implemented more broadly but less intensively during the grant's second year. That is, more students accessed resources, but they did so for less time. It is likely that many students participating in R-Tech services in year 2 did not need intensive remediation and tutoring, but participated in R-Tech as a means to improve grades or as part of regular instruction. In contrast, the more concentrated implementation of R-Tech during the grant's first year suggests that services were initially offered to at-risk students who needed considerable remediation and support.

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 discussions with teachers on R-Tech campuses indicate that districts generally provided limited training to teachers. Notably, less than 5% of teachers responding to the fall 2008 survey (54 individuals), 38% of spring 2009 survey respondents (215 individuals), and 29% of spring 2010 respondents (392 individuals) reported they had participated in professional development related to R-Tech, which may indicate that R-Tech affected some teachers but did not have a broad impact on classroom instruction.

The proportion of teachers indicating they received R-Tech training is likely related to districts' R-Tech implementation. For example, teachers participating in focus group discussions on campuses in which R-Tech was implemented as part of the regular school day (i.e., non-supplemental programs) reported participating in more training than teachers on campuses implementing supplemental programs. Teachers participating in non-supplemental programs reported greater awareness of R-Tech services and more active roles in implementing the program than teachers in districts implementing supplemental programs.

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

Across survey administrations, most of the 392 teachers who indicated they participated in R-Tech professional development reported receiving training in TAKS/TEKS preparation (69%), integrating instructional technology (68%), and working with at-risk students (67%). Vendors generally provided teachers professional development onsite and in-person. Many teachers commenting on R-Tech training in response to surveys (212 individuals) considered learning how to use new software (26%) and hardware (23%) and integrate technology into classroom instruction (22%) as the most useful aspects of training sessions. Teachers who participated in R-Tech training generally could not identify a negative aspect of training. However, some teachers reported difficulty remembering what was addressed during R-Tech professional development because the sessions occurred too early in the school year.

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

Survey results suggest that R-Tech professional development activities had little effect on teachers' classroom practices. Across survey administrations, teachers reported that R-Tech had not affected classroom instruction or lesson planning, and few surveyed teachers were aware that they had participated in training related to R-Tech. However, as previously noted, teachers implementing non-supplemental programs during regular classroom instruction were more aware of R-Tech services and received more professional development than teachers working at schools implementing supplemental programs.

During focus groups conducted as part of spring site visits, teachers integrating technology into regular class instruction within a technology immersion program noted that the Internet allowed them to enhance their lesson plans and to easily provide visual and auditory examples of lesson content to students. In addition, teachers providing students access to online, self-paced programs during regular classroom instruction reported greater ability to individualize instruction, reinforce concepts, and target areas of student need. In contrast, teachers working at schools implementing supplemental programs appreciated the ability to provide remediation to struggling students, but did not link the program or the training content to classroom instructional practices.

Although few teachers reported improvements in instructional practice from R-Tech training, teachers participating in spring 2010 focus groups spoke of positive effects from the grant. Teachers said R-Tech increased their access to technology resources and that students were more engaged when they used these resources.

RESEARCH QUESTION 4: WHAT IS THE EFFECT OF R-TECH ON STUDENT OUTCOMES?

The evaluation considered the effect of R-Tech on student achievement outcomes, including TAKS and attendance rates. Given variations in the availability of outcome data, analyses of attendance outcomes are limited to R-Tech's first implementation year (2008-09), while analyses of TAKS outcomes consider the program's full 2-year implementation period.

Is there a relationship between the amount of time spent using R-Tech resources and student outcomes?

The amount of time a student participated in R-Tech services was not related to higher TAKS scores. If anything, the opposite was true. For example, students who more time in R-Tech had significantly lower reading/ELA and social studies TAKS scores than students who spent less time in R-Tech. It is important to note that students who spent more time in R-Tech may have differed from students who spent less time in R-Tech. For example, they could have been at greater academic risk, they could have been less motivated, or they could have differed on other characteristics that affect TAKS scores and were not included in regression models. The amount of time students' spent receiving R-Tech services did not demonstrate a relationship to students' attendance outcomes.

Is there a relationship between R-Tech program configurations and student outcomes?

The following sections consider whether the manner in which districts implemented R-Tech may have affected students' TAKS and attendance 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 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. Results indicated that programs implemented during the regular school day had a positive relationship to better testing outcomes in reading/ELA and mathematics, as well as to better attendance outcomes during the R-Tech's first implementation year. Thus, there is evidence that, everything else being equal, offering R-Tech services during regular instructional hours or during elective periods may be more beneficial than offering services outside regular instructional hours.

Program type. Results also indicated that students who participated in R-Tech self-paced instructional programs experienced reduced TAKS reading/ELA and mathematics scores relative to students participating in other types of programs. R-Tech dual credit and distance learning programs did not demonstrate a relationship with students' TAKS reading/ELA and mathematics scores. However, 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. Program type did not demonstrate a relationship to students' attendance outcomes.

RESEARCH QUESTION 5: HOW COST EFFECTIVE IS R-TECH?

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 2-year grant period, which program configurations made the most effective use of funding, and whether R-Tech will be sustained after grant funds expire. The findings presented in this section rely on financial information reported in TEA's ER system through July 2010. At that time, 31 Cycle 1 districts had accessed their full grant awards, and the remaining 32 districts had accessed about 71% of their grant funding, on average. In addition, only 62% of Cycle 1 districts had reported cost share expenditures in July 2010. Recognizing that the financial data included in analyses are incomplete, readers are asked to use caution in interpreting results.

How are grant funds allocated in R-Tech districts?

In order to understand how R-Tech districts allocated grant funds across the 2-year grant period, researchers examined district expenditure data submitted to TEA through 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.

Most R-Tech funding was used to purchase supplies and materials to support the grant's implementation. More than half of funds (54 %) were used to purchase a range of technology resources, including 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.

Districts spent a quarter of grant funds (25%) on payroll costs to support personnel related to R-Tech activities, including facilitators, computer lab staff, extra duty pay for teachers who worked before or after school to provide grant services, and for substitutes to enable teachers to participate in professional development. Districts implementing self-paced instructional programs had somewhat higher than average expenditures on payroll costs, which likely reflects increased expenditures on personnel to staff computer labs before and after school.

Smaller proportions of funding were spent on professional and contracted services (13%), including registration fees and tuition for dual credit or distance learning courses, technical support, and professional development activities, and capital outlay (6%).

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

The following sections discuss how districts' implementation strategies affected R-Tech's costs, and consider program size, the type of program implemented, and whether R-Tech services were implemented as supplemental or non-supplemental programs. Findings related to per-student costs of the program are limited to state-provided grant funding because more than a third of R-Tech districts (24) had not reported information about matching fund expenditures at the time of the report's writing. Across all R-Tech districts, the average cost per student of implementing the program in terms of state funding was about $294 for the 2-year grant period. Note that this amount overstates the average cost per student because districts invested substantial R-Tech funding in technology resources that will be used beyond the life of the grant, as well as by students who did not participate in R-Tech services. Further, because results are not linked to student achievement, it is difficult to know whether the programs that achieved lowest per-student costs were most "effective" in terms of improving student outcomes.

Program Size

Districts that served large numbers of students in R-Tech had the lowest per-student program costs. Districts that served 1,000 or more students had average per-student program costs of about $141, while districts that served fewer than 100 students had average per-student program costs of about $774. Mid-sized programs, serving between 250 and 499 students, had average per-student costs of about $289.

Type of R-Tech Program

Most R-Tech districts (87%) offered some form of self-paced instructional program, including online tutoring, remediation, and credit recovery. 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 522 students in R-Tech and incurred average per-student costs in terms of state-provided grant funding of about $296 for the 2-year grant period.

Districts that offered dual credit and distance learning programs (30%) spent less on technology purchases, but more on contracted services, including college tuition and fees. Overall, districts implementing this type of program served an average of 345 students and experienced the highest per-student costs—$490 per student, on average. Unlike investments in technology resources, which may be purchased once and serve multiple students, expenditures on college tuition and fees must be paid individually for each student participating in dual credit coursework and for each course, which may explain the high per-student expenditures for dual credit programs.

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, spending an average of $163,990 on supplies and materials in support of the grant. These districts implemented R-Tech broadly, serving 586 students, on average, which reduced their per-student costs of implementation relative to other R-Tech districts. Technology immersion districts had an average grant-funded per-student program cost of about $236. The two districts that used R-Tech funding to purchase iPods loaded with instructional resources for students implemented small programs, serving only 118 students, on average, and had average per-student costs of about $248.

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 ($212 vs. $353). This difference results from the number of students who were able to access R-Tech services. Districts offering supplemental programs served an average of 346 students across the 2-year grant period, while districts implementing R-Tech as part of the regular school day served an average of 693 students.

Is R-Tech sustainable?

Information about districts' ability to sustain R-Tech services once grant funds expire was gathered from surveys of principals on R-Tech campuses (spring 2009 and 2010) and through principal interviews conducted during spring 2010 site visits to six R-Tech districts. Principals' survey and interview responses reflect ambivalence about the sustainability of R-Tech. According to principals surveyed in 2010, lack of funding to sustain services is the greatest barrier to extending R-Tech beyond the grant period (58% of respondents). Principals responding to the 2010 survey also identified strategies to continuing R-Tech, and many 2010 respondents indicated they would seek additional funding (60%) or incorporate R-Tech into regular classroom instruction (31%) rather than providing supplemental instruction offered outside of scheduled classes. During site visit interviews, principals underscored the financial challenges to continuing R-Tech, but expressed commitment to finding additional funding to support services. Interviewed principals also raised concerns about aging computer resources, noting that older machines would have to be replaced.

DISCUSSION OF FINDINGS

Findings from the evaluation's second interim report, which considered findings for R-Tech's first year, indicate that many districts encountered barriers to implementation arising from the supplemental nature of the program. Results from surveys and interviews conducted during the 2008-09 school year indicated that many students identified for R-Tech services were unable to participate in supplemental instruction offered outside of the regular school day. Most notably, many students attending rural schools live a considerable distance from campus and rely on school buses for transportation. In many districts, bus schedules did not permit students to arrive early, stay after school, or attend Saturday school to participate in supplemental instruction. In addition, many students were unable to participate in supplemental R-Tech programs because of conflicts with extracurricular activities or work schedules, and some parents objected to students remaining after school because they relied on adolescent children to provide childcare for younger siblings. Further, some students simply would not participate in instructional programs offered outside of the regular school day.

As a means to overcome barriers to student participation, districts increasingly offered R-Tech services as part of the school day. Districts expanded access to computer labs during school hours, incorporated R-Tech resources in regular classroom instruction, and required some at-risk students to participate in R-Tech instruction rather than taking elective courses. As more students accessed R-Tech services in the grant's second year, it also appears that services were offered more broadly and included many students who were not identified for services because of poor academic performance, but who participated in R-Tech as part of regular instruction or to reinforce concepts taught in class.

Results from the 2-year evaluation underscore the benefits of implementing R-Tech within the school day. Despite having higher overall implementation costs, districts that implemented non-supplemental R-Tech programs experienced lower average per-student costs of implementation because more students were able to access resources when services were offered as part of the regular school day. Students who participated in R-Tech during the school day also experienced better reading/ELA and mathematics TAKS outcomes and better first year attendance rates relative to counterparts who participated in supplemental programs, although this difference may be the effect of student characteristics rather than program participation. That is, students participating in supplemental programs may have been at greater academic risk than students participating in more broadly implemented non-supplemental programs.

In addition to benefits in terms of student participation, districts implementing R-Tech as part of the regular school day also had greater teacher involvement in grant activities. Teachers working in schools implementing non-supplemental programs were more aware of R-Tech's goals and instructional resources than teachers in schools with supplemental programs, and teachers in non-supplemental programs were more likely to use resources to support instruction. In surveys and focus group discussions, teachers who incorporated R-Tech in classroom instruction noted the value of using R-Tech provided technology resources to differentiate instruction and present concepts to students with different learning styles.

Given the evaluation's 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 may improve student achievement outcomes.

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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, spring 2009, and spring 2010. 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. The spring 2010 survey also asked principals to identify the type of R-Tech program implemented on their campus and whether R-Tech was implemented as a supplemental program or as part of regular instruction. Principals who also acted as R-Tech facilitators responded to both sets of questions. Spring surveys 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, as well as 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 a copy of the spring 2010 principal and R-Tech facilitator surveys.[1]

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.

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[1]Copies of the fall 2008 and spring 2009 principal and R-Tech facilitator survey may be found in Appendix A of the evaluation's second interim report (February 2010).

Spring 2010

Similar to previous survey administrations, the principal of each school participating in R-Tech during the 2009-10 school year was sent a link to the voluntary, online principal and facilitator survey in April 2010. Principals were asked to forward the link to the individual or individuals who served as the R-Tech facilitator for the campus. Principals and facilitators were asked to complete the survey within 3 weeks and were provided with a 3 week extension in order to increase survey response rates.

Number of Survey Respondents and Response Rates: Fall 2008, Spring 2009, and Spring 2010

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).

In spring 2010, 173 individuals responded to the survey, of which 77 acted *only* as a principal, 83 acted *only* as a facilitator and were *not* principals, and 13 served in *both* roles. Nineteen schools had multiple R-Tech facilitators responding to the spring 2010 survey (14 campuses had two facilitators, two campuses had three facilitators, and one campus each had four, five, and six facilitators).

Table A.1
The Number of Responses, by Respondent Type: Fall 2008, Spring 2009, and Spring 2010

Respondent Type	Fall 2008 Number of Responses	Spring 2009 Number of Responses	Spring 2010 Number of Responses
Principal only	66	60	77
R-Tech facilitator only	71	61	83
Principal and facilitator[a]	16	15	13
Total	**153**	**136**	**173**

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
[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, spring 2009, and spring 2010 (N=115, N=115, and N=114 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, Spring 2009, and Spring 2010

	Fall 2008 (N=115) Campuses with Survey Respondents	Fall 2008 (N=115) Percentage of Campuses Responding	Spring 2009 (N=115) Campuses with Survey Respondents	Spring 2009 (N=115) Percentage of Campuses Responding	Spring 2010 (N=114) Campuses with Survey Respondents	Spring 2010 (N=114) Percentage of Campuses Responding
Principal	82	71.3%	75	65.2%	90	78.9%
R-Tech Facilitator	75	65.2%	65	56.5%	78	68.4%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
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, spring 2009, and spring 2010 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, Spring 2009, and Spring 2010

	Fall 2008 Principals (n=82)	Fall 2008 Facilitators (n=71)	Fall 2008 All Respondents (N=153)	Spring 2009 Principals (n=75)	Spring 2009 Facilitators (n=61)	Spring 2009 All Respondents (N=136)	Spring 2010 Principals (n=90)	Spring 2010 Facilitators (n=83)	Spring 2010 All Respondents (N=173)
Gender									
Male	65.9%	23.9%	46.4%	70.7%	19.7%	47.8%	61.1%	26.5%	44.5%
Female	34.1%	76.1%	53.6%	29.3%	80.3%	52.2%	38.9%	73.5%	55.5%
School level									
Middle school	36.6%	15.5%	26.8%	40.0%	24.6%	33.1%	41.1%	39.7%	40.5%
High school	58.5%	67.6%	62.7%	50.7%	52.5%	51.5%	53.3%	56.2%	54.6%
Other[a]	4.9%	16.9%	10.5%	9.3%	23.0%	15.4%	5.6%	4.1%	4.9%
Experience (average years)									
At current school	6.6	11.3	8.8	6.8	8.1	7.4	7.1	9.1	8.1
In current position at current school	3.3	5.8	4.4	3.7	4.7	4.1	3.5	5.4	4.4

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
[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: Spring 2009 and Spring 2010

	Spring 2009 Principals (N=75)	Spring 2009 Facilitators (N=61)	Spring 2009 Principals (N=90)	Spring 2009 Facilitators (N=83)
Planning implementation				
No involvement	12.0%	19.7%	4.4%	28.9%
Minor involvement	18.7%	14.8%	21.1%	12.0%
Moderate involvement	37.3%	16.4%	38.9%	24.1%
Substantial involvement	32.0%	49.2%	35.6%	34.9%
Identifying students				
No involvement	14.7%	24.6%	4.4%	33.7%
Minor involvement	18.7%	16.4%	18.9%	20.5%
Moderate involvement	34.7%	19.7%	41.1%	24.1%
Substantial involvement	32.0%	39.3%	35.6%	21.7%
Monitoring students' use				
No involvement	8.0%	13.1%	8.9%	21.7%
Minor involvement	33.3%	16.4%	30.0%	10.8%
Moderate involvement	49.3%	31.1%	44.4%	31.3%
Substantial involvement	9.3%	39.3%	16.7%	36.1%
Communicating with parents				
No involvement	10.7%	23.0%	3.3%	33.7%
Minor involvement	33.3%	32.8%	27.8%	22.9%
Moderate involvement	36.0%	26.2%	38.9%	24.1%
Substantial involvement	20.0%	18.0%	30.0%	19.3%
Participating in training				
No involvement	16.0%	14.8%	13.3%	28.9%
Minor involvement	40.0%	16.4%	38.9%	19.3%
Moderate involvement	30.7%	36.1%	41.1%	22.9%
Substantial involvement	13.3%	32.8%	6.7%	28.9%
Developing PEPs				
No involvement	17.3%	29.5%	13.3%	44.6%
Minor involvement	38.7%	24.6%	43.3%	25.3%
Moderate involvement	32.0%	24.6%	27.8%	15.7%
Substantial involvement	12.0%	21.3%	15.6%	14.5%
Providing technical support				
No involvement	32.0%	18.0%	22.2%	30.1%
Minor involvement	32.0%	24.6%	47.8%	16.9%
Moderate involvement	30.7%	27.9%	21.1%	25.3%
Substantial involvement	5.3%	29.5%	8.9%	27.7%
Other				
No involvement	34.6%	68.8%	54.2%	62.1%
Minor involvement	30.8%	6.3%	20.8%	6.9%
Moderate involvement	26.9%	12.5%	20.8%	10.3%
Substantial involvement	7.7%	12.5%	4.2%	20.7%

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
Note. This question was not asked in fall 2008.

Table A.5
The Challenges to R-Tech Implementation as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)	Spring 2010 (N=173)
Communication of R-Tech goals to parents			
Not a challenge	20.9%	18.4%	29.5%
Minor challenge	46.4%	33.1%	32.4%
Moderate challenge	25.5%	33.8%	30.1%
Substantial challenge	7.2%	14.7%	8.1%
Project reporting requirements			
Not a challenge	29.4%	23.5%	31.8%
Minor challenge	39.9%	36.8%	37.0%
Moderate challenge	23.5%	23.5%	22.5%
Substantial challenge	7.2%	16.2%	8.7%
Insufficient planning time			
Not a challenge	NA	20.6%	36.4%
Minor challenge	NA	40.4%	35.8%
Moderate challenge	NA	22.8%	19.7%
Substantial challenge	NA	16.2%	8.1%
Communication of R-Tech goals to staff			
Not a challenge	40.5%	28.7%	39.3%
Minor challenge	39.2%	33.1%	31.2%
Moderate challenge	18.3%	27.9%	23.1%
Substantial challenge	2.0%	10.3%	6.4%
Development of students' PEPs			
Not a challenge	26.8%	22.8%	34.1%
Minor challenge	40.5%	40.4%	37.0%
Moderate challenge	28.1%	30.1%	23.7%
Substantial challenge	4.6%	6.6%	5.2%
Monitoring students' progress			
Not a challenge	35.9%	23.5%	38.7%
Minor challenge	39.2%	43.4%	35.3%
Moderate challenge	22.9%	25.0%	19.1%
Substantial challenge	2.0%	8.1%	6.9%
Coordinating training for staff			
Not a challenge	32.0%	23.5%	32.9%
Minor challenge	41.8%	44.9%	37.6%
Moderate challenge	20.3%	24.3%	23.1%
Substantial challenge	5.9%	7.4%	6.4%
Conflicts with other programs			
Not a challenge	45.1%	31.6%	46.8%
Minor challenge	37.3%	44.1%	29.5%
Moderate challenge	13.1%	16.9%	18.5%
Substantial challenge	4.6%	7.4%	5.2%

(continued)

Table A.5
The Challenges to R-Tech Implementation as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010 (continued)

Challenge	Fall 2008 (N=153)	Spring 2009 (N=136)	Spring 2010 (N=173)
Level of technology resources			
Not a challenge	39.2%	32.4%	48.0%
Minor challenge	41.2%	40.4%	29.5%
Moderate challenge	17.0%	19.9%	17.3%
Substantial challenge	2.6%	7.4%	5.2%
Level of technical support			
Not a challenge	43.8%	36.8%	45.7%
Minor challenge	40.5%	39.7%	34.7%
Moderate challenge	12.4%	18.4%	15.0%
Substantial challenge	3.3%	5.1%	4.6%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
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, Spring 2009, and Spring 2010

Barrier and Intensity	Fall 2008 (N=153)	Spring 2009 (N=136)	Spring 2010 (N=173)
Student resistance			
Not a barrier	23.5%	28.7%	26.0%
Minor barrier	45.8%	36.0%	38.7%
Moderate barrier	26.1%	23.5%	26.6%
Substantial barrier	4.6%	11.8%	8.7%
Conflicts with school-sponsored extra-curricular activities			
Not a barrier	39.9%	36.8%	47.4%
Minor barrier	36.6%	36.8%	35.3%
Moderate barrier	21.6%	12.5%	12.7%
Substantial barrier	2.0%	14.0%	4.6%
Conflicts with athletic programs			
Not a barrier	37.9%	40.4%	45.1%
Minor barrier	37.9%	28.7%	28.9%
Moderate barrier	19.6%	16.9%	17.9%
Substantial barrier	4.6%	14.0%	8.1%
Conflicts with non-school extra-curricular activities			
Not a barrier	45.8%	43.4%	55.5%
Minor barrier	41.8%	36.0%	32.4%
Moderate barrier	12.4%	13.2%	9.8%
Substantial barrier	0.0%	7.4%	2.3%

(continued)

Table A.6
The Barriers to Student Participation in R-Tech Services as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010 (continued)

Barrier and Intensity	Fall 2008 Respondents (N=153)	Spring 2009 Respondents (N=136)	Spring 2010 Respondents (N=173)
Conflicts with student employment			
Not a barrier	42.5%	49.3%	57.2%
Minor barrier	33.3%	30.1%	26.0%
Moderate barrier	22.9%	14.0%	13.9%
Substantial barrier	1.3%	6.6%	2.9%
Conflicts with students' responsibilities at home			
Not a barrier	NA	NA	54.3%
Minor barrier	NA	NA	34.1%
Moderate barrier	NA	NA	9.8%
Substantial barrier	NA	NA	1.7%
Students' lack of proficiency using technology			
Not a barrier	NA	NA	63.0%
Minor barrier	NA	NA	31.8%
Moderate barrier	NA	NA	4.6%
Substantial barrier	NA	NA	.6%
Other			
Not a barrier	72.0%	50.0%	65.6%
Minor barrier	4.0%	13.6%	25.0%
Moderate barrier	4.0%	13.6%	6.3%
Substantial barrier	20.0%	22.7%	3.1%
Transportation limits			
Not a barrier	42.5%	50.0%	47.4%
Minor barrier	26.1%	22.8%	26.0%
Moderate barrier	19.6%	13.2%	15.6%
Substantial barrier	11.8%	14.0%	11.0%
Parent resistance			
Not a barrier	65.4%	58.1%	59.0%
Minor barrier	23.5%	33.8%	31.8%
Moderate barrier	9.2%	5.1%	8.7%
Substantial barrier	2.0%	2.9%	0.6%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Note. NA=Not applicable. These barriers were not included on the fall 2008 and spring 2009 surveys.

Table A.7
The Barriers to Dual Credit Implementation as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Challenge to Implementing Dual Credit	Fall 2008 Respondents (N=33)	Spring 2009 Respondents (N=29)	Spring 2010 Respondents (N=43)
Misaligned university and district semester timelines			
Not a challenge	36.4%	31.0%	39.5%
Minor challenge	30.3%	31.0%	27.9%
Moderate challenge	27.3%	24.1%	23.3%
Substantial challenge	6.1%	13.8%	9.3%
Tuition costs			
Not a challenge	27.3%	34.5%	34.9%
Minor challenge	33.3%	31.0%	27.9%
Moderate challenge	12.1%	24.1%	25.6%
Substantial challenge	27.3%	10.3%	11.6%
Textbook costs			
Not a challenge	27.3%	34.5%	34.9%
Minor challenge	30.3%	31.0%	32.6%
Moderate challenge	27.3%	24.1%	20.9%
Substantial challenge	15.2%	10.3%	11.6%
Student disinterest			
Not a challenge	24.2%	44.8%	37.2%
Minor challenge	48.5%	24.1%	44.2%
Moderate challenge	15.2%	27.6%	11.6%
Substantial challenge	12.1%	3.4%	7.0%
Coordination/ communication with university partners			
Not a challenge	45.5%	37.9%	30.2%
Minor challenge	39.4%	41.4%	46.5%
Moderate challenge	12.1%	20.7%	14.0%
Substantial challenge	3.0%	0.0%	9.3%
Student failure in dual credit courses			
Not a challenge	NA	41.4%	34.9%
Minor challenge	NA	41.4%	55.8%
Moderate challenge	NA	6.9%	4.7%
Substantial challenge	NA	10.3%	4.7%
Coordinating technical support between district and university partners			
Not a challenge	NA	31.0%	32.6%
Minor challenge	NA	51.7%	39.5%
Moderate challenge	NA	13.8%	14.0%
Substantial challenge	NA	3.4%	14.0%

(continued)

Table A.7
The Barriers to Dual Credit Implementation as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010 (continued)

Challenge to Implementing Dual Credit	Fall 2008 Respondents (N=33)	Spring 2009 Respondents (N=29)	Spring 2010 Respondents (N=43)
Identification of appropriate course offerings			
Not a challenge	63.6%	34.5%	41.9%
Minor challenge	27.3%	55.2%	46.5%
Moderate challenge	6.1%	10.3%	9.3%
Substantial challenge	3.0%	0.0%	2.3%
Other[a]			
Not a challenge	75.0%	50.0%	50.0%
Minor challenge	25.0%	16.7%	25.0%
Moderate challenge	0.0%	33.3%	12.5%
Substantial challenge	0.0%	0.0%	12.5%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Notes. The number of respondents (N) represents principals and facilitators at schools implementing dual credit programs. NA=Not applicable. These challenges were not included on the fall 2008 survey.
[a] In 2009, 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. Similarly, in 2009, only one respondent provided an open-ended response describing "other" challenges. This respondent reported that postsecondary partner institutions continually changed course requirements and expectations.

Table A.8
Principals' Perceptions of Barriers to R-Tech Sustainability as a Percentage of Respondents: Spring 2009 and Spring 2010

	Spring 2009 (N=75) Number	Spring 2009 (N=75) Percent	Spring 2010 (N=90) Number	Spring 2010 (N=90) Percent
Lack of student interest				
Not a barrier	24	32.0%	39	43.3%
Minor barrier	30	40.0%	36	40.0%
Moderate barrier	16	21.3%	8	8.9%
Substantial barrier	5	6.7%	7	7.8%
Lack of staff interest				
Not a barrier	29	38.7%	41	45.6%
Minor barrier	31	41.3%	40	44.4%
Moderate barrier	10	13.3%	6	6.7%
Substantial barrier	5	6.7%	3	3.3%
Insufficient financial resources				
Not a barrier	17	22.7%	20	22.2%
Minor barrier	22	29.3%	18	20.0%
Moderate barrier	15	20.0%	24	26.7%
Substantial barrier	21	28.0%	28	31.1%
Insufficient technology resources (e.g., hardware, software)				
Not a barrier	30	40.0%	30	33.3%
Minor barrier	25	33.3%	28	31.1%
Moderate barrier	13	17.3%	19	21.1%
Substantial barrier	7	9.3%	13	14.4%
Insufficient technical support				
Not a barrier	37	49.3%	37	41.1%
Minor barrier	21	28.0%	36	40.0%
Moderate barrier	11	14.7%	10	11.1%
Substantial barrier	6	8.0%	7	7.8%
Other				
Not a barrier	59	78.7%	3	3.3%
Minor barrier	7	9.3%	2	2.2%
Moderate barrier	5	6.7%	2	2.2%
Substantial barrier	4	5.3%	0	0.0%

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.

This survey is secure socket layer (SSL) protected.
All data are encrypted for transmission.

Texas Rural Technology (R-Tech) Pilot
Online Principal and R-Tech Facilitator Survey
Spring 2010

The Texas Center for Educational Research (TCER) is conducting an evaluation of the Texas Rural Technology (R-Tech) Pilot under contract with the Texas Education Agency (TEA). As part of the evaluation, TCER is asking principals and R-Tech facilitators from each campus where R-Tech is implemented to participate in an online survey. The purpose of this survey is to collect information about the effect of R-Tech on schools, teachers, and students. The survey is voluntary and will take approximately 15 minutes to complete. All information collected through the survey will remain confidential. TCER will not share your individual answers with anyone in your school or district, or at TEA. All survey information will be reported in aggregate and will not be linked to an individual respondent. If you have any questions about this survey or the evaluation, please contact Catherine Maloney at TCER (512-467-3596 or catherine.maloney@tcer.org) or Candace Macken at TEA (512-463-7814 or programeval@tea.state.tx.us).

By clicking here, then NEXT, you are agreeing to complete this survey.

○

Texas Rural Technology (R-Tech) Pilot
Online Principal and R-Tech Facilitator Survey
Spring 2010

If you require a paper and pencil version of the survey, please contact Dana Beebe at 800-580-8237.
Please complete the online survey by May 7, 2010. Thank you for your participation!

GENERAL INFORMATION

School Name

____

District Name

____

What is your gender?

○ Male
○ Female

Including this school year, how many years have you been employed at **this** school?

____

Including this school year, how many years have you been employed at this school in your **current** position?

____

R-TECH IMPLEMENTATION

Please indicate the extent to which **you** are involved in the R-Tech Program this school year.

	No Involvement	Minor Involvement	Moderate Involvement	Substantial Involvement
Planning R-Tech implementation	○	○	○	○
Identification of R-Tech students	○	○	○	○
Developing students' Personal Education Plans (PEP)	○	○	○	○
Monitoring students' use of R-Tech services	○	○	○	○
Participating in R-Tech training opportunities	○	○	○	○
Providing technical support	○	○	○	○
Communicating with parents	○	○	○	○
Other (specify) ______________________	○	○	○	○

Please describe the extent to which each of the following issues presents a challenge to implementing the R-Tech Program in your school.

	Not a Challenge	Minor Challenge	Moderate Challenge	Substantial Challenge
Communication of R-Tech goals to staff	◯	◯	◯	◯
Communication of R-Tech goals to parents	◯	◯	◯	◯
Identification of R-Tech students	◯	◯	◯	◯
Development of R-Tech student Personal Education Plans (PEP)	◯	◯	◯	◯
Monitoring R-Tech student progress	◯	◯	◯	◯
Communication/coordination with R-Tech vendors	◯	◯	◯	◯
Coordinating R-Tech training for teachers and staff	◯	◯	◯	◯
Level of technology resources	◯	◯	◯	◯
Level of technical support	◯	◯	◯	◯
Project reporting requirements	◯	◯	◯	◯
Conflicts with other programs	◯	◯	◯	◯
Teachers/staff lack technical skills	◯	◯	◯	◯
Insufficient planning time	◯	◯	◯	◯
Lack staff needed to implement R-Tech	◯	◯	◯	◯
Space limitations (e.g., insufficient space in computer labs)	◯	◯	◯	◯
Other (specify) ______	◯	◯	◯	◯

Please indicate the methods by which your school addressed or overcame challenges to R-Tech implementation this school year. **(Mark all that apply.)**

Method

- ☐ My school did not experience challenges in implementing R-Tech.
- ☐ Upgraded technology infrastructure
- ☐ Purchased additional computer hardware (i.e., computers, laptops, printers, etc.)
- ☐ Purchased additional computer software (i.e., instructional programs, software licenses, etc.)
- ☐ Purchased additional furnishings (i.e., tables, desks, computer carrels, etc.)
- ☐ Held R-Tech information sessions for parents and students
- ☐ Held R-Tech information sessions for teachers and staff
- ☐ Added staff to manage R-Tech implementation tasks
- ☐ Expanded vendor role in providing support for R-Tech implementation and reporting
- ☐ Provided training to improve teacher/staff technology skills
- ☐ Other

(specify)

	Yes	No
Does your campus offer dual credit instruction as part of R-Tech?	○	○

Please describe the extent to which each of the following issues presents a challenge to implementing the R-Tech dual credit offerings in your school.

	Not a Challenge	Minor Challenge	Moderate Challenge	Substantial Challenge
Identification of appropriate dual credit course offerings	○	○	○	○
Coordination/communication with college/university partners	○	○	○	○
Misaligned college/university and district semester timelines	○	○	○	○
Textbook costs	○	○	○	○
Tuition costs	○	○	○	○
Student disinterest	○	○	○	○
Student failure in dual credit courses	○	○	○	○
Coordinating technical support between district and college/university partners	○	○	○	○
Other	○	○	○	○

(specify)

Please indicate the methods by which your school addressed or overcame challenges to implementing R-Tech dual credit offerings. (**Mark all that apply**.)

Method

- ☐ My school did not experience challenges in implementing R-Tech dual credit offerings.
- ☐ Provided additional counseling/tutoring support for dual credit students
- ☐ Adjusted district calendar to accommodate university course timelines
- ☐ Used High School Allotment (HSA) or other funds to cover textbook/tuition costs
- ☐ Held dual credit information sessions for students and parents
- ☐ Collaborated with college/university staff to resolve implementation challenges
- ☐ Other

(specify)

R-TECH AND STUDENTS

How are students identified for R-Tech services on your campus? (**Mark all that apply**.)

Student Identification Factors

- ☐ Parent/student interest
- ☐ Poor performance on the TAKS test
- ☐ Poor performance on another assessment
- ☐ Poor grades
- ☐ Teacher referral
- ☐ Curricular need (dual credit)
- ☐ First-generation college student
- ☐ Other

(specify)

Please indicate the extent to which each of the following issues may present barriers to student participation in R-Tech services on your campus.

	Not a Barrier	Minor Barrier	Moderate Barrier	Substantial Barrier
Parent resistance	○	○	○	○
Student disinterest/resistance	○	○	○	○
Transportation (e.g., bus schedules limit students' access before/after school)	○	○	○	○
Conflicts with athletic programs	○	○	○	○
Conflicts with school-sponsored extra-curricular student activities	○	○	○	○
Conflicts with non-school-sponsored extra-curricular student activities	○	○	○	○
Conflicts with student work schedules	○	○	○	○
Conflicts with students' responsibilities at home (e.g., babysitting)	○	○	○	○
Students' lack of proficiency using technology	○	○	○	○
Other	○	○	○	○

(specify)

Please indicate the methods by which your school addressed or overcame challenges to student participation in R-Tech on your campus. (**Mark all that apply**.)

Method

- ☐ My school did not experience challenges to student participation in R-Tech.
- ☐ Provided additional transportation opportunities (e.g., car pools, expanded bus service, etc.)
- ☐ Expanded the available times and locations for R-Tech service delivery
- ☐ Implemented incentives for R-Tech participation (e.g., award extra credit, additional grades, etc.)
- ☐ Developed R-Tech promotional materials (i.e., brochures, handouts, advertisements)
- ☐ Required R-Tech participation for some students (i.e., mandatory participation)
- ☐ Implemented R-Tech as part of regular classroom instruction.
- ☐ Other

(specify)

What are the key benefits of R-Tech for students?

What are the key challenges to implementing R-Tech for students?

R-TECH AND TEACHERS

Please indicate the extent to which teachers, on average, are involved in R-Tech.

	No Involvement	Minor Involvement	Moderate Involvement	Substantial Involvement
Planning R-Tech implementation	○	○	○	○
Identification of R-Tech students	○	○	○	○
Developing students' Personal Education Plans (PEP)	○	○	○	○
Monitoring students' use of R-Tech services	○	○	○	○
Monitoring R-Tech students' academic progress	○	○	○	○
Participating in R-Tech training opportunities	○	○	○	○
Providing technical support	○	○	○	○
Other	○	○	○	○

(specify)

____

What are the key benefits of R-Tech for teachers?

____

____

What are the key challenges to implementing R-Tech for teachers?

____

____

Where do R-Tech professional development activities usually take place?

○ On site, in person
○ Off site, in person
○ Online

What types of professional development activities are offered to teachers through R-Tech? (**Mark all that apply**.)

Activities

- ☐ Visiting another district's R-Tech program
- ☐ Introduction to R-Tech vendor software
- ☐ Using instructional hardware (e.g., Smart Boards, laptops, iPods, etc.)
- ☐ Curricular alignment
- ☐ Working with at-risk students
- ☐ Facilitating technology-based instruction
- ☐ TEKS/TAKS preparation
- ☐ College readiness preparation
- ☐ Course for college credit
- ☐ Study groups (assorted topics)
- ☐ Participation in online R-Tech training not related to vendor software
- ☐ Other

(specify)

Please indicate the extent to which you would agree with the following statements regarding the effect of R-Tech on teachers.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Teaching has improved.	○	○	○	○	○
Teachers' technical skills and abilities have improved.	○	○	○	○	○
Teachers have a greater awareness of technology-based learning opportunities for students.	○	○	○	○	○
Teachers have the opportunity to participate in technology-based professional development.	○	○	○	○	○
Teachers have a better understanding of the needs of at-risk students.	○	○	○	○	○
Teachers' lesson plans have improved.	○	○	○	○	○

R-TECH GOALS

Please respond to the following items addressing the goals of R-Tech on your campus.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
The goals of R-Tech are clear.	○	○	○	○	○
The expectations of R-Tech are clear.	○	○	○	○	○
R-Tech vendor services are aligned with our campus goals.	○	○	○	○	○
R-Tech vendor services are aligned with the TEKS/TAKS.	○	○	○	○	○
R-Tech is positively affecting student achievement on this campus.	○	○	○	○	○
R-Tech is positively affecting classroom instruction on this campus.	○	○	○	○	○
Overall, I am pleased with the services provided by R-Tech.	○	○	○	○	○

Please mark your role on this campus.

Principal Only	R-Tech Facilitator Only	Principal and R-Tech Facilitator
○	○	○

TYPE OF R-TECH PROGRAMS

Below please find brief descriptions of commonly implemented R-Tech programs. Please select the program type that most closely fits your school's *primary* approach to implementing R-Tech. If none of the categories describes your school's program, please select "Other" and briefly describe how your school is implementing R-Tech.
(Choose only one program type.)

Program Type

- ○ **Self-paced instructional programs.** These 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.
- ○ **Dual credit and distance learning programs.** These 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.
- ○ **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.
- ○ **iPods loaded with instructional content.** Some R-Tech districts provide students with iPods loaded with instructional programs, as a means to extend learning beyond the school day. Teachers provide students with assigned videos and podcasts and follow up with activities to ensure students understand the content they view.
- ○ **One-to-one tutoring with online instructional support.** In this type of R-Tech program, tutors provide students with one-to-one instruction, and students have access to technology-based instructional support that complements work completed in tutorials.
- ○ **Other**

Please describe:

____

____

____

STUDENT ACCESS TO R-TECH RESOURCES

Below please find a list of common ways that students access R-Tech resources. Please select the manner in which most students who receive R-Tech services at your school access R-Tech resources. If none of the listed ways describes how students access resources on your campus, please select "Other" and briefly describe how students access R-Tech resources on your campus. **(Choose only one.)**

Most students access R-Tech resources...

- ○ in a computer lab outside of regularly scheduled class time (e.g., before or after school, during study hall).
- ○ using a home computer.
- ○ throughout the school day using a laptop assigned to the student.
- ○ when teachers schedule class time in the school's computer lab.
- ○ at home using a laptop computer students have checked out (on loan) from school.
- ○ using iPods that students take home.
- ○ using two-way video conferencing equipment (e.g., dual credit courses).
- ○ when teachers send individual students or small groups of students to the computer lab during class time.
- ○ Other

Please describe:

What are your goals for R-Tech's effects on teachers?

How will you know if teacher goals have been met?

In what ways has R-Tech supported increased teacher effectiveness on your campus?

R-TECH SUSTAINABILITY

Please indicate the extent to which each of the following may pose barriers to sustaining R-Tech services after grant funds expire.

	Not a Barrier	Minor Barrier	Moderate Barrier	Substantial Barrier
Lack of student interest	○	○	○	○
Lack of staff interest	○	○	○	○
Insufficient financial resources	○	○	○	○
Insufficient technology resources (e.g., hardware, software)	○	○	○	○
Insufficient technical support	○	○	○	○
Other	○	○	○	○

(specify)

Please indicate the methods by which your school will address barriers to sustaining R-Tech services after grant funds expire (**Mark all that apply**.)

Method

- ☐ My school will not experience barriers to sustaining R-Tech services after grant funds expire.
- ☐ Seek additional grants or funding sources to support R-Tech services
- ☐ Incorporate R-Tech services as part of classroom instruction
- ☐ Incorporate R-Tech services as part of an alternative education program
- ☐ Discontinue R-Tech services when grant funds expire
- ☐ Other

(specify)

Please select continue and then click on NEXT to move to the final question(s). ○ **Continue**

R-TECH TRAINING

Please describe the content of the training you have received to assist you in implementing R-Tech.

Overall, how many hours of training have you received to assist you in implementing R-Tech during the 2009-10 school year?

Do you hold a technology certificate? **(Mark only one.)**

- ○ Technology Applications 8-12
- ○ Computer Science 8-12
- ○ Technology Applications-All Levels
- ○ Master Technology Teacher
- ○ I am not certified as a technology specialist.

Please select continue and then click on NEXT to move to the final question(s). ○ **Continue**

What contributed most to your school's ability to implement R-Tech (e.g., pre-existing resources, strong administrative support)?

If you have other comments about the challenges and benefits of implementing R-Tech, please enter them here:

TO COMPLETE THE SURVEY HIT SUBMIT.

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APPENDIX B

THE ONLINE TEACHER SURVEY

The evaluation included a voluntary, online survey of all teachers working on R-Tech campuses. The survey was administered in fall 2008, spring 2009, and again in spring 2010. 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.

Spring 2010

Similar to previous survey administrations, the principal of each school participating in R-Tech during the 2009-10 school year was sent a link to the spring 2010 teacher survey and was asked to forward the link to each teacher working on the campus. Teachers were provided with 3 weeks to complete the survey and the survey administration was extended an additional 3 weeks in order to increase response rates. Principals also received survey reminders across the survey administration period.

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 fall 2008, 1,213 teachers working on 92 R-Tech campuses responded to the survey of teachers. In spring 2009, 568 teachers on 77 R-Tech campuses responded and in spring 2010, 1,377 teachers on 94 campuses responded to the survey. The percentage of campuses with teachers responding in fall 2008, spring 2009, and spring 2010 were 80%, 67%, and 82%, 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, from 1 to 42 in spring 2009, and from 1 to 57 in spring 2010. 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 2008-09 school year.[2] 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% across all survey administrations. Campus response rates of greater than 100% are likely the result of teachers' aides and other support staff participating in the 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, Spring 2009, and Spring 2010

Response Rate	Fall 2008	Spring 2009	Spring 2010
Campus-Level Response Rates			
Number of campuses surveyed	115	115	114
Campuses with teachers responding	92	77	94
Percentage of campuses with respondents	80.0%	67.0%	82.5%
Teacher-Level Response Rates			
Teacher counts	3,672	3,620	3,721
Number of teachers responding to survey	1,213	568	1,377
Percentage of teachers responding to survey	33.0%	15.7%	37.0%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010; Academic Excellence Indicator System (AEIS) data files 2008-09.

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

CHARACTERISTICS OF SURVEY RESPONDENTS

Table B.2 presents information about the characteristics of teachers who responded to the fall 2008, spring 2009, and spring 2010 surveys.

Table B.2
The Characteristics of Teacher Survey Respondents as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

	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)	Spring 2010 Middle School Teachers (n=544)	Spring 2010 High School Teachers (n=833)	Spring 2010 All Teachers (N=1,377)
Gender									
Male	22.7%	41.5%	35.7%	21.8%	35.8%	31.0%	21.0%	43.1%	34.4%
Female	77.3%	58.5%	64.3%	78.2%	64.2%	69.0%	79.0%	56.9%	65.6%
Teaching assignment: Grade									
6th grade	41.7%	5.4%	16.6%	49.2%	5.9%	21.0%	46.0%	4.7%	21.0%
7th grade	71.4%	11.9%	30.3%	69.0%	12.9%	32.4%	62.1%	8.8%	29.8%
8th grade	66.3%	12.4%	29.0%	72.1%	14.0%	34.2%	65.3%	10.4%	32.1%
9th grade	3.2%	74.3%	52.3%	3.6%	78.7%	52.6%	1.3%	74.8%	45.8%
10th grade	1.1%	83.4%	58.0%	2.0%	86.0%	56.9%	0.4%	83.8%	50.8%
11th grade	0.8%	84.5%	58.7%	1.5%	87.1%	57.4%	1.3%	84.9%	51.9%
12th grade	0.5%	81.6%	56.6%	0.0%	82.7%	54.0%	0.6%	80.0%	48.6%
Experience (in average years)	6.4	7.3	7.0	6.7	7.0	6.9	6.5	7.8	7.3

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
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' Role in R-Tech Implementation as a Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Implementation Role	Fall 2008 Respondents (N=1,213)	Spring 2009 Respondents (N=568)	Spring 2010 Respondents (N=1,377)
Supervise or monitor students			
No role	67.0%	54.4%	61.9%
Minor role	11.4%	12.1%	14.1%
Moderate role	9.5%	15.3%	13.3%
Substantial role	12.1%	18.1%	10.7%
Communication with parents			
No role	75.5%	69.0%	70.5%
Minor role	13.3%	16.0%	16.4%
Moderate role	8.2%	8.5%	9.3%
Substantial role	3.0%	6.5%	3.8%
Monitor Personal Education Plans			
No role	76.0%	69.9%	72.8%
Minor role	8.9%	12.0%	13.4%
Moderate role	8.8%	8.8%	8.4%
Substantial role	6.3%	9.3%	5.4%
Identification of students			
No role	77.9%	71.0%	68.4%
Minor role	11.2%	15.7%	16.5%
Moderate role	7.4%	7.9%	9.7%
Substantial role	3.5%	5.5%	5.4%
Develop Personal Education Plans			
No role	79.6%	74.8%	76.0%
Minor role	9.8%	11.6%	12.2%
Moderate role	6.1%	7.7%	7.3%
Substantial role	4.5%	5.8%	4.5%
Identify R-Tech professional development topics			
No role	82.5%	77.8%	79.5%
Minor role	12.0%	11.8%	11.2%
Moderate role	4.1%	7.6%	6.5%
Substantial role	1.4%	2.8%	2.8%
Provide technical support			
No role	82.7%	78.7%	79.2%
Minor role	12.0%	13.4%	13.1%
Moderate role	3.5%	4.8%	5.4%
Substantial Role	1.7%	3.2%	2.4%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.

Table B.4
Teachers' Views of R-Tech Goals and Outcomes as a Percentage of Respondents, by Level of Agreement: Fall 2008, Spring 2009, and Spring 2010

Statements about Goals	Fall 2008 Respondents (N=1,213)	Spring 2009 Respondents (N=568)	Spring 2010 Respondents (N=1,377)
Overall, I am pleased with the services provided by R-Tech.			
Agree/Strongly agree	39.7%	50.7%	44.6%
Disagree/Strongly disagree	3.1%	4.2%	4.1%
Don't know	57.3%	45.1%	51.3%
R-Tech is positively affecting student achievement on campus.			
Agree/Strongly agree	38.3%	50.4%	43.3%
Disagree/Strongly disagree	2.4%	5.1%	4.5%
Don't know	59.3%	44.5%	52.2%
Vender services are aligned with the TEKS/TAKS.			
Agree/Strongly agree	38.4%	47.5%	40.2%
Disagree/Strongly disagree	2.7%	4.4%	3.3%
Don't know	58.9%	48.1%	56.6%
Goals are clearly communicated.			
Agree/Strongly agree	35.9%	44.5%	38.8%
Disagree/Strongly disagree	16.7%	18.3%	18.4%
Don't know	47.5%	37.1%	42.8%
Vender services are aligned with our campus goals.			
Agree/Strongly agree	35.4%	42.4%	36.1%
Disagree/Strongly disagree	3.2%	5.8%	3.7%
Don't know	61.4%	51.8%	60.2%
I use information from students' Personal Education Plans when I plan classroom instruction.			
Agree/Strongly agree	23.7%	29.4%	27.5%
Disagree/Strongly disagree	19.3%	25.0%	21.9%
Don't know	57.0%	45.6%	50.7%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
Notes. Because notably small percentages of teachers *strongly agreed* (< 12%) or *strongly disagreed* (< 5%) across statements of R-Tech goals in spring 2009, Table B.4 presents responses as summed percentages. 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 2008, spring 2009, and spring 2010 surveys.

Table B.5
Format of Professional Development as a Percentage of Respondents: Spring 2010

Format	Middle School (n=544)	High School (n=833)	All Respondents (N=1,377)
Onsite, in person	83.6%	88.1%	86.2%
Offsite, in person	11.5%	5.7%	8.2%
Online	4.8%	6.2%	5.6%

Source: R-Tech Teacher Survey, spring 2010
Note. Data is note presented for fall 2008 and spring 2009 because this item was added to the spring 2010 survey. In previous survey administrations, teachers were asked to identify the format of each type of training session they attended. For information regarding the format of professional development in fall 2008 and spring 2009, see Figure 5.2 in chapter 5 of the evaluation's second interim report.

Table B.6
The Effects of R-Tech Implementation on Teachers as a Percentage of Respondents, by Level of Agreement: Fall 2008, Spring 2009, and Spring 2010

Positive Effects	Fall 2008 Respondents (N=1,213)	Spring 2009 Respondents (N=568)	Spring 2010 Respondents (N=1,377)
I have a greater awareness of technology-based learning opportunities for students.			
Agree/Strongly agree	49.5%	59.9%	55.0%
Disagree/Strongly disagree	5.9%	6.2%	5.8%
Don't know	44.6%	34.0%	39.1%
I have the opportunity to participate in technology-based professional development.			
Agree/Strongly agree	47.9%	55.6%	51.9%
Disagree/Strongly disagree	5.1%	8.6%	7.0%
Don't know	47.0%	35.7%	41.2%
My technical skills and abilities have improved.			
Agree/Strongly agree	43.4%	53.2%	48.8%
Disagree/Strongly disagree	7.4%	9.2%	6.5%
Don't know	49.1%	37.3%	44.7%
I have a better understanding of the needs of at-risk students.			
Agree/Strongly agree	41.5%	50.5%	47.9%
Disagree/Strongly disagree	10.3%	11.8%	10.1%
Don't know	48.2%	37.7%	42.0%
My teaching has improved.			
Agree/Strongly agree	38.3%	47.2%	43.4%
Disagree/Strongly disagree	7.6%	9.7%	7.4%
Don't know	54.1%	43.1%	49.2%
My lesson plans have improved.			
Agree/Strongly agree	36.2%	43.5%	41.0%
Disagree/Strongly disagree	11.4%	13.7%	11.5%
Don't know	52.4%	42.8%	47.5%

Sources: R-Tech Teacher Survey, fall 2008, spring 2009, and spring 2010.
Notes. Because notably small percentages of teachers *strongly agreed* (< 14%) or *strongly disagreed* (< 3%) across statements about R-Tech effects in spring 2009, Table B.6 presents responses as summed percentages. 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 2008, spring 2009, and spring 2010 surveys.

This survey is secure socket layer (SSL) protected.
All data are encrypted for transmission.

Texas Rural Technology (R-Tech) Pilot
Online Teacher Survey Spring 2010

The Texas Center for Educational Research (TCER) is conducting an evaluation of the Texas Rural Technology (R-Tech) Pilot under contract with the Texas Education Agency (TEA). As part of the evaluation, TCER is asking teachers from each campus where R-Tech is implemented to participate in an online survey. The purpose of this survey is to collect information about the effect of R-Tech on schools, teachers, and students. The survey is voluntary and will take approximately 15 minutes to complete. All information collected through the survey will remain confidential. TCER will not share your individual answers with anyone in your school or district, or at TEA. All survey information will be reported in aggregate and will not be linked to an individual respondent.

If you have any questions about this survey or the evaluation, please contact Catherine Maloney at TCER (512-467-3596 or catherine.maloney@tcer.org) or Candace Macken at TEA (512-463-7814 or programeval@tea.state.tx.us).

By clicking here, then NEXT, you are agreeing to complete this survey.

○

Texas Rural Technology (R-Tech) Pilot
Online Teacher Survey Spring 2010

If you require a paper and pencil version of the survey, please contact Dana Beebe at 800-580-8237.
Please complete the online survey by **May 7, 2010**. Thank you for your participation!

GENERAL INFORMATION

School Name ____________________

District Name ____________________

What is your gender?

○ Male
○ Female

What grades do you currently work with at this school? (**Mark all that apply**.)	6	7	8	9	10	11	12
	☐	☐	☐	☐	☐	☐	☐

What is your primary teaching assignment? (**Mark only one**.)

○ Mathematics
○ Science
○ English/language arts
○ Social studies/history
○ Self-contained (i.e., teach multiple subjects to the same group of students)
○ Other

(specify)

____

Including this school year, how many years have you been working in your current position **at this school**?

____

R-TECH IMPLEMENTATION

Please describe the extent of your role in implementing the R-Tech Program in your school.

	No Role	Minor Role	Moderate Role	Substantial Role
Identification of R-Tech students	○	○	○	○
Communication with R-Tech parents	○	○	○	○
Supervise R-Tech students	○	○	○	○
Develop R-Tech student Personal Education Plans (PEP)	○	○	○	○
Monitor R-Tech student Personal Education Plans (PEP)	○	○	○	○
Identify R-Tech professional development topics	○	○	○	○
Coordinate R-Tech vendor services	○	○	○	○
Provide technical support	○	○	○	○
Other role	○	○	○	○

(specify)

____

Have you experienced any challenges in implementing R-Tech?

○ Yes
○ No
○ I have no role in implementing the R-Tech Program.

Please describe these challenges.

R-TECH PROFESSIONAL DEVELOPMENT

Please indicate whether you have participated in any of the following professional development activities this school year. (**Mark all that apply**.)

- ☐ I did not participate in professional development activities this school year.
- ☐ Visiting another district's R-Tech program
- ☐ Introduction to R-Tech vendor software
- ☐ Using instructional hardware (e.g., Smart Boards, laptops, iPods,etc.)
- ☐ Curricular alignment
- ☐ Working with at-risk students
- ☐ Facilitating technology-based instruction
- ☐ TEKS/TAKS preparation
- ☐ College readiness preparation
- ☐ Course for college credit
- ☐ Study groups (assorted topics)
- ☐ Participation in online R-Tech training not related to vendor software
- ☐ Other

(specify)

____

Have you participated in training implemented as part of your district's R-Tech grant?

- ○ Yes
- ○ No
- ○ I don't know

Where do R-Tech professional development activities usually take place?

- ○ On site, in person
- ○ Off site, in person
- ○ Online

What was the <u>most</u> useful aspect of R-Tech professional development?

____

What was the <u>least</u> useful aspect of R-Tech professional development?

____

R-TECH AND TEACHERS

Please respond to the following items addressing your involvement with R-Tech.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
My teaching has improved.	◯	◯	◯	◯	◯
My technical skills and abilities have improved.	◯	◯	◯	◯	◯
I have a greater awareness of technology-based learning opportunities for students.	◯	◯	◯	◯	◯
I have the opportunity to participate in technology-based professional development.	◯	◯	◯	◯	◯
I have a better understanding of the needs of at-risk students.	◯	◯	◯	◯	◯
My lesson plans have improved.	◯	◯	◯	◯	◯

Please describe any other effects you may have experienced based on your school's involvement with R-Tech.

____

____

____

R-TECH GOALS

Please respond to the following items addressing the goals of R-Tech on your campus.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
R-Tech goals are clearly communicated to teachers.	◯	◯	◯	◯	◯
R-Tech vendor services are aligned with our campus goals.	◯	◯	◯	◯	◯
R-Tech vendor services are aligned with the TEKS/TAKS.	◯	◯	◯	◯	◯
I use information from R-Tech students' Personal Education Plans (PEP) when I plan classroom instruction.	◯	◯	◯	◯	◯
R-Tech is positively affecting student achievement on this campus.	◯	◯	◯	◯	◯
Overall, I am pleased with the services provided by R-Tech.	◯	◯	◯	◯	◯

To complete this survey hit submit.

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APPENDIX C

THE 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 2008-09 or 2009-10 school years, including the 2008 and 2009 summer sessions. 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 and spring 2010.

SURVEY PROCEDURES

Parental Consent

Three weeks in advance of each survey administration, principals on R-Tech campuses were asked to distribute a letter to parents of students participating in R-Tech 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 Texas Center for Educational Research (TCER) or to notify TCER that they did not approve of their students' participation by telephone or email. 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 2009 survey and 14 parents returned forms in spring 2010. Principals received notification of the students whose parents requested that they not participate in the survey in advance of survey administration.

Survey Administration

Each spring, principals were provided with a link to an online survey of students receiving R-Tech services. 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, evaluators extended survey deadlines by 2 weeks in spring 2009 and 3 weeks in spring 2010 in order to increase response rates.

Number of Survey Respondents and Response Rates, Spring 2009 and Spring 2010

Table C.1 presents campus- and student-level response rates for the spring 2009 and spring 2010 online student surveys. The table indicates that 2,993 students attending 54 campuses responded to the survey in spring 2009 and 4,411 students attending 77 campuses responded in spring 2010.[3] Less than half of R-Tech campuses (47%) had students who participated in the 2009 survey, and students on about 68% of campuses participated in spring 2010. Using student data upload information submitted by districts to TEA for the 2008-09 and 2009-10 school years, including the 2008 and 2009 summer sessions, TCER identified 14,849 unique students who received R-Tech services during the program's first year and 16,864 who received services in its second 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% in 2008-09 and 26% in 2009-10. Across campuses with students participating in the survey, the number of survey respondents ranged from 1 to 363 students in spring 2009 and 1 to 247 in spring 2010. 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 and Spring 2010

Response Rate	Spring 2009	Spring 2010
Campus-Level Response Rates		
Number of campuses surveyed	115	114
Campuses with students responding	54	77
Percentage of campuses with respondents	47.0%	67.5%
Student-Level Response Rates		
Number of students participating in R-Tech	14,849 [a]	16,864[b]
Number of students responding to survey	2,993	4,411
Percentage of students responding to survey	20.1%	26.2%

Sources: R-Tech Student Survey, spring 2009 and spring 2010; Texas Education Agency, student upload data: summer 2008, fall 2008, and spring 2009 and summer 2009, fall 2009, and spring 2010.
[a]Total number of unique students who received R-Tech services in *at least* one of the following periods: summer 2008, fall 2008, spring 2009. Students receiving services across multiple periods are counted only once.
[b]Total number of unique students who received R-Tech services in *at least* one of the following periods: summer 2009, fall 2009, spring 2010. Students receiving services across multiple periods are counted only once.

[3]In total, 3,047 students responded to the 2009 survey; however, 54 students indicated that they did not agree to complete the survey. Similarly, 4,488 students responded to the 2010 survey, and 77 students did not agree to participate. Students indicating that they did not want to participate were exited from the survey and no further data were collected. The student-level response rates presented in Table C.1 are based on the 2,993 and 4,411 students who provided responses to the 2009 and 2010 surveys, respectively.

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 and Spring 2010

	Spring 2009 Middle School Students (n=1,530)	Spring 2009 High School Students (n=1,463)	Spring 2009 All Respondents (N=2,993)	Spring 2010 Middle School Students (n=2,490)	Spring 2010 High School Students (n=1,921)	Spring 2010 All Respondents (N=4,411)
Gender						
Male	51.8%	52.2%	52.0%	50.5%	50.9%	50.7%
Female	48.2%	47.8%	48.0%	49.5%	49.1%	49.3%
Ethnicity						
African American	8.0%	9.3%	8.7%	9.5%	11.1%	10.2%
Hispanic/Latino	47.5%	32.2%	40.0%	32.4%	37.9%	34.8%
White	39.7%	54.8%	47.1%	53.0%	46.3%	50.1%
Other	4.8%	3.8%	4.3%	5.1%	4.6%	4.9%
Grade Level						
6th grade	24.3%	--	12.4%	28.1%	--	15.8%
7th grade	32.5%	--	16.6%	37.6%	--	21.2%
8th grade	43.1%	--	22.1%	34.3%	--	19.4%
9th grade	--	23.9%	11.7%	--	21.4%	9.3%
10th grade	--	27.8%	13.6%	--	24.6%	10.7%
11th grade	--	28.4%	13.9%	--	31.3%	13.6%
12th grade	--	19.9%	9.7%	--	22.6%	9.9%

Sources: R-Tech Student Survey, spring 2009 and spring 2010.

SUPPLEMENTAL TABLES

This section presents supplemental information referenced in report chapters.

Table C.3
Students' Access to R-Tech Services as a Summed Percentage of Respondents, by Survey Administration: Spring 2009 and Spring 2010

Location and Time	Never	Rarely	Sometimes	Often	Almost Daily
Spring 2009Respondents (N=2,993)					
At school before classes begin	39.7%	20.3%	12.9%	10.6%	16.6%
At school after classes are over	43.6%	20.3%	13.8%	10.6%	11.6%
At school during lunch	62.5%	15.9%	8.9%	4.6%	8.1%
At school during a free period	37.7%	13.7%	15.2%	15.1%	18.4%
At school during regular class time	9.3%	12.7%	17.6%	19.0%	41.4%
At home using a home computer	21.2%	7.8%	12.7%	17.3%	41.1%
At home using a school computer (laptop)	78.6%	4.0%	4.3%	4.0%	9.0%
At a public library	64.4%	19.0%	9.0%	4.1%	3.5%
Other	64.6%	8.0%	9.8%	5.4%	12.2%
Spring 2010 Respondents (N=4,411)					
At school before classes begin	40.9%	21.8%	19.5%	8.2%	9.6%
At school after classes are over	39.5%	21.2%	21.9%	9.2%	8.2%
At school during lunch	61.8%	14.9%	12.1%	4.5%	6.6%
At school during a free period	30.4%	14.1%	25.5%	14.8%	15.2%
At school during regular class time	9.3%	11.1%	25.8%	19.7%	34.2%
At home using a home computer	19.8%	10.4%	16.9%	19.2%	33.7%
At home using a school computer (laptop)	73.8%	5.6%	6.0%	5.3%	9.2%
At a public library	63.8%	18.0%	11.7%	4.1%	2.6%
Other	63.1%	9.3%	13.4%	5.4%	8.8%

Sources: Tech Student Survey, spring 2009 and spring 2010.

This survey is secure socket layer (SSL) protected.
All data are encrypted for transmission.

Texas Rural Technology (R-Tech) Pilot
Online Student Survey
Spring 2010

Because you participated in technology-based instruction at your school during the 2009-10 school year, you are being asked to participate in an online survey conducted by the Texas Center for Educational Research (TCER). The survey is completely voluntary and takes about 15 minutes to complete. The survey will ask for your opinions about learning with technology such as computers, laptops, or online coursework. Your answers will remain confidential, and individual students' survey responses will not be shared with teachers, principals, or anyone else. We hope you will agree to take the survey because your responses will provide important information that may help us understand how to better support students through the use of technology.

I agree to participate in the survey	**I do NOT agree to participate in the survey**
○	○

Texas Rural Technology (R-Tech) Pilot
Online Student Survey
Spring 2010

Please complete the online survey by May 7, 2010. Thank you for your participation!

GENERAL INFORMATION

School Name

District Name

What is your gender?

○ Male
○ Female

Which of the following best describes you?

○ Hispanic/Latino (includes Mexican American)
○ African American
○ White
○ Other

(specify)

	6	7	8	9	10	11	12
In what grade are you currently enrolled?	○	○	○	○	○	○	○

THE RURAL TECHNOLOGY (R-TECH) PILOT AT YOUR SCHOOL

Please read this section carefully before proceeding to the next section of the survey.

The rest of the survey asks you about your use of technology resources offered through your school's Rural Technology (R-Tech) program. R-Tech technology resources may include: computer-based or online tutoring for a specific subject area, computer-based or online coursework, courses taken through video conferencing, or dual credit classes offered online (high school students only). You may know these resources by the name of the software your school is using as part of its R-Tech program. For example, you may complete technology-based units using PLATO, A+nyWhere Learning Systems, NovaNET, Achieve TeenBiz 3000, or another software package provided through R-Tech.

If you have questions about which technology resources are part of R-Tech, please ask your teacher or the survey administrator (i.e., librarian, computer lab facilitator) for help.

ACCESS TO R-TECH TECHNOLOGY RESOURCES

Think about the places and times that you use technology resources (e.g., instructional programs on computers, video conferencing) to help with your learning. Please indicate how often you use technology resources in each of the following situations? (*Choose* ***one*** *answer for each situation*.)

Rarely = a few times a year, **Sometimes** = once or twice a month, **Often** = once or twice a week

	Never	Rarely	Sometimes	Often	Almost Daily
At school before classes begin (e.g., in a computer lab, learning center, or school library)	○	○	○	○	○
At school after classes are over (e.g., in a computer lab, learning center, or school library)	○	○	○	○	○
At school during lunch (e.g., in a computer lab, learning center, or school library)	○	○	○	○	○
At school during a free period (e.g., study hall)	○	○	○	○	○
At school during regular class time	○	○	○	○	○
At home using a home computer (i.e., a computer that belongs to you or someone in the family)	○	○	○	○	○
At home using a laptop I take home from school	○	○	○	○	○
At a public library (not at school)	○	○	○	○	○
Other	○	○	○	○	○

(specify)

STUDENTS' PERCEPTIONS OF R-TECH TECHNOLOGY RESOURCES

Read each of the following statements about learning with technology resources (e.g., instructional programs on computers, videoconferencing) and mark your level of agreement with each statement.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I learn more when I use technology resources.	○	○	○	○	○
Technology resources allow me to work at my own pace.	○	○	○	○	○
Computer and other technology resources at my school are often slow or broken.	○	○	○	○	○
I am bored by the school work I do using technology resources.	○	○	○	○	○
My school's Internet connections are too slow or are often not working.	○	○	○	○	○
My teacher can't fix things when something is wrong with the technology resources I use for learning.	○	○	○	○	○
Technology resources allow me to focus on the area where I need extra help.	○	○	○	○	○
I have trouble getting my questions answered when I use technology resources.	○	○	○	○	○
The programs I need are not on the computer.	○	○	○	○	○
Technology resources allow me to take classes taught by teachers who are not at my school.	○	○	○	○	○
Technology resources allow me to make up coursework I have missed.	○	○	○	○	○
When I use computers to learn, I know right away whether I got a question right or wrong.	○	○	○	○	○
My grades have improved since I began using technology resources for learning.	○	○	○	○	○
I have difficulty coming to school early or staying after school to use technology resources.	○	○	○	○	○
Technology resources make learning more interesting.	○	○	○	○	○
Using my school's technology resources sometimes interferes with my extra-curricular activities (e.g., sports, drill team, clubs).	○	○	○	○	○
I feel more confident about my school work since I started using technology resources to help me learn.	○	○	○	○	○

When you use technology resources for learning (e.g., instructional programs on computers, videoconferencing), which subject area do you concentrate on the most? (Mark only one.)

- ○ English/language arts/reading
- ○ Science
- ○ Social Studies
- ○ Math
- ○ A language that is not English
- ○ Other

(please specify)

Have you taken a technology-based course at your school that allowed you to earn credit at a college or university (i.e., a dual credit course)?

- ○ Yes
- ○ No

DUAL CREDIT COURSEWORK

Please list the course(s) you are taking for dual credit using technology resources (e.g., instructional programs on computers, video conferencing).

____

____

____

____

____

____

Read each of the following statements about dual credit coursework offered through technology resources (e.g., instructional programs on computers, videoconferencing) and mark your level of agreement with each statement.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
Dual credit courses are more challenging than my regular high school classes.	○	○	○	○	○
It is easy to communicate with the instructor(s) of my dual credit course(s).	○	○	○	○	○
It is easy to communicate with other students enrolled in my dual credit course(s).	○	○	○	○	○
I had difficulty obtaining the textbook(s) and other class materials for my dual credit course(s).	○	○	○	○	○
Dual credit coursework is preparing me for college.	○	○	○	○	○
The calendar for my dual credit class is different from my regular high school classes (e.g., different dates for final exams, holidays).	○	○	○	○	○
I can get help easily when I don't understand information that is part of dual credit courses.	○	○	○	○	○
I would like to take more dual credit courses using technology resources.	○	○	○	○	○

What do you <u>like best</u> about using technology resources (e.g., instructional programs on computers, video conferencing) for learning?

____
____
____
____
____
____

What do you <u>like least</u> about using technology resources (e.g., instructional programs on computers, video conferencing) for learning?

____
____
____
____
____
____

Click continue, then hit NEXT button ○ **Continue**

To exit the survey hit submit

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 six R-Tech districts (9 campuses) conducted in May 2010. Site visit districts represent most of the types of R-Tech programs implemented by Cycle 1 districts (i.e., self-paced programs, dual credit programs, technology immersion programs, and programs providing iPods loaded with instructional content).

In February 2010, TCER sent an email to district- and campus-level administrators in identified districts, inviting participation in the R-Tech site visits. The email 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 identified 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 group discussions. In addition, researchers observed delivery of R-Tech services; however, in two districts, services were provided in students' homes, which prevented researcher observation. The sections that follow provide information on each site visit activity.

The Principal Interview

The principal interview gathered information about the roles and responsibilities of staff involved in implementing R-Tech, the challenges of implementing R-Tech and how challenges may have been overcome, as well as how the approach to implementing R-Tech may have changed across grant years. The interview also addressed R-Tech's effects on student and teacher outcomes and program sustainability. Principal interviews were conducted on each site visit campus.

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, the challenges and benefits of participation in R-Tech, and how program implementation may have changed across grant years. 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 2009 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; the challenges and benefits teachers and students experience as a result of the grant; and how R-Tech implementation may have changed across grant years.

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 2009 or spring 2010 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 12 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. 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.

Observation of R-Tech Services

With the exception of Districts B and C in which students participated in R-Tech services at home (see program descriptions in the next 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	6-12	Self-paced remediation across subject areas	All site visit activities completed at MS; no student focus group at HS.[a]
B	6-8	Instructional content loaded on iPods	Unable to observe R-Tech service delivery (provided at students' homes); all other activities completed.
C	6-9	Instructional content loaded on iPods	Unable to observe R-Tech service delivery (provided at students' homes); no student focus group.[a]
D	6-9	Self-paced TAKS remediation	All site visit activities completed at MS and HS.
E	6-12	School-wide technology immersion program; Dual credit coursework (Grades 11 and 12)	All site visit activities completed at MS and HS, no focus group for students participating in dual credit coursework.[a]
F	6-12	Self-paced remediation in ELA	All site visit activities completed at MS; no student focus group at HS.[a]

Sources: District grant applications and progress reports; site visit data.
Notes. HS=High School; MS=Middle School.
[a]Specified student focus group did not take place because fewer than three parents returned signed permission slips.

District A

District A served students who reside in a small farming community located in the vicinity of a large urban area. The district was experiencing growth as increasing numbers of urban residents relocate to the area and commute to jobs in the city. Recognizing that its schools were increasingly serving students from a "variety of backgrounds, experiences, economic and cultural characteristics" (District Grant Application), District A sought R-Tech funding as a means to provide individualized instruction designed to meet diverse student needs. The district offered R-Tech services through a self-paced, online tutorial program that provides remediation and credit recovery in a range of courses, including the core content areas. Middle school students were identified for R-Tech if they received a grade below 70 in any of their core content area courses, and high school students participated in services if they were missing the credits needed for graduation. R-Tech was also implemented in the district's alternative education campus, which ensured that students kept up with coursework while placed at the campus.

District B

District B was located in a rural, community of fewer than 1,000 residents, many of whom worked in timber production or the area's nurseries. Most of the district's students came from low-income backgrounds and few families have technology resources in their homes. As a means to increase students' access to technology and curriculum resources, the district used R-Tech resources to provide each student in Grade 6 through 8 with an iPod. Teachers in the core content areas loaded iPods with interactive content to supplement classroom instruction and ensure that students "could have 24/7 access to their curriculum and could extend their learning beyond the doors of [the] school" (District Grant Application).

District C

District C was located in a rural, farming community experiencing an influx of Hispanic students, many of whom were characterized as ELL. 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 took iPods home and accessed podcasts outside of the regular school day. Many students used iPod resources with family members, which administrators noted had 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 was to improve TAKS scores among its ELL and LEP students.

District D

District D was in a small community located at the fringe of large metropolitan area. The district enrolled a large proportion of low income students, and nearly all students were White. Many of the district's students resided in a local children's home and faced academic challenges resulting from homelessness, poverty, and parental neglect. District administrators noted that high poverty levels and low property values made District D one of the poorest school districts in the state.

District D sought 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 used R-Tech resources.

District E

District E was located in the county seat of a rural community focused on manufacturing and oil and gas production. The district was experiencing changes in the makeup of its student population, and enrolled 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 E used R-Tech funds to support the purchase of laptops for all students and teachers in Grades 6 through 12. Students were issued their own laptops which they used in class and at home. Teachers received continuing training in the integration of technology in classroom instruction and used laptops to prepare and deliver course content and to tailor instruction to individual student needs. The district also implemented a dual credit program in its high school. The dual credit program was offered using two-way video conferencing equipment located in the high school's distance learning lab. Students participating in dual credit coursework used laptops to take notes and to communicate online with course instructors

District F

District F was located in a rural, manufacturing community in the vicinity of a mid-sized urban area. The district enrolled a predominantly minority student population, many of whom were 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 was intended to improve students' vocabulary and comprehension skills. Students may have accessed the program outside of school hours by checking out laptops or using workstations at the public library.

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 eleventh- and twelfth-grade students[4] 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 2, 30% of Cycle 1 districts offered dual credit coursework as part of R-Tech. 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 2008, spring 2009, and spring 2010 surveys of principals and program facilitators in R-Tech districts, as well as from the spring 2009 and spring 2010 surveys 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 that participated 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 and spring 2008-09 and 2009-10 reporting periods, and upload reports indicated that their primary instructional area was "Distance Learning to Earn College Credit." During the 2008-09 school year, 3,230 students in Grades 11 and 12 were included in the data uploads for the fall and spring reporting periods, of which 221 (6.8%) were enrolled in R-Tech dual credit courses. During the 2009-10 school year, 3,823 students in Grades 11 and 12 were included in R-Tech student data uploads for the fall and spring reporting periods. Of these, 183 (4.8%) participated in R-Tech dual credit courses.

[4]Students enrolled in Texas' early college high schools may participate in some dual credit courses as early as the ninth grade.

The Characteristics of Dual Credit Students

Table E.1 presents the characteristics of eleventh- and twelfth-grade students who participated in R-Tech dual credit programs during the 2008-09 and 2009-10 school years. Results indicate that relative to other eleventh- and twelfth-grade R-Tech students, dual credit students were less likely to be African American (2% vs. 8% in 2008-09; 7% vs. 10% in 2009-10) or from low income backgrounds (26% vs. 43% in 2008-09; 29% vs. 42% in 2009-10), and were more likely to be female (60% vs. 47% in 2008-09; 64% vs. 47% in 2009-10) and White (72% vs. 60% in 2008-09; 65% vs. 61% in 2009-10). In addition, proportionately fewer special education (0% vs. 13% in 2008-09; 2% vs. 13% in 2009-10) and LEP (0% vs. 3% in 2008-09; 1% vs. 3% in 2009-10) students participated in dual credit programs.

Table E.1
The Characteristics of Students Participating in R-Tech Dual Credit Programs, Grades 11 and 12: 2008-09 and 2009-10

	2008-09 Dual Credit[a,b] (N=221)	2008-09 Non-Dual Credit[c,d] (N=3,009)	2009-10 Dual Credit[e,f] (N=183)	2009-10 Non-Dual Credit[g,h] (N=3,640)
African American	1.9%	8.4%	6.6%	9.6%
Hispanic	25.1%	26.7%	23.8%	27.9%
White	72.1%	59.5%	64.6%	61.2%
Other	1.0%	1.1%	5.0%	1.3%
Female	40.5%	52.8%	63.5%	47.1%
Male	53.4%	51.7%	36.5%	52.9%
Economically disadvantaged	25.6%	42.7%	28.7%	41.8%
Special education	0.5%	13.2%	1.7%	13.0%
Limited English proficient	0.0%	2.8%	1.1%	2.5%

Sources: Public Education Information Management System fall 2007, fall 2008, and fall 2009 snapshot data for the students attending the participating campuses; Texas Education Agency R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010.

[a]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall or spring was distance learning to earn college credit.

[b]Six of the 221 students had missing demographic information. The percentages in the table were based on the 215 students who had demographic information.

[c]Of the 3,009 students, 130 had missing demographic information. The percentages in the table were based on the 2,879 participants who had demographic information.

[d]These students had reported fall 2008 or spring 2009 primary instructional hours greater than 0 and their primary instructional method in fall 2009 or spring 2010 was research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, or a Web-based program.

[e]These students had reported fall 2009or spring 2010 primary instructional hours greater than 0 and their primary instructional method in fall or spring was distance learning to earn college credit.

[f]Of the 183 students, 2 had missing demographic information. The percentages in the table were based on the 181 participants who had demographic information.

[g]Of the 3,640 students, 95 had missing demographic information. The percentages in the table were based on the 3,545 participants who had demographic information.

[h]These students had reported fall 2009 or spring 2010 primary instructional hours greater than 0 and their primary instructional method in fall 2009 or spring 2010 was research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, or computer aided instruction.

The Subject Areas Studied by Dual Credit Students

Table E.2 presents information about the subject areas eleventh- and twelfth-grade students participating in R-Tech dual credit programs studied relative to other eleventh- and twelfth-grade students receiving R-Tech services. Results indicate some notable differences in the subject areas emphasized in dual credit programs. Relative to eleventh- and twelfth-graders participating in other R-Tech programs, students in dual credit programs were considerably more likely to focus on social studies (62% vs. 10% in 2008-09; 62% vs. 14% in 2009-10). In contrast, students in other programs were more likely to focus on math (49% vs. 8% for dual credit students in 2008-09; 36% vs. 7% for dual credit students in 2009-10) and somewhat more likely to focus on science (18% vs. 2% in 2008-09; 13% vs. 9% in 2009-10). While students in dual credit programs were more likely to focus on ELA in 2008-09 (36% vs. 27%), they were less likely to focus on ELA in 2009-10 (25% vs. 35%). The reasons for these differences were not clear.

Table E.2
The Subject Areas Addressed by Students Participating in R-Tech Dual Credit Programs, Grades 11 and 12: 2008-09 and 2009-10

	2008-09 Dual Credit[a,b] (N=221)	2008-09 Non-Dual Credit[c,b] (N=3,009)	2009-10 Dual Credit[a, b] (N=183)	2009-10 Non-Dual Credit[b,d] (N=3,640)
Mathematics	7.7%	48.7%	6.6%	35.5%
English language arts	36.2%	27.3%	25.1%	34.5%
Science	1.8%	18.2%	8.7%	12.6%
Social studies	62.0%	9.9%	61.7%	13.9%
Language other than English	0.0%	0.8%	0.5%	1.9%
Other subject area	0.0%	0.0%	0.0%	0.0%
Reading and mathematics[e]	0.0%	0.0%	0.0%	14.4%

Sources: Public Education Information Management System fall 2007, fall 2008, and fall 2009 snapshot data for the students attending the participating campuses; Texas Education Agency R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010.
[a]These students had reported fall or spring primary instructional hours greater than 0 and their primary instructional method in fall or spring was distance learning to earn college credit.
[b]Percentages may total to more than 100% because a student could have a different primary academic area in fall and spring.
[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]These students had reported fall 2009 or spring 2010 primary instructional hours greater than 0 and their primary instructional method in fall 2009 or spring 2010 was research-based instructional support, academic tutoring or counseling, distance learning aligned with the TEKS, or computer aided instruction.
[e]This category for R-Tech coursework was added to the student upload data reports for the project's second year.

THE IMPLEMENTATION OF TECHNOLOGY-BASED DUAL CREDIT COURSES

Surveys 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%), and in spring 2010, 43 of 173 respondents (25%) 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 sorted in terms of the "Spring 2010" column. 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). Across survey administrations, response patterns indicate that relatively few principals and facilitators felt that the challenges identified by the survey were serious barriers to implementing dual credit programs. The sections that follow discuss survey responses.

Costs of dual credit programs. Although the state provided funding for high school textbooks and the costs associated with high school courses, it was not obligated to cover the costs of students' college coursework, including tuition and textbooks; however, districts may have used HSA funds for these purposes. Not surprisingly, of the items identified as barriers to R-Tech dual credit programs, costs appeared to be a concern of many survey respondents across both project years. In spring 2010, the largest proportion of respondents (37%) identified tuition costs as a moderate/substantial barrier, and responses for fall 2008 and spring 2009 suggest that tuition costs have been a persistent concern across project years. Similarly, about a third (32%) of spring 2010 respondents noted textbook costs as moderate/substantial barrier, although the percentage of respondents concerned with textbook costs dropped across survey administration periods.

Coordination with university partners. In addition to the costs of dual credit programs, respondents across survey administration periods indicated challenges in terms of coordinating dual credit programs with university partners. In spring 2010, about a third of respondents indicated that misaligned calendars and lack of appropriate course offerings created challenges for the implementation of dual credit courses, 28% indicated coordination of technical support was challenging, and 23% noted difficulties communicating with university partners. With the exception of misaligned calendars, the percentage of survey respondents indicating challenges for each item describing a need for coordination with university partners increased across survey administration periods, which may indicate that problems became more pronounced over time or that respondents' frustration levels with existing problems mounted with ongoing implementation.

Student issues. Across survey administrations, response patterns indicate that relatively few respondents felt that student disinterest and failure[5] impeded the implementation of dual credit coursework. Further, the percentage of respondents indicating student issues limited the implementation of dual credit coursework declined across survey administrations, which suggests student concerns diminished as schools gained more experience implementing technology-based dual credit courses.

[5] 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.

Table E.3
Principals' and Facilitators' Perceptions: Moderate and Substantial Barriers to Dual Credit Implementation, as a Summed Percentage of Respondents: Fall 2008, Spring 2009, and Spring 2010

Moderate/Substantial Challenges to Implementing Dual Credit Courses	Fall 2008 Respondents (N=33)	Spring 2009 Respondents (N=29)	Spring 2010 Respondents (N=43)
Tuition costs	39.4%	34.4%	37.2%
Misaligned university and district semester timelines	33.4%	37.9%	32.6%
Identification of appropriate course offerings	9.1%	10.3%	32.5%
Textbook costs	42.5%	34.4%	32.2%
Coordinating technical support between district and university partners	NA	17.2%	28.0%
Coordination/ communication with university partners	15.1%	20.7%	23.2%
Student disinterest	27.3%	31.0%	18.6%
Student failure in dual credit courses	NA	17.2%	9.4%
Other	0.0%	33.3%	25.0%

Sources: R-Tech Principal/Facilitator Survey, fall 2008, spring 2009, and spring 2010.
Notes. Summed percentages represent the 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. This statement was not included on the fall 2008 survey.

While a third of spring 2009 respondents indicated other challenges, only one person entered a written response, which indicated that the district lacked the necessary staff to implement dual credit courses effectively. Similarly, in spring 2010 a quarter of respondents indicated other challenges but only one principal entered a written response. According to the principal, the campus experienced challenges as a result of the postsecondary institution's "changing requirements and expectations…in regards to courses."

Overcoming Challenges to Dual Credit Implementation

The spring principal and facilitator surveys 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. Table E.4 presents the percentage of respondents who indicated they used each strategy sorted in terms of the "Spring 2010" column. Notably, the percentage of respondents indicating they used strategies for overcoming challenges increased across nearly all survey items. With the exception of collaboration with university staff, which remained largely unchanged across years, a larger percentage of respondents held information sessions for parents and students (63% vs. 41%), provided academic support (54% vs. 41%), used HSA funding to cover costs (47% vs. 45%), and adjusted district calendars (33% vs. 14%) in order to facilitate dual credit course offerings. The increase in support for dual credit courses, particularly in providing information and academic support for students, may help to explain the reduced concerns about student issues reflected in Table E.3.

Table E.4
Districts' Methods to Overcoming Challenges to Dual Credit Implementation as a Percentage of Survey Respondents: Spring 2009 and Spring 2010

Method	Spring 2009 Respondents (N=29)	Spring 2010 Respondents (N=43)
Collaborated with university staff to resolve challenges	65.5%	65.1%
Held information sessions for students and parents	41.4%	62.8%
Provided additional academic support for students	41.4%	53.5%
Used HSA or other funds to support costs	44.8%	46.5%
Adjusted district calendar to accommodate university timelines	13.8%	32.6%
Other	17.2%	4.7%

Sources: R-Tech Principal/Facilitator Survey, spring 2009 and spring 2010.
Notes. 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. "Other" methods included applying for grant funding to cover tuition and textbook costs, as well as providing additional tutorials to support dual credit students.

STUDENTS' PERCEPTIONS OF DUAL CREDIT COURSES

The spring surveys asked R-Tech students if they had taken a technology-based course that enabled them to receive college credit. 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 2009 survey, 171 (24%) responded that they participated in dual credit courses as part of R-Tech. In spring 2010, 1,037 eleventh and twelfth-grade R-Tech students participated in the survey. Of these, 270 (26%) indicated that they participated in dual credit course work during the 2009-10 school year.

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 across years, most surveyed students focused on subject areas related to social studies (e.g., history, government, and economics). Many students also took courses related to English, and notably small percentages of students took dual credit courses related to math or science. Surveyed students also reported participating in dual credit courses related to psychology and sociology and business related courses. Responses in the "other" category include 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 and Spring 2010

Subject Area	Spring 2009 Respondents (N=171)	Spring 2010 Respondents (N=270)
History	28.7%	30.0%
English	49.1%	28.9%
Government/Economics	24.0%	26.3%
Business and business management	14.6%	12.2%
Psychology/Sociology	15.2%	10.7%
Math	9.4%	9.3%
Science	5.8%	4.4%
Languages	4.1%	1.4%
Other	9.4%	10.0%

Sources: R-Tech Student Survey, spring 2009, and spring 2010.
Note. Percentages will not total 100; students may have listed 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 disagree* (-10), *disagree* (-5), *unsure* (0), *agree* (5), and *strongly agree* (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 and Spring 2010

Statement	Spring 2009 Respondents (N=171)[a]	Spring 2010 Respondents (N=270)[b]
Dual credit coursework is preparing me for college.	5.0	5.5
I would like to take more dual credit courses using technology resources.	3.7	3.9
The calendar for my course is different from my regular classes.	3.4	3.5
Dual credit courses are more challenging than regular courses.	3.2	3.4
It is easy to communicate with other students.	2.9	3.1
It is easy to communicate with the instructors.	2.5	2.7
I can get help easily when I don't understand information.	1.8	2.1
I had difficulty obtaining the textbook and other materials.	-1.6	-2.6

Sources: R-Tech Student Survey, spring 2009 and spring 2010.
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 surveyed students who enrolled in dual credit courses during the 2008-09 school year.
[b]The number of respondents represents surveyed students who enrolled in dual credit courses during the 2009-10 school year.

Across school years, students expressed increasing levels of agreement with statements indicating that dual credit coursework is challenging and good preparation for college, and that they would like to take more dual credit courses. Students' agreement with statements indicating that it was easy to communicate with course instructors and classmates and to get help in dual credit courses also increased across implementation years. Students also expressed higher levels of disagreement with the statement indicating it was difficult to obtain course materials in spring 2010. These findings suggest that schools' improved their implementation of technology-based dual credit courses across R-Tech implementation years.

The student survey also included open-ended questions asking what respondents liked most and least about using technology for learning, and 32 students participating in dual credit courses entered comments describing what they liked about dual credit courses and 63 students entered comments describing what they disliked about such courses. Students noted that they liked having the opportunity to earn college credit and to interact with college faculty. In terms of dislikes, students noted problems communicating with faculty, using technology, as well as some other challenges. These comments are discussed in the following sections.

College credit. Of the 32 students who entered comments describing what they liked about dual credit courses, 41% appreciated the ability to earn college credit while in high school. One student described dual credit courses as "a great way to get college coursework" while still attending a rural high school. Several students felt that dual credit courses helped them "get ahead" and prepared them for college. One student commented, "I love the technology resources because I have been able to take college courses through [school name omitted] and I will be a sophomore when I go to [school name omitted], and will have 23 college hours."

Interacting with professors and students from other schools. Five students noting what they liked about dual credit courses (16% of respondents) expressed excitement about the opportunity to interact with and learn from professors and students other than those at their rural schools. "[I like] that I can take lectures from amazing professors in great universities," wrote one student. Another student appreciated hearing professors' and students' diverse opinions about course content during online lectures.

Lack of communication and interaction. Most students describing challenges to taking dual credit courses (32 individuals) commented on the inability to communicate with professors and interact in course discussions. Several students wrote that they struggled to "engage in conversation" and "participate in a group discussion" during video conferences. Some students disliked that the video conferences primarily consisted of lectures due to the inability to facilitate group discussions online. "Video conferencing is more lecture and I am one of those students who needs to interact in person," noted one such student. Students also indicated they had difficulty communicating with teachers outside of regular class time. One student commented, "I dislike the fact that when I'm having trouble understanding something, I cannot always ask the teacher for help because she/he is not here." "Sometimes it takes my online professors a week before they email me back, which is frustrating when I need help on something right then," agreed another student.

Technology problems. Some students experiencing challenges in dual credit courses (24 individuals) reported that technology challenges created barriers to dual credit participation. Several students struggled to learn from dual credit course lectures because of poor quality video conferences. One student commented, "Video conferencing is just terrible all around. There is a lot of lag, blurriness, and loss of sound…because the signal isn't that great." Another student also described school hardware and internet connections which were inadequate for distance learning:

> Computers at my school are old and the Internet is slow. Something is always wrong with the Internet connection and our technology director can't fix it. Sometimes it affects my college

> classes when I have an important test… I end up having to email the professor to tell him what's wrong and why I can't take my test. All in all, there is always a technology problem.

Many students noted that their school's strict Internet filters created additional barriers to completing college course assignments. One school did not allow students to use personal email on school computers, so students could not contact their professors. At another school, students reported that their college professor often posted online videos for students to watch, but the school's filter did not allow students to access the links. "Most of the time, my dual credit professors would post videos for me to watch," explained one student, "Unfortunately, I couldn't watch them… [And] when I was asked to research a topic, most of the time I was very limited because websites with valuable information were blocked."

Other challenges. In addition, 11 students described other challenges to dual credit participation. Four students reported that it was difficult to remain focused and on task while taking online courses. "I am sometimes not as focused or diligent in my studies," admitted one student. Four students described the difficulty of college coursework and exams. One student warned, "Dual credit classes are very hard. I think every student should wait until they get to college [to take college courses]." Additionally, three students experienced scheduling conflicts between their high school and college courses. "I hated having a…deadline of [college] semesters way before the high school semesters [ended]. It caused problems with my testing," wrote one student.

SUMMARY

About 30% of Cycle 1 districts offered dual credit programs as part of R-Tech. Across implementation years the percentage of eleventh- and twelfth-grade students participating in R-Tech and enrolled in dual credit courses dropped from about 7% in 2008-09 to about 5% in 2009-10. Relative to other eleventh- and twelfth-grade students receiving R-Tech services, dual credit students in both implementation years 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 reported few serious challenges implementing dual credit programs, and the challenges they did encounter, including program costs, difficulties coordinating with university partners, and issues related to student participation, tended to diminish across grant years. To some extent, the reduced challenges in year 2 may be explained by the increased focus on providing academic support and information to students and parents in year 2.

Across both grant years, surveyed students who participated in dual credit offerings felt that their courses were more rigorous than their regular high school classes and provided strong preparation for postsecondary educational opportunities; however, some students' comments noted challenges to participating in courses, including difficulty communicating with instructors and problems with video conferencing equipment and Internet filters. Students also indicated that they would like to participate in more dual credit courses, which suggests districts may want to consider expanding dual credit offerings.

APPENDIX F

TECHNICAL APPENDIX—HIERARCHICAL LINEAR MODELING (HLM) ANALYSES OF TAKS OUTCOMES

EFFECTS OF R-TECH ON STUDENTS' TAKS SCORES (CHAPTER 5)

The evaluation investigated three aspects of the R-Tech program: (1) the effect of the number of semesters a student participated in R-Tech 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 programs implemented during the project's first and second years 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 resulted in collinearity issues. In addition, inclusion could have resulted in the identification of the districts and/or campuses.

Analyses

The effects of R-Tech participation semesters, 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). 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, spring 2009, fall 2009, and/or spring 2010. Separate analyses were performed for the supplemental status indicator and for program type.

Student-level model. In the student-level model, spring 2010 TAKS *T* scores[6] were regressed on spring 2008 TAKS *T* scores, number of semesters of R-Tech participation (dummy variables for 2, 3, or 4 semesters of participation, 1 if yes, 0 if no, with the reference group being 1 semester), 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,

$$Y_{ij}=\beta_{0j} + \beta_{1j}(\textit{Spring 2008 T score [grand mean centered]})_{ij} + \beta_{2j}(\textit{Two semesters participation})_{ij} + \beta_{3j}(\textit{Three semesters participation})_{ij} + \beta_{4j}(\textit{Four semesters participation})_{ij} + \beta_{5j}(\textit{Economic status})_{ij} + \beta_{6j}(\textit{African American status})_{ij} + \beta_{7j}(\textit{Hispanic status})_{ij} + \beta_{8j}(\textit{Female})_{ij} + \beta_{9j}(\textit{Middle school grades})_{ij} + \beta_{10j}(\textit{LEP status})_{ij} + r_{ij}.$$

Significant variation was found across schools for 2010 TAKS reading/ELA, mathematics, science, and social studies *T* scores. Specifically, 18% of the variance in both TAKS reading/ELA and mathematics *T* scores and 19% of the variance in both TAKS science and social studies *T* scores was among schools.[7] Thus, the school means (β_{0j}) were specified as randomly varying. The coefficients for spring 2008 *T* scores (β_{1j}) were also specified as randomly varying when chi-square statistics were significant. The coefficients for the remaining independent variables were specified as fixed.

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[6]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, spring 2009, fall 2009, or spring 2010 student upload.

[7]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.

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[8] or the percentage of students passing all 2008 TAKS tests (with percentages ranging from 30% to 98%, and with a grand mean of 66.9%), as well as initial achievement, number of semesters participation in R-Tech, 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,

$$\beta_{0j}=\gamma_{00} + \gamma_{01}(\textit{Supplemental status[or Program type]})_j + \gamma_{02}(\textit{2008 school achievement [grand mean centered]})_j + \mu_{0j}.$$

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, spring 2009, fall 2009, or spring 2010 student upload indicated that the content area was a primary, secondary, or tertiary instructional focus.[9] Researchers posit that the number of semesters a student participated in R-Tech, supplemental status, and program type, along with school achievement, gender, economically disadvantaged status, ethnicity, LEP status, grade grouping, and spring 2008 TAKS score are related to the 2010 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. Limitations are discussed at the end of the Appendix.

[8]Note that when both school poverty or the percentage of economically disadvantaged students at a school (a continuous variable with percentages ranging from 6.9% to 94.8%, and with a grand mean of 53.6%) and 2008 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.

[9]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	6,991	0.46	0.50
African American	6,991	0.09	0.28
Hispanic	6,991	0.26	0.44
Economically disadvantaged (1=yes, 0=no)	6,991	0.56	0.50
Limited English proficient (1=yes, 0=no)	6,991	0.03	0.18
Middle grades (6 to 8=1, 9 to 11=0)	7,196	0.52	0.50
Two semesters in R-Tech	7,196	0.36	0.48
Three semesters in R-Tech	7,196	0.24	0.43
Four semesters in R-Tech	7,196	0.26	0.44
TAKS reading/ELA *T* score (2008)	3,808	49.20	9.20
TAKS reading/ELA *T* score (2010)	6,129	48.10	9.61
School-Level Descriptive Statistics: (Level 2)			
School achievement (2008 percentage passing)	77	66.22	12.31
Supplemental status (1=yes, 0=no)	77	0.57	0.50
Self-paced software (1=yes, 0=no)	77	0.90	0.31
Distance learning (1=yes, 0=no)	77	0.14	0.35

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status			
Intercept	50.412	0.491	102.66***
Supplemental status	-1.898	0.532	-3.57*
School achievement[a] 0.03	3	0.025	1.31
Female	1.627	0.273	5.97***
African American	-1.901	0.468	-4.07***
Hispanic	-0.568	0.262	-2.16*
Economic disadvantage	-0.850	0.424	-2.00*
Limited English proficient	-3.783	0.921	-4.11***
Middle school level[c] -0.582		0.545	-1.07
Spring 2008 *T* score[a] 0.53	9	0.027	20.00***
Two semesters in R-Tech	0.531	0.516	1.03
Three semesters in R-Tech -0.250		0.634	-0.39
Four semesters in R-Tech -1.451		0.540	-2.69**
Program Type			
Intercept	51.246	0.801	63.96***
Self-paced software[b]	-1.964	0.536	-3.66**
Distance learning[b]	0.321	0.548	0.58
School achievement[a] 0.05	0	0.022	2.25*
Female	1.626	0.272	5.97***
African American	-2.089	0.449	-4.65***
Hispanic	-0.764	0.261	-2.93**
Economic disadvantage	-0.845	0.422	-2.00*
Limited English proficient	-4.074	0.912	-4.47***
Middle school level[c] -0.868		0.549	-1.58
Spring 2008 *T* score[a] 0.54	7	0.027	20.31***
Two semesters in R-Tech	0.590	0.560	1.05
Three semesters in R-Tech -0.121		0.687	-0.18
Four semesters in R-Tech	-1.336	0.605	-2.21*

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 individual student data from TEA.

Notes. Data from the student uploads indicated that English language arts was a primary, secondary, or tertiary instructional focus. (TEA student upload templates required the specification of an R-Tech student's primary, secondary, and tertiary instructional focus.) Analyses included 3,535 R-Tech participants from 67 campuses. Eighteen 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 40%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 13% for the supplemental status model and 21% for the program type model.

[a]The predictor was centered around its grand mean.

[b]Program types were limited to self-paced computer software and dual credit or distance learning because 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 2009-10.

[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	49.2549			
School mean	2.6180	56	177.24	0.000
2008 TAKS-outcome slope	0.0148	58	133.80	0.000
Program Type				
Level-1 student effect	49.3264			
School mean	2.3801	55	149.33	0.000
2008 TAKS-outcome slope	0.0139	58	137.91	0.000

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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	8,780	0.47	0.50
African American	8,780	0.12	0.33
Hispanic	8,780	0.31	0.46
Economically disadvantaged (1=yes, 0=no)	8,780	0.59	0.49
Limited English proficient (1=yes, 0=no)	8,780	0.04	0.19
Middle grades (6 to 8=1, 9 to 11=0)	9,042	0.51	0.50
Two semesters in R-Tech	9,042	0.35	0.48
Three semesters in R-Tech	9,042	0.17	0.37
Four semesters in R-Tech	9,042	0.28	0.45
TAKS mathematics *T* score (2008)	4,596	48.20	8.45
TAKS mathematics *T* score (2010)	7,610	47.16	8.81
School-Level Descriptive Statistics: (Level 2)			
School achievement (2008 percentage passing)	85	66.33	12.13
Supplemental status (1=yes, 0=no)	85	0.54	0.50
Self-paced software (1=yes, 0=no)	85	0.89	0.31
Distance learning (1=yes, 0=no)	85	0.15	0.36

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status			
Intercept	48.401	0.523	92.60***
Supplemental status	-1.024	0.456	-2.25*
School achievement[a] 0.04	8	0.021	2.30*
Female	-0.098	0.198	-0.50
African American	-0.825	0.251	-3.29**
Hispanic	-0.127	0.304	-0.42
Economic disadvantage	-0.385	0.215	-1.79
Limited English proficient	-1.041	0.500	-2.08*
Middle school level[c] 0.16	8	0.575	0.29
Spring 2008 *T* score[a] 0.68	1	0.028	24.60***
Two semesters in R-Tech	0.006	0.450	0.01
Three semesters in R-Tech -0.049		0.435	-0.11
Four semesters in R-Tech	-0.730	0.576	-1.27
Program Type			
Intercept	49.324	0.832	59.28***
Self-paced software[b]	-1.401	0.705	-1.99*
Distance learning[b] -0.393		0.659	-0.60
School achievement[a] 0.05	5	0.021	2.67*
Female	-0.101	0.198	-0.51
African American	-0.864	0.247	-3.50**
Hispanic	-0.172	0.299	-0.58
Economic Disadvantage	-0.383	0.215	-1.79
Limited English proficient	-1.091	0.498	-2.19*
Middle school level[c] -0.034		0.606	-0.06
Spring 2008 *T* score[a] 0.67	9	0.028	24.45***
Two semesters in R-Tech	0.000	0.453	0.00
Three semesters in R-Tech -0.041		0.433	-0.10
Four semesters in R-Tech	-0.686	0.583	-1.18

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 individual student data from TEA.

Notes. Data from the student uploads indicated that mathematics was a primary, secondary, or tertiary instructional focus. Analyses included 4,227 R-Tech participants from 81 campuses. Eighteen 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 56%. 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 9% for the program type model.

[a]The predictor was centered around its grand mean.

[b]Program types were limited to self-paced computer software and dual credit or distance learning because 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.

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	29.0096			
School mean	4.0023	69	378.07	0.000
2008 TAKS-outcome slope	0.0310	71	310.02	0.000
Program Type				
Level-1 student effect	29.0086			
School mean	4.2876	68	386.52	0.000
2008 TAKS-outcome slope	0.0309	71	310.65	0.000

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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	737	0.46	0.50
African American	737	0.14	0.35
Hispanic	737	0.34	0.47
Economic disadvantage (1=yes, 0=no)	737	0.60	0.49
Limited English proficient (1=yes, 0=no)	737	0.05	0.23
Two semesters in R-Tech	752	0.27	0.44
Three semesters in R-Tech	752	0.20	0.40
Four semesters in R-Tech	752	0.34	0.47
TAKS science *T* score (2008)	475	48.39	9.06
TAKS science *T* score (2010)	627	46.78	9.16
School-Level Descriptive Statistics: (Level 2)			
School achievement (2008 percentage passing)	33	62.70	11.78
Supplemental status (1=yes, 0=no)	33	0.64	0.49
Self-paced software (1=yes, 0=no)	33	0.88	0.33
Distance learning (1=yes, 0=no)	33	0.30	0.47

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status			
Intercept	49.912	1.332	37.46***
Supplemental status	0.597	1.163	0.51
School achievement[a] 0.15	2	0.046	3.31**
Female	-0.681	0.501	-1.36
African American	0.154	0.860	0.18
Hispanic	-0.281	0.698	-0.40
Economic disadvantage	-0.931	0.577	-1.61
Limited English proficient	-1.438	1.475	-0.98
Spring 2008 *T* score[a] 0.74	2	0.045	16.56***
Two semesters in R-Tech	-0.686	0.964	-0.71
Three semesters in R-Tech -0.616		1.022	-0.60
Four semesters in R-Tech	-1.885	1.125	-1.68
Program Type			
Intercept	49.693	2.282	21.78***
Self-paced software[b] 0.70	5	2.147	0.33
School achievement[a] 0.14	6	0.045	3.26**
Female	-0.698	0.501	-1.39
African American	0.178	0.859	0.21
Hispanic	-0.256	0.696	-0.37
Economic disadvantage	-0.951	0.577	-1.65
Limited English proficient	-1.464	1.476	-0.99
Spring 2008 *T* score[a] 0.74	1	0.045	16.46***
Two semesters in R-Tech	-0.701	0.967	-0.73
Three semesters in R-Tech -0.687		1.019	-0.67
Four semesters in R-Tech	-1.972	1.106	-1.78

*$p < .05$; **$p < .01$; ***$p < .001$.

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 individual student data from TEA.

Notes. Data from the student uploads indicated that science was a primary, secondary, or tertiary instructional focus. Analyses included 439 R-Tech participants from 22 campuses. Nineteen 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 63%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 53% for the supplemental status model and 52% for the program type model.

LEP status was removed as a predictor because it resulted in a nearly perfect linear relationship with another predictor (singularity or extreme multicolinearity).

[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 10 science students were exclusively in a dual credit or distance learning program.

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	25.4027			
School mean	3.2557	15	50.90	0.000
2008 TAKS -outcome slope	0.0112	17	30.67	0.022
Program Type				
Level-1 student effect	25.3730			
School mean	3.3337	15	51.29	0.000
2008 TAKS -outcome slope	0.0114	17	30.70	0.022

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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	352	0.47	0.50
African American	352	0.14	0.35
Hispanic	352	0.27	0.45
Economic disadvantage (1=yes, 0=no)	352	0.54	0.50
Limited English proficient (1=yes, 0=no)	352	0.02	0.14
Two semesters in R-Tech	362	0.20	0.40
Three semesters in R-Tech	362	0.16	0.36
Four semesters in R-Tech	362	0.46	0.50
TAKS social studies *T* score (2008)	173	46.75	8.65
TAKS social studies *T* score (2010)	302	45.78	9.38
School-Level Descriptive Statistics: (Level 2)			
School achievement (2008 percentage passing)	25	62.56	10.50
Supplemental status (1=yes, 0=no)	25	0.68	0.48
Self-paced software (1=yes, 0=no)	25	0.88	0.33
Distance learning (1=yes, 0=no)	25	0.32	0.48

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 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

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status			
Intercept	54.852	3.317	16.54***
Supplemental status	-4.662	3.126	-1.49
School Achievement[a]	0.002 0.14	1 0.01	
Female	0.094 0.86	7 0.11	
African American	0.363	1.661	0.22
Hispanic	0.971 1.39	2 0.70	
Economic disadvantage	-2.738	1.053	-2.60*
Spring 2008 *T* score[a] 0.73	2	0.056	13.15***
Two semesters in R-Tech	-3.493	1.993	-1.75
Three semesters in R-Tech	-4.911	2.357	-2.08*
Four semesters in R-Tech	-5.350	2.419	-2.21*
Program Type			
Intercept	55.312	5.362	10.32***
Self-paced software[b] -4.334		5.147	-0.84
School achievement[a]	0.018 0.14	4 0.13	
Female	0.145 0.87	1 0.17	
African American	0.437	1.671	0.26
Hispanic	0.774 1.39	2 0.56	
Economic disadvantage	-2.791	1.057	-2.64*
Spring 2008 *T* score[a] 0.73	7	0.056	13.22***
Two semesters in R-Tech	-3.319	2.000	-1.66
Three semesters in R-Tech -4.453		2.343	-1.90
Four semesters in R-Tech	-4.706	2.372	-1.98*

*$p < .05$; **$p < .01$; ***$p < .001$.
Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 individual student data from TEA.
Notes. Data from the student uploads indicated that social studies was a primary, secondary, or tertiary instructional focus. Analyses included 161 R-Tech participants from 16 campuses. Nineteen 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 61%. 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 model and the program type model.
[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 10 science students were exclusively in a dual credit or distance learning program.

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	27.6734			
School mean	19.8791	13	62.89	0.000
2008 TAKS -outcome Slope	Effect is fixed			
Program Type				
Level-1 student effect	27.9240			
School mean	20.3781	13	50.2734	0.000
2008 TAKS -outcome slope	Effect is fixed			

Sources: Texas Education Agency (TEA) R-Tech student upload data: fall 2008, spring 2009, fall 2009, and spring 2010. Public Education Information Management System (PEIMS) student demographic data from fall 2008, spring 2009, fall 2009, and fall 2010. Texas Assessment of Knowledge and Skills 2008 and 2010 individual student data from TEA.

HLM Analyses Limitations

Missing data. The goal of these analyses was to generalize the results to the target population of students who took part in R-Tech instructional activities in the participating campuses. Therefore, it is informative to ask whether the samples used in the analyses were representative of the original populations. Table F.13 compares the original populations with the partial samples used in each of the HLM analyses. Gender, ethnic, economic, and limited English proficient status differences between the populations and the partial samples were small (from less than 1% to about 3%). However, the percentages of special education students were from 8% to 12% lower in the partial samples. Thus, the major difference between the populations and the partial samples was a lower percentage of special education students in the partial samples.

Table F.13
Demographic Characteristics of Full and Restricted or Partial Samples

	Reading/ELA		Mathematics		Science		Social Studies	
Characteristic	Full	Partial	Full	Partial	Full	Partial	Full	Partial
Percentage minority	34.0%	35.2%	39.9%	42.4%	44.9%	46.5%	38.2%	35.4%
Percentage female	46.4%	48.0%	47.9%	48.8%	47.2%	48.5%	46.8%	49.7%
Percentage disadvantaged	48.7%	52.0%	52.4%	54.5%	55.9%	58.8%	47.1%	47.2%
Percentage Limited English proficient	3.2%	2.4%	3.4%	2.6%	4.8%	3.2%	2.9%	0.0%
Percentage special education	13.3%	2.9%	11.7%	2.1%	13.4%	1.1%	12.1%	4.3%

TAKS as the measure of student achievement. Because the TAKS is not a completely vertically equated test (i.e., the skills measured and the scoring from one grade to the next is along a continuum) in all subjects at all grade levels, 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.

APPENDIX G

TECHNICAL APPENDIX—HIERARCHICAL LINEAR MODELING (HLM) OF STUDENTS' ATTENDANCE OUTCOMES

EFFECTS OF R-TECH ON STUDENTS' ATTENDANCE RATES (CHAPTER 5)

The effect of R-Tech on student attendance was investigated. First, the relationship between R-Tech participation and attendance rates was studied. Second, the relationships between three aspects of R-Tech participation and student attendance rates were investigated. These aspects of participation were the number of hours per week a student spent in R-Tech instructional activities, whether or not the R-Tech program was offered as a supplemental service outside regular instructional hours, and the type of instructional program. The two major types of R-Tech programs were self-paced computer software and dual credit or distance learning.

Analyses

The effect of R-Tech on student attendance was studied using a 2-level hierarchical linear model (HLM). Analyses were conducted for students participating in R-Tech in fall 2008 and/or spring 2009. Separate analyses (a) contrasted participants and non-participants, (b) examined the effect of supplementary status and R-Tech instructional hours per week for participants, and (c) examined the effect of program type and R-Tech instructional hours per week for participants.

Student-level models. In the student-level models, spring 2009 attendance rates were regressed on spring 2008 attendance rates, spring 2008 TAKS composite *T* scores[10], 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). In the participants versus non-participants model, an R-Tech participation indicator (1 if participant, 0 if not) was added. In the participants only models, average number of R-Tech primary instructional hours per week[11] was added. That is,

$$Y_{ij}=\beta_{0j} + \beta_{1j}(\textit{Spring 2008 attendance rate [grand mean centered]})_{ij} + \beta_{2j}(\textit{Spring 2008 composite TAKS T score [grand mean centered]})_{ij} + \beta_{3j}(\textit{Economic status})_{ij} + \beta_{4j}(\textit{African American status})_{ij} + \beta_{5j}(\textit{Hispanic status})_{ij} + \beta_{6j}(\textit{Female})_{ij} + \beta_{7j}(\textit{Middle school indicator})_{ij} + \beta_{8j}(\textit{LEP status})_{ij} + r_{ij.}$$

$$+ \beta_{9j}(\textit{R-Tech participation indicator})_{ij} \textit{ (participants versus non-participants models)}$$

$$+ \beta_{9j}(\textit{R-Tech instructional hours per week [grand mean centered]})_{ij} \textit{ (participants only models)}$$

[10]The spring 2008 TAKS composite *T* score was average of the spring 2008 TAKS reading *T* score and the spring 2008 TAKS mathematics *T* score.

[11]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.

Significant variation in 2009 student attendance rates was found across schools. Specifically, 5% of the variance in participant and non-participant attendance rates was between campuses, and 15% of the variance in participant attendance rates was between campuses.[12] Thus, the school means (β_{0j}) were specified as randomly varying. The coefficients for spring 2008 attendance rates, spring 2008 TAKS composite *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 models. At the school level, in the participants versus non-participants model, researchers examined whether R-Tech participation influenced 2009 student attendance rates after controlling for school achievement[13] 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 2008 attendance, ethnicity, economic status, LEP status, gender, and grade level. One participants only model was used to answer the questions of whether the number of R-Tech instructional hours per week as well as whether or not services were provided outside regular instructional hours differentially effected students' attendance rates, net of the control variables. A second participants only model was used to answer the questions of whether the number of R-Tech instructional hours per week as well as program type differentially effected students' attendance rates, again net of the control variables. That is,

$$\beta_{0j=}\gamma_{00} + \gamma_{01}(\textit{School achievement [grand mean centered]})_j + \mu_{0j}.$$

$$+ \gamma_{02}(\textit{Supplemental status[or Program type]})_j \textit{ (participants only models)}$$

Data were analyzed using a 2-level HLM. A student was considered an R-Tech participant if he or she was included in the fall 2008 or spring 2009 student uploads.[14] In the models, researchers posit that R-Tech is related to student attendance. Researchers also posit that, among R-Tech participants, R-Tech instructional hours, supplemental status, and program type are related to student attendance. Statistical details for the participant and non-participant analyses are provided in Tables G.1, G.2, and G.3, for the participant only analyses in Tables G.4, G.5, and G.6.

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[12]Variation in attendance rates scores can be divided between variation over students and variation over schools. The percentage of this total variation in attendance rates 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.

[13]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.

[14]In the data uploads hosted by TEA, R-Tech districts submitted information on students' program participation.

Table G.1
Descriptive Statistics for Participant and Non-Participant Student Attendance

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	39,480	0.48	0.50
African American	39,480	0.10	0.29
Hispanic	39,480	0.28	0.45
Economically Disadvantaged (1=yes, 0=no)	39,480	0.47	0.50
LEP (1=yes, 0=no)	39,480	0.02	0.16
Middle Grades (6 to 8=1, 9 to 11=0)	39,797	0.38	0.48
R-Tech Participant	39,797	0.32	0.47
Attendance Rate (2008)	32,709	0.96	0.05
Attendance Rate (2009)	39,797	0.95	0.05
TAKS Composite *T* Score (2008)	28,204	50.63	7.90
School-Level Descriptive Statistics: (Level 2)			
School Achievement (percentage)	114	64.00	13.60

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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 from TEA.

Table G.2
Hierarchical Regression Models Predicting the Effects of R-Tech Participation on Student Attendance Rates

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Intercept	0.9556	0.0009	1049.19***
School Achievement[a]	0.0001	0.0000	1.57
Female	-0.0034	0.0005	-6.81***
African American	0.0053	0.0010	5.34***
Hispanic	0.0018	0.0008	2.24*
Economic Disadvantage	-0.0046	0.0005	-8.98***
LEP	0.0047	0.0022	2.16*
Middle School Level[b]	0.0056	0.0008	6.63***
R-Tech Participation	-0.0002	0.0011	-0.17
2008 Attendance Rate[a]	0.7294	0.0158	46.03***
2008 TAKS Composite *T* score[a,c]	0.0004	0.0000	9.87***

*$p < .05$; **$p < .01$; ***$p < .001$.
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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 from TEA.
Notes. Analyses included 28,073 participating and non-participating students from 113 R-Tech campuses. Five percent of the variance in 2009 attendance rates was between campuses. The percentage of within-school variance explained by the student-level predictors was 53%. The percentage of between-school variance explained by the campus-level predictor (relative to the student-level model) was 0%. 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.
[a]The predictor was centered around its grand mean.
[b]The student was in Grades 6, 7, or 8 in 2008-09.
[c]The spring 2008 TAKS composite *T* score was average of the spring 2008 TAKS reading *T* score and the spring 2008 TAKS mathematics *T* score.

Table G.3
Variance Decomposition from Conditional HLM Models Showing the Effects of R-Tech Participation on 2009 Attendance Rates

Test/Random Effect	Variance Component	*df*	X^2	*p*
Level-1 Student Effect	0.00130			
School Mean	0.00003	111	619.78	0.000
2008 Attendance-Outcome Slope	0.02102	112	862.29	0.000
2008 TAKS-Outcome Slope	0.00000	112	157.33	0.003

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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 from TEA.

Table G.4
Descriptive Statistics for Participant Only Student Attendance

Variable Name	*N*	*Mean*	*SD*
Student-Level Descriptive Statistics: (Level 1)			
Female	12,407	0.47	0.50
African American	12,407	0.09	0.29
Hispanic	12,407	0.27	0.45
Economically Disadvantaged (1=yes, 0=no)	12,407	0.52	0.50
LEP (1=yes, 0=no)	12,407	0.03	0.18
Middle Grades (6 to 8=1, 9 to 11=0)	12,471	0.43	0.49
R-Tech Instructional Hours	12,139	2.34	2.29
Attendance Rate (2008)	10,583	0.96	0.05
Attendance Rate (2009)	12,471	0.95	0.05
TAKS Composite *T* Score (2008)	8,913	49.11	7.86
School-Level Descriptive Statistics: (Level 2)			
School Achievement (percentage)	96	64.84	13.19
Supplemental Status (1=yes, 0=no)	96	0.52	0.50
Self-paced software (1=yes, 0=no)	96	0.92	0.28
Distance Learning (1=yes, 0=no)	96	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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 from TEA.

Table G.5
Hierarchical Regression Models Predicting the Effects of Instructional Time, Program Type, and Supplemental Status on Student Attendance

School-Level Analysis	Gamma Coefficient	Standard Error	*t*-value
Supplemental Status			
Intercept	0.9535	0.0014	670.84***
Supplemental Status	-0.0040	0.0014	-2.78**
School Achievement[a] 0.00	00	0.0001	-0.64
Female	-0.0018	0.0008	-2.32*
African American	0.0052	0.0015	3.45**
Hispanic	0.0008 0.00	12 0.65	
Economic Disadvantage	-0.0050	0.0009	-5.42***
LEP	0.0060	0.0029	2.07*
Middle School Level[c]	0.0089 0.00	14 6.24	***
R-Tech Instructional Hours[a,d] -0.000	1	0.0004	-0.34
2008 Attendance Rate[a] 0.76	65	0.0220	34.85***
2008 TAKS Composite *T* Score[a]	0.0004 0.00	01 7.04	***
Program Type			
Intercept	0.9568	0.0031	309.87***
Self-paced software[b]	-0.0053	0.0031	-1.75
Distance Learning[b] -0.001	4	0.0017	-0.78
School Achievement[a] 0.00	00	0.0001	-0.37
Female	-0.0018	0.0008	-2.34*
African American	0.0050	0.0015	3.31**
Hispanic	0.0004 0.00	12 0.38	
Economic Disadvantage	-0.0050	0.0009	-5.46***
LEP	0.0058	0.0029	2.00*
Middle School Level[c]	0.0091 0.00	14 6.40	***
R-Tech Instructional Hours[a,d] -0.000	2	0.0005	-0.51
2008 Attendance Rate[a] 0.76	85	0.0219	35.03***
2008 TAKS Composite *T* Score[a]	0.0004 0.00	01 7.16	***

$*p < .05$; $**p < .01$; $***p < .001$.

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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 from TEA.

Notes. Analyses included 8,575 R-Tech participants from 93 campuses. Fifteen percent of the variance in 2009 attendance rates was between campuses. The percentage of within-school variance explained by the student-level predictors was 52%. The percentage of between-school variance explained by the campus-level predictors (relative to the student-level model) was 0% for the supplemental status and program type models. 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.

[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 G.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	0.00116			
School Mean	0.00005	78	228.41	0.000
Instructional Hours-Outcome Slope	0.00001	80	173.25	0.000
2008 Attendance-Outcome Slope	0.02709	80	309.94	0.000
Program Type				
Level-1 Student Effect	0.00116			
School Mean	0.00005	77	228.15	0.000
Instructional Hours-Outcome Slope	0.00001	80	174.51	0.000
2008 Attendance -Outcome Slope	0.02679	80	309.85	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 the fall of 2008. *Texas Assessment of Knowledge and Skills* 2008 and 2009 individual student data from TEA. Individual student attendance rates from 2008 and 2009 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. There is no interest in generalizing across populations. Rather, the purpose is to generalize the results to the target population of students in the 115 participating campuses from the 62 participating school districts. Yet, even with this rather modest aim, missing data is a potential limitation to the generalizability of the findings. In the analyses including participants and non-participants, 44,265 students attended Grades 6 to 12 in the 115 participating R-Tech campuses. Yet because of missing data at various stages in the construction of data files, only 28,073 students were included in the analysis (see Table G.7). This was a percentage reduction of 36.6%. Similarly, in the analyses for participants only, 14,047 students attending Grades 6 to 12 in the 115 participating R-Tech campuses actually took part in R-Tech instructional activities in either fall of 2008 or spring of 2009. Because of missing data in constructing the data files, only 8,575 students were included in the analysis. This was a percentage reduction of 39.0%.

Table G.7
Number of Cases at Each Step in the Attendance Analyses

Steps	Participants and Non-Participants	Participants Only
Attending Grades 6-12 in an R-Tech campuses in 2008-09	44,265	14,047
Valid gender, ethnic, economic, and LEP data	42,513	13,212
Enrolled in fall 2008 and spring 2009	39,480	12,587
Valid attendance rates for 2008 and 2009	32,522	10,650
Valid R-Tech instructional hours in fall 2008 or spring 2009	NA	10,323
Valid TAKS scores in spring	28,073	8,677
Valid campus supplemental status and program type data	NA	8,575
Percentage reduction	**36.6%**	**39.0%**

Note. NA=Not applicable.

Were the resultant samples used in the HLM analyses representative of the original samples? Table G.9 compares the original samples with the partial or restricted samples used in both HLM analyses. Ethnic differences were slight. However, the restricted samples had higher percentages of female students and slightly lower percentages of limited English proficient students. The restricted participant and non-participant sample had a lower percentage of economically disadvantaged students. The participant only full and restricted samples had similar percentages of economically disadvantaged students. The most noticeable difference between full and restricted samples was the percentage of special education students. Both restricted samples had considerably lower percentages of special education students.

Table G.8
Demographic Characteristics of Full and Restricted or Partial Samples

	Participants and Non-Participants		Participants Only	
Characteristic	Full	Partial	Full	Partial
Percentage Minority	35.9%	35.9%	37.3%	36.6%
Percentage Female	46.3%	50.0%	44.6%	49.2%
Percentage Disadvantaged	46.4%	43.8%	49.7%	49.8%
Percentage LEP	2.4%	1.5%	3.1%	2.2%
Percentage Special Education	12.1%	1.7%	13.3%	2.1%

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