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ABSTRACT

The 76th Legislature authorized the Texas Education Agency to develop and conduct educational technology pilot programs during the 2000-2001 biennium. The purpose of the pilots was to use innovative technologies to deliver curriculum and improve student learning. The programs, implemented in 13 Texas school districts, utilized 28 different technology and content vendors. The Ed Tech PILOTS (Educational Technology) Providing Increased Learning Opportunities for Texas Students) projects used a variety of technologies, such as laptop computers, the Internet, and CD-ROM-based instruction. To obtain baseline data, surveys of principals, teachers, and students were administered before the pilots were implemented; principals and teachers were also surveyed at the end of the pilots. The PILOTS projects produced significant positive impacts in many areas. Schools experienced successes in terms of student and teacher performance and self-confidence, and family involvement. This report describes each of the pilots and summarizes baseline information and data collected from participating school districts. Also included are lessons learned and recommendations that will enable similar projects to operate more effectively in the future and that will enhance education in Texas through the use of technology. Recommendations include the following: (1) Create a new process to fund and carry out research that is different from the current grant process; (2) Implement additional pilots that examine the feasibility of providing substantial content via technology; (3) Encourage more curriculum content to be delivered electronically; and (4) Develop strategies for helping districts supply an adequate level of technical support to their schools. Appendixes include: baseline data versus end of study data for the principal survey and the teacher survey; results of the teacher self assessment; and results of student assessment of teachers. (AEF)

A Report to The Texas Legislature

REPORT ON ED TECH PILOTS

from the Texas Education Agency

Report on the Ed Tech PILOTS

A Report to the Texas Legislature from the Texas Education Agency December 1, 2001

Submitted to the Governor, Lieutenant Governor, Speaker of the House of Representatives, and the members of the Texas Legislature

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TEXAS EDUCATION AGENCY

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Jim Nelson
Commissioner of Education

December 1, 2001

The Honorable Rick Perry, Governor of Texas
The Honorable Bill Ratliff, Lieutenant Governor of Texas
The Honorable Pete Laney, Speaker of the House of Representatives
Members of the Texas Legislature

The 76th Legislature authorized the Texas Education Agency to develop and conduct educational technology pilot programs, including a laptop initiative, during the 2000-2001 biennium. The purpose of the pilots was to use innovative technologies to deliver curriculum and improve student learning. The programs, implemented in 13 Texas school districts, utilized several different technology and content vendors.

This report describes each of the pilots and summarizes baseline information and data collected from participating school districts. Also included are recommendations that will enable similar projects to operate more effectively in the future and that will enhance education in Texas through the use of technology.

I am pleased to submit this report for your consideration.

Respectfully submitted,

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EXECUTIVE SUMMARY

Ed Tech PILOTS
Educational Technology
Providing Increased Learning Opportunities for Texas Students

1.1 Introduction

Overview: In March 1999, the Texas Education Agency (TEA) began the Ed Tech PILOTS authorized by the Texas Legislature in Rider 66 of the 1999 Legislative Appropriations Act. Under the authorization, the Agency awarded grants enabling a broad-based selection of school districts to develop **innovative technological strategies to boost student learning**. TEA selected 13 school districts and 28 technology and curriculum companies to participate in the Ed Tech PILOTS. The Ed Tech PILOTS used a variety of technologies, such as laptop computers, the Internet, CD-ROM-based instruction, and other strategies. For some districts, the Ed Tech PILOTS project continued and expanded technology efforts already in existence. Installation of hardware and software began in February 2000, with the study continuing through the 2000-2001 school year. TEA's contractor, MGT of America, and its two subcontractors, T.H.E. Institute and Publishers Resource Group (PRG), delivered a report on project results to TEA in September 2001. Those results are incorporated in this report.

Impact: The Ed Tech PILOTS project produced **significant positive impacts** in many areas. Schools experienced successes in terms of student and teacher performance and self-confidence, and family involvement. Due to the short duration of these pilots, sufficient data was not available to determine the impact on student achievement.

History: Senate Bill 294, enacted by the 75th Texas Legislature, required the Commissioner of Education to develop a study to determine the costs and benefits of using computer networks, including the Internet, in public schools. The issues studied included the delivery, through a computer network, of updated supplements to textbooks. The report to the 76th Texas Legislature based on this project, the *Computer Network Study,* can be found on the TEA web page, http://www.tea.state.tx.us/Textbooks/archives/cnstemp.htm. The Ed Tech PILOT project used recommendations from this study in its design.

1.2 Purposes

- Examine the effectiveness of using various technologies in delivering substantial curriculum content to students;
- Gather data related to the impact on students, teachers, campuses, families, and communities; and
- Collect data on cost and benefits of using the technologies and content.

1.3 Methodology

To carry out the requirements of the pilot program, TEA performed a variety of activities. These included:

- selecting a contractor (MGT of America, assisted by T.H.E. Institute and Publishers Resource Group) as its business partner to assist in the design, implementation, administration and evaluation of the pilots;
- developing and administering a Request for Statement of Interest (RFSOI) to enlist participation from technology and content vendors; and
- developing and administering a Request for Application (RFA), to select school campuses for pilot sites.

Whereas the original intent was to conduct up to 25 pilots, the limited amount of technology resources offered by vendors through the RFSOI made it necessary to reduce the number of pilots to 13. Each of the sites selected received a $90,000 grant from TEA to help administer the pilot over the two-year period. For additional information concerning the development of the pilot project, please see Chapter 3, Methodology.

1.4 Pilot Sites

The following districts and campuses conducted the Ed Tech PILOTS:

District	Campus	ESC Region
Austin ISD	Bedichek Middle School	13
Carrollton-Farmers Branch ISD	Vivian Field Middle School	10
Clear Creek ISD	Ross Elementary School	4
Dallas ISD	Dallas Environmental Science Academy	10
Highland Park ISD (Amarillo)	Highland Park Elementary	16
Hillsboro ISD	Hillsboro Junior High	12
Johnson City ISD	L.B.J. Middle School	13
Lake Worth ISD	Lake Worth High School	11
Midland ISD	Coleman High School	14
Pharr-San Juan-Alamo ISD	Austin Middle School	1
San Antonio ISD	Rhodes Technology Academy	20
Spring Branch ISD	Spring Woods High School	4
Tuloso-Midway ISD	Tuloso-Midway Primary/Intermediate Schools	2

Detailed information on each of the pilots can be found on the TEA web page, http://tea.state.tx.us/technology/pilots.

1.5 *Vendor Participants*

The following 28 vendors worked with schools to provide technology and/or content resources to be used by the pilots:

- American Education Corporation
- Apple Computer
- bigchalk.com
- Bricolage Interactive Design
- Casio
- Decision Development Corporation
- Dell Computer
- Discourse Technologies Inc.
- Earthwalk Communications
- Edsoft Software Corporation
- Glencoe/McGraw-Hill Publishing Company
- HyperGraphics
- Hyper TV Networks
- Intelligent Peripheral Devices
- Knowledge Adventure
- Lexia Learning Systems
- The Lightspan Partnership
- Microsoft
- NetLibrary
- NovaNET Learning
- Prentice Hall
- Riverdeep
- Softbook Press
- SRA/McGraw-Hill
- Test Masters
- Vocabulary Enterprises
- William K. Bradford Publishing Company, Inc.
- WorldView Software

1.6 *Highlights of Success*

The following examples highlight some of the **significant areas of success** experienced by participating schools. For more information on each example, see the corresponding pilot chapter in this report.

- **Vivian Field Middle School** found that the project had a significant impact on the families of participating students. For many of the families, the laptop that the student brings home is the only access to a computer in the home. Not only were parents more inclined to get involved with their children's classwork, they also used the laptops to improve their own skills. In fact, one student proudly told his teacher that his mother had used his laptop to learn about computers, which enabled her to get a better job. To learn more about this success, see Chapter 7 of this report.

- **Hillsboro Junior High School** had significant success in ensuring that the technology was used outside of traditional school hours and walls. Students checked out laptops from school to use at home during the school year. The program was very successful, with very little incidence of missing laptops (none were permanently lost) or breakage. In addition, the school used its laptops during summer vacation by holding a two-week technology camp, during which students used laptops to record and analyze science data and produce multimedia projects. To learn more about this success, see Chapter 11 of this report.

- **Highland Park Elementary School (Amarillo)** experienced the most significant results in the area of TAAS writing scores. Because writing scores had been low, a primary reason Highland Park submitted an application for this project was to obtain AlphaSmart devices to help improve writing skills, and thereby raise TAAS writing scores. The results reflect that 97 percent of fourth-grade students passed the TAAS writing test, and TAAS fourth-grade writing scores increased from 90 percent to 97 percent passing. Moreover, scores of Hispanic students increased from 88 percent to 100 percent passing, and scores of economically disadvantaged students increased from 86 percent to 96 percent passing. While one year is not long enough to prove that the approach is successful, the Highland Park staff attributes these gains in writing scores to the use of AlphaSmarts and the Classworks Gold software. To learn more about this success, see Chapter 10 of this report.

- During one visit to **Rhodes Technology Academy** near the end of the year, MGT consultants and TEA staff were able to observe and interact with a few of the honors students who had been using the laptops that Rhodes acquired with local funds to augment the resources obtained from their vendor partners. These students were very pleased that they had the opportunity to use these computers during the year, and described them as excellent tools for learning. They said the laptops enabled them to progress much further than would have been possible if they had not had the computers. They constructed several sophisticated websites showing results of research they carried out as part of the pilot. To learn more about this success, see Chapter 16 of this report.

- Parental response to the Lightspan program at **Tuloso-Midway Primary and Intermediate Schools** was positive. As part of the pilot, parents were provided training that allowed them to take the resources home so that together they and their children often became actively involved in learning. One of the principals said that she frequently heard comments from her parents such as, "I am learning too!" Teachers reported that parents want their children in the program. Some parents inquired about buying the program so they and their children could use it at home. To learn more about this success, see Chapter 18 of this report.

- **Coleman High School** demonstrated that it was able to replace its former computer-assisted learning system *(PLATO)* with a new one *(NovaNet),* train its teachers to implement it, and use the new learning system with its students. All of this occurred within a few months during the Spring and Summer of 2000. Coleman's internal evaluation of the new computer-aided instruction (CAI) concluded that it greatly improved student learning. To learn more about this success, see Chapter 14 of this report.

- **Spring Woods High School** students in the pilot significantly increased their usage of computers from an average of 7.5 hours per week before the pilot to 14 hours per week near the conclusion of the pilot. They also gave their teachers high ratings for the ways they used technology to help them learn. This pilot also demonstrated that grouping ESOL students and having them work exclusively with a team of teachers who had been trained to use a variety of new technologies resulted in improved outcomes on the tenth-grade TAAS examination. To learn more about this success, see Chapter 18 of this report.

- **Austin Middle School** found that the pilot modernized the classrooms and brought the school up to date in technology. The enriched resources available to students were not limited to textbooks, encyclopedias and regular research material. As a result, participating students improved in both oral and written presentations. To learn more about this success, see Chapter 15 of this report.

- **LBJ Middle School** found that the project engaged students with low attention spans in the computer-delivered lessons. Two participating students responded so well to the computer-delivered instruction that the campus plans to establish a computer curriculum lab to help those students who are not as successful in the regular classroom. To learn more about this success, see Chapter 10 of this report.

- **Ross Elementary School** found that the project had a significant impact on the families of participating students. Not only did parent communication increase, but as a result of the pilot, there was an increase in the number of families who have purchased home computers and/or Internet service to allow students more opportunities to apply what they have learned in class. To learn more about this success, see Chapter 8 of this report.

- **Bedichek Middle School** found that the project had a profound impact on the way students felt about using technology in the classroom and their future. Ninety-four percent of the participating students believe that the school should use more technology in the classes, and 86 percent feel that using technology made them a better student. While 50 percent of these students indicated at the beginning of the year that they planned to go to college, that number increased to 91 percent by the end of the year. To learn more about this success, see Chapter 6 of this report.

1.7 Evaluation Summary

To obtain baseline data, surveys of principals, teachers, and students were administered before the pilots were implemented. Principals and teachers were also surveyed at the end of pilots. **Key findings from the surveys of principals are provided below.**

- Although before the pilots many of the participating principals reported high levels of technology usage by students, few reported frequent student use of technology to solve problems. At the end of the pilot program principals reported that students are gradually increasing their use of technology to enhance their problem solving skills.

- At the beginning and at the end of the pilot program, almost all principals reported that their schools were technologically advanced.

- Before the pilots were implemented, most participating schools had a few notable shortcomings regarding technology. At the end of the pilot, most principals reported that improvements had occurred with respect to the shortcomings noted earlier.

A complete summary of the findings from the pre- and postpilot principal surveys can be found in section 4.1.1 of Chapter 4.

Key findings from the surveys of teachers include:

- Compared to principals, teachers involved in the pilots reported lower levels of technology usage by students before the pilots were implemented. At the end of the study teachers reported students were not only using technology more frequently, but had increased their abilities to use technology independently.

- Similar to the perceptions of principals, before the pilots few teachers reported that students used technology to solve problems. After the pilots, teachers, like principals, reported that students had made progress in using technology to solve either simple or complex real-life problems.

- Although when the pilots began, most of the participating teachers were advanced technology users, almost all of them increased their technology capabilities during the pilot.

- Before the pilots, most participating schools had a few notable shortcomings regarding technology. One common effect of the pilot project was that schools took steps to correct these shortcomings.

A complete summary of the findings from the pre- and postpilot teacher surveys can be found in section 4.1.2 of Chapter 4.

Immediately before the pilots were implemented, MGT asked participating teachers and their high school, junior high school, and middle school students to assess the extent to which technology was being used in the classroom. The same assessment was conducted at the end of the program.

Among the items assessed through this process were:

- the **amount of class time** students actually spent using computers versus the amount of time they thought they should be spending;
- the **effectiveness of technology** use by teachers; and
- **factors that hindered technology use** by students.

For a complete summary of the findings from the teacher and student assessments, see section 4.1.3 of Chapter 4.

1.8 Lessons Learned

This section provides some insights into a number of factors that influenced the implementation and operation of the pilots.

1.8.1 The level of private sector participation in pilot projects is subject to a significant number of variables.

The **involvement of the private sector has been significantly less** than expected. Even though the expectation was that no money from the project would go to members of the private sector, the evaluation team felt that the advantages to companies participating in the project would far outweigh the expense of participating. The evaluation team sent out a survey to all vendors that originally had expressed interest in participating in the pilot project.

The top two reasons why vendors did not participate were:

1. **63 percent** indicated that they could not afford to provide training and technical support for their product at no cost for the life of the project.
2. **54 percent** indicated that they could not afford to provide their product to schools at no cost.

1.8.2 Careful planning and flexible implementation greatly enhance the opportunities for success.

Challenges related to the early implementation of the pilots indicate that **careful planning** is crucial in ensuring an effective technology model and a **smooth transition from traditional to technology-rich classrooms**. The experiences of the pilot projects have highlighted five distinct aspects of planning that are key in successfully implementing their projects:

1. planning to accommodate changes in school staff during and after the transition period;

2. planning to help teachers and administrators negotiate the often stressful transition from traditional to technology-rich classrooms;

3. planning to ensure that new technology will work with existing technology and school structures;

4. planning to ensure that the pieces of existing and new technology work smoothly together and with other existing school structures; and

5. allowing unexpected factors to enrich an already solid plan.

1.8.3 *The transition between providing content via print and providing content via technology requires a shift in perception from all stakeholders.*

The pilot projects include several models for electronic delivery of content that was originally available only in print. These include companies that provide the service of digitizing print materials, as well as traditional print publishers who digitize their own materials. Both of these models provide interesting insights into the transition between print and electronic content.

The experience of pilot sites indicates that the brokering of agreements between print publishers and these intermediaries is a key step that is slow to occur.

1.8.4 *Replication of the pilots may not involve some of the challenges encountered by pilots.*

A key outcome of this pilot project was to identify models for effective technology use that can be replicated in other schools. Related to this outcome is the identification of pitfalls that schools can avoid. Some challenges are inherent in the pilot process itself. However, districts would not necessarily encounter these challenges in an implementational environment.

1.8.5 *Additional and different measures of technology's impact on students and teachers are needed.*

The TEA/MGT team created instruments and gathered other data intended to measure various aspects of the impact of technology on students, teachers, parents, the school, and the teaching/learning process. In that process, care was taken to make the instruments easy to use and to gather data commonly found in schools. Despite those efforts, the information gathered is inconsistent, and in a number of cases it is not sufficient to satisfy the needs of the study.

As occasionally happens in educational research, some of the data gathered conflict with anecdotal information. For example, in one site, survey data from teachers showed a significant decline in the amount of time they thought students should be using technology in schools as well as a lower rating of their own effectiveness with technology. Yet interviews with these same teachers indicated a strong belief that technology was helping the students learn more and better, that students were more excited about learning since they were able to use technology, and story after story of student successes. It may be that the surveys, designed to take a relatively short amount of time, were not able to tease out key answers, or it may be that teachers, frustrated by the occasional technical problem or other implementation issue, used the surveys to reflect that frustration. Starting innovative projects always creates a certain amount of disorder until teachers and students become comfortable using the new tools and strategies. Pulling together and interpreting these sometimes conflicting data can be a challenge.

In other cases, anecdotal data gathered through interviews was the only way to understand the nature of what was occurring in the classroom. One of the most often cited benefits of using the technology in the classroom over time was the growing self-confidence of the students. Measuring a student's self-confidence is a rather sophisticated and complex process, and does not show up on an easily administered instrument. Yet teachers who work with students every day can see minor changes in students' behaviors in the classroom, in the hallway, or on the playground that clearly show increased self-confidence. The extent to which this newly gained self-confidence can be attributed to technology use in the classroom is questionable, yet the teachers who know the students have little doubt.

A final piece of information relative to the success of individual pilots is the extent to which the pilots will be carried forward and expanded after the grant and financial support from TEA ends. At a May 8, 2001 meeting of representatives from all the pilots, this was discussed. Virtually every pilot site was making plans to extend and/or expand the pilot efforts. Much of the discussion actually focused on how they were going to expand, what they were going to do differently, how they were going to get additional funding, and so forth. Some may call this the ultimate measure of success—the commitment of local dollars toward an innovation.

1.8.6 Involving parents continues to be a difficult task.

A number of pilots specifically wanted to involve parents in the school through the use of technology. Virtually all sites had a parents' night or similar event to kick off the pilot activities. Sometimes, however, interaction diminished after the initial activities. Some parents did not want additional e-mail added to their current load. Other sites, especially those using the Lightspan technology, were more successful in involving parents. This could be attributable to the age level (elementary), the software, or the persistence of the teachers.

1.9 Recommendations

Based on the experiences of the pilots and a review of the relevant research in technology and education, the following recommendations should enable similar projects to operate more effectively, and enhance education in Texas through the use of technology.

Recommendation 1:

Create a new process to fund and carry out research that is different from the current grant process.

The purposes of grants and the purposes of research often are very different. As such, they should have different processes for involving school districts. The **competitive grant process** has been refined over many years to ensure that the competition for funds is fair and equitable, yet still meets the requirements of the grant.

A research process would have different purposes and hence a different process. This process should be flexible, allowing TEA, for example, the possibility of selecting school districts for research without competition, if this would expedite or make the research more effective. In addition to flexibility, the process would incorporate well-established research procedures. Finally, it would also allow TEA to provide incentives or create sanctions for such activities as data collection.

Recommendation 2:

Implement additional pilots that examine the feasibility of providing substantial content via technology.

- Even with the limited time for this study, areas of great promise began to emerge from the pilot sites. These areas should be investigated further and some of the school districts involved in the Ed Tech PILOTS should be asked to participate in these further investigations. Using a new research process, study of some or all of the areas listed below should yield significant information that will inform policy makers. Changing the delivery of content into the teaching and learning environment is changing one of the most fundamental aspects of education. It deserves special attention. The following are but a few of the areas that could show great promise:

- using technology with at-risk students;
- using technology with students with disabilities;
- exploring strategies for increasing parental involvement through technology-oriented programs;
- partnering with one or more publishers to determine what it would take to create and deliver digital content through a variety of technologies to an entire campus or district;
- assessing the potential for using handheld devices in the classroom; and
- studying the implications of infusing large amounts of technology into the infrastructure of the school.

Recommendation 3:

Encourage more curriculum content to be delivered electronically.

It is clear from the pilot study—and interviews with teachers in particular—that having substantial electronic content available is extremely valuable to teachers when a number of criteria are met. Those criteria include:

- the content matches the TEKS;
- the hardware and infrastructure are readily available to teachers and equitably accessible to students;
- the teachers have had training on how to access and use the content in their classrooms as part of the teaching and learning process;
- the teachers have confidence that the hardware, infrastructure, and content will consistently work well; and
- the teachers are supported by their principals in using on-line content.

Teachers want substantial electronic curriculum content when they know how to access and use technology effectively. Typically, publishers will develop more electronic curriculum content when they know teachers have access and know how to use technology effectively. Efforts to encourage more curriculum content to be delivered electronically will promote teacher use of that content in their classrooms as a part of the teaching and learning process.

Recommendation 4:

Develop strategies for helping districts supply an adequate level of technical support to their schools.

In the Ed Tech PILOTS, as in most other pilots, technical support proved to be critical to success. For a variety of reasons, most school districts do not provide the level of technical support that teachers need in order to integrate technology into their curriculum successfully. This is an area where education is significantly behind business in the application of technology. Such strategies might include some combination of the following:

- incentives to districts to increase the allocation of local funds to support this function;
- funding assistance from the state through allotment funds or other means;
- contractual support from private vendors; and
- increased support from the regional education service centers.

1.10 Existing Strategies

The state has several strategies in place to assist districts in **planning** for and implementing technology programs. **The Long-Range Plan for Technology 1996-2010** is organized around the key areas of Teaching and Learning, Educator Preparation and Development, Administration and Support, and Infrastructure for Technology. The **Technology Allotment**, which provides $30 per student per year, assists districts in meeting the goals of this plan. This dedicated funding allows districts to plan for long-term goals and objectives. The Educational Technology Advisory Committee (ETAC) has developed the **Texas STaR Chart**, a tool for planning and assessing school technology and readiness aligned with the Long Range Plan for Technology. The statewide Educational Technology Coordinating Council's (ETCC) **State of Texas Master Plan for Educational Technology 2000-2003** recommends that the Texas STaR Chart serve as the standard for assessing technology preparedness in K-12 schools.

The **adoption process** for **instructional materials** has defined textbooks to include electronic curriculum content and provide a wider array of choices for school districts. **Technology proficiencies for students and teachers** have been established. A wealth of resources correlated to these proficiencies are available on the TEA web site. To best use these resources **professional development** opportunities are available from a variety of sources. Districts are encouraged to use the tools and resources available to effectively plan and implement educational technology programs. The ETAC is currently developing a campus-based STaR Chart with a planned release during the 2002-2003 school year. The Texas StaR Chart is available online at http://www.tea.state.tx.us/technology/etac/txstar and provides charts and graphs to assist districts in assessing their technology readiness. A variety of technology planning resources are available at http://www.tcet.unt.edu/tek-plan.htm.

The world of technology is changing every day and many of the tools and resources now available were still on the drawing board when these pilots were launched. With this rapid pace of technological innovation, it is essential to continue to explore the potential of technologies and digital content to improve teaching and learning. Additional pilot projects based on the lessons learned in this and other studies should help determine how **educational technologies can provide increased learning opportunities for Texas students.**

Chapter 2

Introduction

INTRODUCTION

Texas has long been a leader in using technology for instructional purposes. In the early 1980s when the budding world of educational technology was struggling with a definition of what students should know and be able to do with technology—if anything—Texas put a stake in the ground and defined Computer Literacy. Not only did the state define Computer Literacy, it also required all students at the 7th or 8th grade levels to take a one-semester course in Computer Literacy.

This early action was followed by a variety of other initiatives that reinforced Texas' position as a leader among the states in educational technology. Included in these initiatives were:

- authorizing school districts to purchase computers from a state bid list in the mid 1980s;
- developing a state Long-Range Plan for Technology in the late 1980s;
- creating a statewide satellite network (T-STAR) in the late 1980s;
- establishing a research and development center (TCET) at the University of North Texas, also in the late 1980s; and
- providing technology allotment funds to school districts annually to enable them to acquire educational technology resources starting in the early 1990s.

Texas also has been a national leader in a closely related area: electronic content. As an adoption state, Texas has a major influence on what happens in the K-12 textbook industry, if only by virtue of its size. In the late 1980s, TEA took a number of actions that caused the textbook industry, the educational technology industry, and state departments of education across the nation to take notice. Two of these actions were:

- redefining textbooks to allow the submission of electronic content in the late 1980s; and
- adopting the first technology-based textbook in the nation, *Windows on Science,* in the early 1990s.

Since that time, there have been numerous submissions and adoptions of technology-based materials in Texas, and it is common for traditional print-based materials to include electronic components.

Following up on efforts to make electronic content more readily available to Texas classrooms, a report to the 75th Legislature addressed the accessibility of information in electronic textbooks for students who are blind or visually impaired. In 1997, Senate Bill 294, enacted by the 75th Texas Legislature, required the Commissioner of Education to develop a study to determine the costs and benefits of using computer networks, including the Internet, in public schools. The issues to be studied included the delivery, through a computer network, of updated supplements to textbooks.

This study, known as the Computer Network Study Project, produced several recommendations that called for TEA to examine a number of issues more closely. Some of those recommendations included:

- Explore, through methodologically sound pilot projects, the impact of technology use on instruction, student performance and behaviors, and campus and district administration.

- Identify and develop, through pilot projects, a range of technology integration models for different content areas, grade levels, and levels of classroom/computer lab technology.

- Provide instructional content through computer networks, including the Internet, that can be accessed in the classroom through different technology configurations.

- Develop a framework for estimating costs. Set up pilot projects representing different models of the delivery of instructional content via computer networks. Require each pilot project to use the cost framework and compile detailed cost data.

In March 1999, in an effort to carry out some of the recommendations of the Computer Network Study, TEA announced that it would conduct a number of educational technology pilots in a representative group of Texas school districts. Rider 66 authorized additional funding for the pilot projects. The purpose of the Ed Tech PILOTS would be to examine the effectiveness of using various technologies in delivering substantial curriculum content to students and to improve student learning. The pilots would be designed to examine how and when electronic media may be used in a cost-effective manner to deliver curriculum that has traditionally been delivered through print media. The pilots would involve a variety of technologies and include hardware and curriculum products from numerous vendors.

Chapter 3

Methodology

METHODOLOGY

This chapter summarizes the approach and methodology employed to design, implement, administer, and evaluate the Ed Tech PILOTS.

3.1 __Initiation of the Pilot Project__

The 76th Texas Legislature enacted legislation directing TEA to conduct innovative pilots to explore the feasibility of using technology to deliver substantial curriculum content that would improve student learning. In response to that directive, the Agency developed a general plan for implementing the pilots and, recognizing the magnitude of the effort necessary to fulfill the legislative intent, prepared a Request for Proposals (RFP) to retain a consulting firm to help design and implement these pilot programs. TEA released the RFP in November 1998. The selected contractor was required to assist the Agency with the following tasks as outlined in the RFP:

- design the standards to be met by vendors selected to provide technology services;
- assist the agency develop cost guidelines for the pilots;
- assist the agency select the pilot sites;
- incorporate the standards into a Request for Statement of Interest;
- evaluate proposals and provide a recommendation to the agency;
- collaborate with vendors, publishers, and developers interested in delivering content to pilot sites;
- provide pilot oversight, including coordination of maintenance and repair;
- provide evaluation services --both formative and summative-- related to the pilot programs, to include monitoring and reporting student performance in all technology pilot sites; and
- assist in writing year-end reports with recommendations for future action, including cost estimates.

TEA hired MGT of America, Inc. (MGT) as the primary contractor. T.H.E. Institute and Publishers Resource Group served as subcontractors to MGT. Work began in March 1999 and was completed in September 2001.

After TEA selected MGT as its business partner to help in design the pilot programs, the next step was to plan the process for implementing the pilots.

3.2 *Preparing for the Pilots*

The project was very complex, involving the vendor community, school districts where the pilots were to be conducted, and an intensive and sophisticated evaluation effort. More specifically, vendors were expected to provide their products or services at no charge to the state or to the school districts. **It was anticipated that the advantages listed below would encourage technology vendors to contribute their resources**:

- prove the concept that technology can improve student achievement;
- provide access to and interaction with content providers; and
- provide an intimate working relationship with one or more school districts.

There were perceived advantages for the content vendors, as well. Some of those were:

- provide a low-risk entry into working with technology such that, if the pilots went well, they would gain an advantage over their competitors; and
- provide an opportunity to send a message to all publishers and educational entities that the company intends to incorporate technology into its future offerings.

Of course, there was one additional significant advantage for all private sector members: publicity. It was expected that the visibility of the project would prove beneficial to all participants, especially the vendors.

While there were perceived advantages to vendors for participating in the project, TEA recognized that **the burden for vendors went beyond provision of products and services to include professional development and support.**

In addition to actually implementing the pilots, **school districts were expected to provide information on student performance, changes in teacher behavior, changes in school climate, and the time, effort, and cost of implementing the pilots.**

Finally, for the results of the pilots to provide realistic, useable information for TEA and the Legislature, the pilots needed to be established in as natural a setting as possible. That is, the specifics of the needs of the district to be fulfilled, the hardware and content to be used to address the identified needs, and the professional development and other support to make the pilots successful needed to grow from the minds of the local school districts. This is a reflection not only of Texans' long-held belief in local control, but also from research that shows that technology-based projects need to be closely coordinated with local technology plans in order to be successful.

Thus, the **overall plan** for implementing the pilots required the following steps:

- solicit educational technology resource contributions from vendors;
- qualify the contributing vendors;
- solicit school district participation that would incorporate educational technology products contributed by the qualified vendors;

- evaluate school district proposals; and

- select school districts that would provide high quality sites with a variety of technology and implementation approaches.

TEA and MGT conducted several internal planning sessions to discuss the various actions that would be necessary in order to design and implement successful pilots. Since securing educational technology resources from vendors was critical to conducting the pilots, it was decided that vendors should be asked to provide input on the design of the pilots and how best to obtain the resources needed to conduct them. To that end, on April 26 and 27, 1999, the Agency invited more than 900 companies to attend a meeting in Austin to provide input about the type of technology projects that should be solicited. Over 160 people representing approximately 120 companies attended. At the meeting, vendors were given the opportunity to meet individually with the project team to discuss the project in more detail. Following that meeting, another 30 to 35 companies contacted Ed Tech PILOTS team members asking for additional information or otherwise showing interest in the project. Drawing on the information garnered at the meeting and national best practices in educational technology, TEA selected the following four technology areas in which to conduct pilots:

- laptop computers;

- enhanced video distance learning;

- internet access; and

- other innovative technologies.

Based on the input from vendors and the objectives for the pilots, the TEA/MGT team concluded that the most effective way to obtain the educational technology resources needed was to issue a Request for Statement of Interest (RFSOI). This process yielded a list of technology-based products that would serve as resources for pilot sites to use to conduct their projects. After securing commitments from vendors to donate educational technology resources, the next step was to issue a Request for Application (RFA) from districts desiring to use some of these resources to conduct innovative pilots that would address some of their specific educational needs. The TEA/MGT team then conducted a rigorous review of district responses to the RFA, thereby seeking to ensure that innovative pilots would be conducted at sites that offered the best chance for success.

3.3 Sequence of Events

As outlined above, TEA performed a variety of activities in order to carry out the pilot project. These included selecting a contractor, developing and administering a Request for Statement of Interest to enlist participation from technology and content vendors, developing and administering a Request for Application, selecting pilot sites, providing support for the pilots, and establishing a process for conducting an evaluation. Exhibit 3-2 presents the project's sequence of events and time line.

EXHIBIT 3-2
TIME LINE

Date	Event
November 1998	TEA released RFP seeking consultant services
March 1999	MGT of America selected
April 1999	Vendor Conference
June 1999	RFSOI developed/released
July 1999	Vendors selected
August 1999	RFA developed/released
December 1999	Pilot sites selected and notified
January 2000	Beginning date of project
February–May 2000	Materials received, staff development held
April–May 2000	TEA and MGT site visits conducted
June–August 2000	Planning and staff development
September 2000–August 2001	Full Implementation of project
September 2000–August 2001	TEA and MGT site visits conducted
December 2000	Report to the Legislature
September 2001	Final project Progress/Activity Report due from pilot sites
September 2001	Final Evaluation Report due from MGT

3.4 RFSOI Developed and Administered

In developing the RFSOI, TEA and MGT used the internal planning sessions and the vendor meetings to apply a diversified approach to the design of standards for vendors. This approach allowed a range of technologies and related vendors to participate fully in the pilots. The process for the pilot design created up to five technology prototypes, each with definable components to be evaluated. For all prototypes, vendors were required to meet a set of standards. These standards included such factors as the stability of the company and its capacity to provide professional development and technical support. In addition, content vendors were required to demonstrate effective software that is useful in teaching the official Texas Curriculum, the Texas Essential Knowledge and Skills (TEKS). Specifically, technically related standards included storage capacity, processor speed and power, and/or baud rate. These standards were approved by TEA and incorporated in the RFSOI that was issued to potential vendors in June 1999. Twenty-six entities, many of them consortia, submitted acceptable proposals in time to be included in the Request for Application that was available to all schools in August 1999. Pilot sites selected vendors based on their digital curricula, their hardware and software, and the standards established by TEA and MGT. The companies selected were:

- American Education Corporation
- Apple Computer
- bigchalk.com
- Bricolage Interactive Design
- Casio
- Decision Development Corporation
- Dell Computer
- Earthwalk Communications
- Glencoe/McGraw-Hill Publishing Company
- HyperGraphics
- Intelligent Peripheral Devices
- Knowledge Adventure
- Lexia Learning Systems
- The Lightspan Partnership
- Microsoft
- NetLibrary
- NovaNET Learning
- Prentice Hall
- Riverdeep
- Softbook Press
- Vocabulary Enterprises
- WorldView Software.

With vendor selection completed, TEA next turned to the responsibility of selecting the districts that were to participate.

3.5 __RFA Developed and Administered__

To expand the visibility of the Ed Tech PILOTS Project, TEA sent a letter to Texas school district superintendents in April 1999 informing them of TEA's intent to conduct the pilots. In addition, school districts received announcements at the state district technology coordinators meeting in mid-April and through a press release that was distributed that same month. In August 1999 Texas school districts and open enrollment charter schools were given the opportunity to apply to participate as a pilot site. As districts applied to participate, they identified the technologies and content they wanted to incorporate into their pilots. Based on the resources proposed in response to the RFSOI, districts selected the vendors with whom they wanted to work from a listing included in the Request for Application.

TEA conducted additional follow-up with the vendors to ensure that the vendors were eligible to participate in the pilot. School districts were allowed to apply in more than one category or grade level, but a separate application was required for each.

In assisting districts in the application process, TEA developed a set of criteria for each of the grade levels at which the pilots would be conducted. The criteria included required, preferred, and optional components at each school level. In all of the pilots, the primary emphasis was to examine the impact of using technology to deliver substantial curriculum content to teachers and students. All pilots would gather data related to the impact on students, teachers, the campus, the community, and the home. Exhibit 3-3 presents the criteria administered in the RFA, along with the projected number of pilots to be conducted.

EXHIBIT 3-3
RFA CRITIERIA

All Pilots—All targeted pilots should consider the following:

- ***Required:*** To qualify for funding, districts must commit to a minimum of two full years of participation and data collection. Teachers participating in the pilot program must make a commitment to ongoing professional development in the application of content through the use of technology. Districts must demonstrate in their proposals how the pilots they describe will address the needs of students with disabilities and special populations. Pilot participants must include results of a self-assessment using the CEO Forum's STaR Chart, a nationally recognized scale for technology implementation.

- ***Preferred:*** Districts should also incorporate plans for use of applications of content through technology devices outside the traditional school day.

- ***Optional:*** Districts are encouraged to determine their specific needs beyond those required by the pilots and use appropriate content and technology to address those needs.

Elementary Pilots—Seven pilots are targeted for the elementary school level: two Laptop Computer Pilots, two Internet Access Pilots, two Innovation Pilots, and one Enhanced Video Distance Learning Pilot.

- ***Required:*** To qualify for funding in this category, pilots target students beginning in January 2000 who are in the 2nd, 3rd, or 4th grades. Districts applying for the elementary pilots must commit to implementing the pilot technology with the same group of students as they progress through the 2000–2001 school year as 3rd, 4th, or 5th graders. Elementary pilots are also required to use technology applications that assist teachers in delivering curriculum content in the foundation content areas (reading/language arts, math, science and social studies). The content chosen must be correlated with the Texas Essential Knowledge and Skills (TEKS) and/or provide a tool to facilitate the delivery or use of content with teachers and students.

- ***Preferred:*** At the elementary level, curriculum areas are frequently integrated and technology devices have multiple applications. Districts applying to participate as pilot sites are encouraged to propose educational technology applications that extend the use of educational technology into the enrichment curriculum and/or applications beyond the classroom to ensure maximum use of all resources.

- ***Optional:*** Elementary applicants are encouraged to find other innovative applications of curriculum and technology that meet the specific needs of their students, faculty, and community.

Middle School Pilots—Eight pilots are targeted for the middle school level: three Laptop Computer Pilots, one Enhanced Video Distance Learning Pilot, two Internet Access Pilots, and two Innovation Pilots.

- ***Required:*** To qualify for funding in this category, pilots target students beginning in January 2000 who are in grades 6 or 7. Grade 5 may also be included if it is part of the middle school. Districts applying for the middle school pilots must commit to implementing the pilot technology with the same group of students as they progress through the 2000–2001 school year. Districts applying for the middle school pilots must also commit to implementing the pilot technology in delivering curriculum content in two of the four foundation content areas of science, language arts, social studies, and math.

- ***Preferred:*** Districts applying to participate as middle school pilot sites are encouraged to propose educational technology applications that extend the use of educational technology into enrichment curriculum areas. Because classes at the middle school level tend to be divided among subject areas, a local area network is preferred for laptop and Internet access pilots to ensure maximum utilization of the technologies. Districts may propose alternatives to a LAN in ensuring maximum use of the technologies.

- ***Optional:*** Middle school applicants are encouraged to find other innovative applications of curriculum and technology that meet the specific needs of their students, faculty, and community.

High School Pilots—Ten pilots are targeted for high schools: four Laptop Computer Pilots, two Enhanced Video Distance Learning Pilots, two Internet Access Pilots, and two Innovation Pilots.

- ***Required:*** To qualify for funding in this category, pilots target students beginning in January 2000 who are in grades 9, 10, or 11. Districts applying for the high school pilots must commit to implementing the pilot technology with the same group of students as they progress through the 2000–2001 school year. Districts applying for the high school pilots must commit to implementing the pilot technology to deliver curriculum content in two of the four foundation content areas of science, language arts, social studies, and math.

- ***Preferred:*** Districts applying to participate as high school pilot sites are encouraged to propose educational technology applications in areas that extend the use of educational technology into other content areas. Because classes at the high school level tend to be divided among subject areas, a local area network is preferred for laptop and Internet access pilots to ensure maximum utilization of the technologies. Districts may propose alternatives to a LAN in ensuring maximum use of the technologies.

- ***Optional:*** High school applicants may choose to use pilot technology resources in additional curriculum areas. High school applicants may also choose additional content applications that meet the specific needs of their students, faculty, and community.

Using these criteria, TEA and MGT determined the desired outcome of the pilots and what types of schools and school districts would contribute most effectively to achieving these outcomes.

3.6 Pilot Sites Selected

School districts responding to the RFA specified the goals and objectives they hoped to accomplish and the technology prototype they wished to use. Each district listed one or more proposed vendors and the software applications they intended to use to produce the desired results. Applications from 90 districts were subjected to an exhaustive review to identify the best pilot sites. The selection process included a peer review by educators from across the state and reviews by TEA staff and the MGT team.

Whereas the original intent was to conduct up to 25 pilots, **the limited amount of technology resources offered by vendors through the RFSOI made it necessary to substantially reduce the number of pilots.** After studying the hardware and software offered, the TEA/MGT team concluded that, provided some districts acquired hardware resources through other sources, 13 pilots could be conducted; thus, **13 sites were selected**. Descriptions of these pilots, along with a summary of the outcomes and accomplishments of each pilot, are found in the pilot summary chapters (Chapters 6 through 18).

Each of the sites selected received $90,000 in funding from TEA to help administer the pilot over the two-year period. While these funds could not be used to purchase computers for student use, they could be used to acquire resources that facilitated teacher use of technology. For the most part **these funds were used to:**

- compensate teachers for conducting classes after school;
- cover the cost of substitutes to enable teachers to attend training;
- gather evaluation data for use in assessing the effectiveness of the project;
- acquire curriculum materials; and
- purchase technology resources, such as smart boards and projectors to facilitate classroom instruction.

3.7 *Project Orientation and Implementation*

Following the selection of the pilot sites, an orientation and planning meeting was scheduled in Austin on January 20, 2000. Representatives from each pilot and a representative from each of the partnering companies were invited to attend. The purpose of the meeting was to provide general information about the project to all pilot participants and to help them prepare to conduct successful pilots.

TEA representatives welcomed the group and provided an overview of the purpose of the pilot project and of this meeting, after which a representative for each campus pilot was given an opportunity to describe the plans for their project. The expectations for vendor participation were outlined. Both vendors and pilot representatives were able to ask questions about the role vendors were expected to play. The administrative processes were described and the evaluation plans were summarized.

Following the meeting of the full group, small group meetings were held where each member of the MGT administrative support team met with their three or four pilot sites to get acquainted and to talk in depth about their specific pilots.

3.8 *Administration and Support of the Pilots*

Initially, all technology vendors participating in the pilot sites were encouraged to interact with content providers. The purpose was to develop strong corporate teams that would support the pilot programs. The TEA/MGT team worked via telephone, e-mail, and the project website to develop and maintain collaborative arrangements with vendors. In addition, much of the technical support available to the pilots was provided via the Internet through the use of interactive websites. It was also MGT's responsibility to monitor the operations of each of the pilots. As pilots were initiated, a pilot liaison was designated by each local school district to act as the primary contact on pilot related matters and represent the district at meetings that occurred. The TEA/MGT team maintained close communications with each pilot liaison in order to more effectively:

- serve as a resource and advisor;
- monitor progress;
- gather and disseminate information;
- help identify and record cost information;
- coordinate maintenance and repair; and
- arrange on-site visits.

At least one on-site visit to each pilot site was conducted during the last semester of the 1999–2000 school year and both semesters of the 2000–2001 school year. These on-site visits allowed TEA and MGT to provide assistance and support; collect information on students, teachers, and parents; interview principals and teachers; and observe classroom operations. This information, along with baseline data collection, quantitative data collection and analysis, and qualitative data analysis are included in the evaluation framework.

3.9 Evaluation Process

To evaluate the progress and outcomes of the pilots, MGT used four methodologies:

- surveys of students, teachers, and principals;
- assessments of quarterly progress reports submitted by the pilots;
- observations during site visits; and
- collection and analysis of relevant student and teacher performance data before, during, and at the conclusion of the pilots.

Each of these methodologies is described below.

3.9.1 Surveys

MGT developed and administered surveys to principals, teachers, and secondary students to assess each participating site's progress in using technology to improve student achievement. Surveys were administered prior to the implementation of each of the pilots to obtain baseline data. The same surveys were administered at the end of the project to obtain data that can be compared with the baseline data.

In some schools the baseline surveys were administered near the end of the 1999–2000 school year. Findings from these baseline surveys are presented in Chapter 4 of this report. In other schools, baseline surveys could not be administered until the beginning of the 2000–2001 school year. The findings from these later surveys are also presented in Chapter 4.

Two types of survey instruments were used for teachers. The first, assessing teacher technology proficiencies, was an adaptation of a survey developed jointly by the Milken Exchange on Education Technology and the Florida Educational Technology Corporation. The second was a brief self-assessment that enabled teachers to assess their current use of technology to improve students' academic achievement.

The brief student survey was designed to obtain students' perceptions of their teacher's use of technology in the classroom. Questions on the student survey matched those on the teachers' self-assessment survey. Surveys were administered only to participating middle school and high school students.

3.9.2 *Progress Reports*

MGT obtained and reviewed copies of the quarterly progress reports submitted by the pilots to TEA. MGT's analyses of the pilots' self-reported accomplishments and challenges during the reporting periods are included in the pilot summary chapters (Chapters 6 –18).

3.9.3 *Observations*

MGT made at least three site visits to each of the pilots during the course of the projects. During those visits, information was collected and meetings were held with staff participating in the pilots. In many sites, MGT's early visits coincided with training that teachers received on their new hardware and/or software from participating vendors. In later visits, MGT was able to observe students using some of the new technology resources.

3.9.4 *Performance Data Collection and Analysis*

MGT established mechanisms for pilots to provide relevant teacher and student demographic and performance data at the beginning and at the end of their projects. These data were used to prepare Chapter 4, Evaluation Summary, and the individual pilot summary chapters.

Chapter 4

Evaluation Summary

EVALUATION SUMMARY

The pilots received their Notice of Grant Approval (NOGA) during the spring semester of the 1999-2000 school year. They spent the last two months of the school year (Year One of the PILOTS) ordering and installing hardware and software and, in some cases, providing initial training to teachers and students who would be involved in the project during the 2000-2001 school year. Some baseline evaluation information and data were gathered and analyzed in Year One. The same evaluation information and data were gathered and analyzed at the end of Year Two. This chapter presents findings from MGT's analyses of baseline information collected in Year One as it compares with the data analysis of information gathered in Year Two.

4.1 Survey Data

Survey response frequencies from principals, teachers, and students who are participating in the pilots are shown in the Appendices of this report. These surveys were administered before the pilots were implemented to obtain baseline data. The same survey instrument was administered at the end of the pilot. Summaries of key findings from the baseline analysis and the end-of-the study analysis are provided.

4.1.1 Key Findings from Principal Surveys

For the 13 pilots, nine principals responded to the survey at both the beginning of the study and at the end. Key findings from these principal surveys are summarized below.

Many of the principals reported high levels of technology usage by students before implementation of the pilots. Based upon principals' surveys, schools involved in the pilots have students who already were using technology to a great extent even before the pilots began, and are using technology even more since the implementation of the program. For example, a majority of principals reported that their students frequently:

- use technology to become more competent in basic skills;
- are able to communicate electronically with others;
- can independently conduct electronic information searches;
- can use technology to better understand the relationship between real life situations and academic concepts; and
- are actively engaged in learning through the use of technology.

Before implementation of the pilots, few principals reported frequent student use of technology to solve problems. However, survey results from the end of the program revealed that students are gradually increasing their use of technology in this manner. Using technology to solve either simple exercise problems or complex real-life problems were areas in which students in a majority of the pilots appeared to be deficient before the pilots. However, according to the survey of principals at the end of the study, students are more frequently using technology to solve problems.

Many of the principals reported that their schools were technologically advanced before the pilots began, and according to survey responses received in Year Two, this is still true. All principals continue to report having computer networks in their schools, and all reported that the most important focus of their school's technology plan is on the use of technology to maximize student learning. Further, a majority of principals reported:

- their students and teachers have fast and reliable Internet access;
- all their staff are familiar with the school's vision for the use of technology;
- technology resources are present and in sufficient quantity to impact and change the learning process, and are regularly upgraded or replaced;
- peripheral devices such as scanners, digital cameras, and plotters are readily available;
- most teachers continue to significantly change their professional practice through the use of technology;
- ample assistance is available when school staff need problems solved or questions answered about software they use; and
- technology is being used in new ways to capture evidence of student performance, and to collect and analyze data and report results.

Before implementation of the pilots, most participating schools had a few notable shortcomings regarding technology. However, according to the survey responses at the end of the program, these opinions have changed. Despite the many indications of high levels of technological knowledge and usage noted above, before the pilots began, a majority of principals indicated weaknesses in some areas. However, as the pilots came to a close, these opinions had changed:

- In the beginning of the pilot program, technology – such as e-mail or interactive websites -- was seldom or never used to communicate with parents. Analysis of principal surveys at the end of the study indicated technology is being used often or extensively to communicate not only with parents, but other stakeholders within the community.
- Few or no community-based partnerships existed to provide students with opportunities to learn real-life applications of technology in community settings, as indicated by the responses on the baseline survey. At the end of the program, principals indicated students had more of these opportunities.
- Classroom successes with technology were not communicated on a regular basis to the school community, according to principals at the beginning of the study. However, as shown by the responses received at the end of the pilot, these successes are more frequently communicated to the school community.

4.1.2 Key Findings from Teacher Surveys

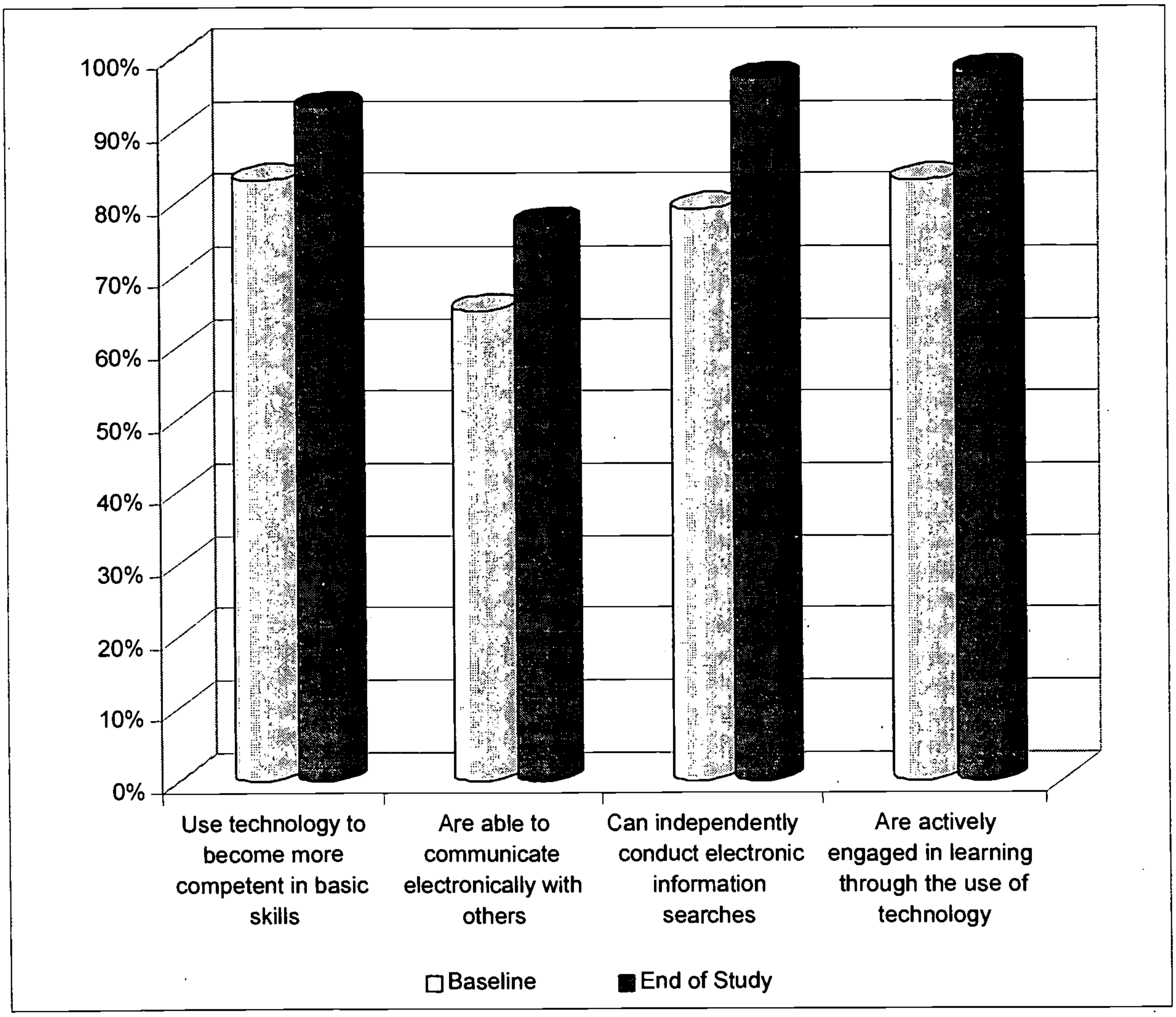
A total of 107 teachers from the 14 schools participating in the pilots completed and submitted surveys before the implementation of the pilot program. At the end of the program, 70 teachers from the participating schools submitted surveys. These surveys provided teachers' perceptions of the state of technology in their schools and classrooms before implementation and at the end of the pilots. Key findings from the baseline analysis and post implementation analysis of teacher surveys are highlighted below.

Compared to principals, teachers involved in the pilots reported lower levels of technology usage by students before implementation of the pilots. However, at the end of the study teachers indicated students are using technology more frequently. Based upon teachers' surveys for the baseline, schools involved in the pilots had students who already were using technology to some extent before the pilots began. However, at the end of the study teachers reported that their students are using technology more to perform a variety of specific tasks, as shown in Exhibit 4-1.

As shown in the chart, teachers believe students:

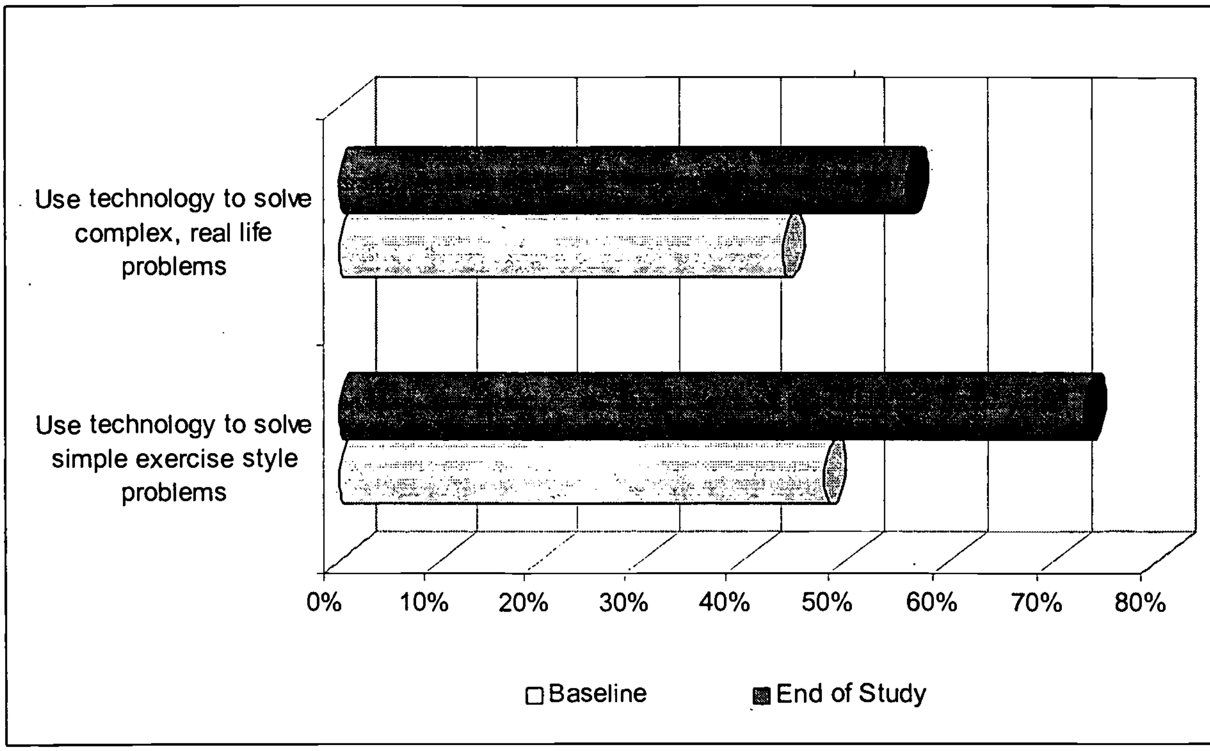
- increased their use of technology to become more competent in basic skills, (from 83 percent at the baseline to 93 percent at the end of the study);
- increased their ability to communicate electronically with others (12 percent above the baseline assessment);
- are able to independently conduct electronic information searches better since the implementation of the pilots (79 percent for the baseline vs. 97 percent at the end of the study); and
- are more actively engaged in learning through the use of technology (83 percent for the baseline vs. 98 percent at the end of the study).

EXHIBIT 4-1
STUDENT TECHNOLOGY ABILITY



Before implementation of the pilots, few teachers – like principals -- reported that students frequently used technology to solve problems. However, at the end of the pilot, teachers indicated students more frequently performed these tasks. In the beginning, using technology to solve either simple exercise problems or complex real-life problems were areas in which students in a majority of the pilots appeared to be deficient, according to the survey of teachers. At the end, teachers indicated an increase in the number of students using technology for solving problems. This increase is shown in Exhibit 4-2 below.

EXHIBIT 4-2
STUDENT USE OF TECHNOLOGY FOR SOLVING PROBLEMS



Before the pilots began, most of the participating teachers were accustomed to using computers at school and at home, and this condition continued throughout the study. In the beginning, a majority (76 percent) of teachers reported having computer networks in their schools, and 82 percent of the teachers reported having a computer at home. At the end of the pilots, 96 percent of teachers reported having computer networks in their schools, and 91 percent reported having a computer at home. More than two-thirds (68 percent) reported that the most important focus of their school's technology plan was on the use of technology to maximize student learning in the beginning, and this number increased to more than three-fourths (84 percent) at the end of the pilot program. Furthermore, a majority of teachers reported that even before the pilots began:

- technology was clearly integrated, where appropriate, in the content standards to which they taught;
- all staff were familiar with the school's vision for the use of technology;
- technology resources were present in sufficient quantity to impact and change the learning process, and it was regularly upgraded or replaced; however, unlike principals, a majority of teachers did not report having peripheral devices, such as scanners, digital cameras, and plotters readily available;
- ample assistance was available when teachers had problems or questions about software they use; however, 48 percent of the teachers reported that technology failures resulted in long periods of time waiting for repairs;

- teachers could use advanced features of word processing software and Web browsers, and they could locate resources on the Internet that were appropriate to their teaching assignments; and

- they also could create multimedia products for and with their students.

Teachers' perceptions of the above conditions continued throughout the implementation of the pilots, including 48 percent of teachers reporting that technology failures resulted in long periods of time waiting for repairs.

Before implementation of the pilots, most participating schools had a few notable shortcomings regarding technology. However, throughout this study these shortcomings have shown considerable improvement. Despite the many indications of high levels of technological knowledge and usage noted above, before the pilots began, a majority of teachers indicated weaknesses in some areas. However, these areas have shown improvement throughout this program.

In the beginning of the pilot program, technology – such as e-mail or interactive websites – was seldom or never used by almost half (45 percent) of teachers to communicate with parents. In the analysis at the end of the pilots, nearly two-thirds (63 percent) of teachers are using technology to communicate with parents and the community.

According to teachers responding to the survey at the beginning of the pilots, only 28 percent indicated they were capable of developing Web pages for classroom use. At the end of the pilot program, nearly half (47 percent) indicate they are able to develop Web pages for use in their classroom.

According to the baseline analysis, most students (51 percent) did not typically use technology to present or communicate information to others. The analysis of teacher surveys at the end of the pilots indicated that only 19 percent of students were not using technology in this manner, and more than half (56 percent) of students were using technology to present/communicate in simple ways such as using presentation software to support a classroom report. An additional 21 percent were using technology to create complex communications such as Web pages.

At the beginning of this study, 36 percent of teachers indicated classroom successes with technology were communicated on a regular basis to the school community. At the end of the program, nearly half (47 percent) of teachers believe this to be so.

4.1.3 Key Findings from Assessments by Teachers and Students

Immediately before the pilots were implemented, MGT asked participating teachers and the students of the high school, junior high school, and middle school teachers to assess the extent to which technology was being used in the classroom. A total of 96 teachers and 707 students completed these assessments before the implementation of the pilots. At the end of the pilot implementation, teachers and their students were asked to complete these same instruments. A total of 56 teachers and 1639 students responded. Key findings from these assessments follow.

According to baseline analysis, when asked what percentage of class time students ideally should be spending using computers and other electronic technology in the classroom, the average of responses by teachers was 47 percent compared to 58 percent by students. Postimplementation assessment analysis indicated a small increase in these averages, to 49 percent for teachers and to 59 percent for students.

Before the pilot implementation, when asked to estimate what percentage of most of their students' instructional time was actually spent using computers and other electronic technology, the average of teachers' and students' estimates was 28 percent. Thus, just before the implementation of the pilots, both teachers and students were far below the ideal amount of usage of computers and other electronic technology they would like to have in the classroom. At the end of the pilot implementation, teachers reported an increase to 39 percent in their students' instructional time where technology was used, and students reported an increase to 33 percent. As at the beginning of the pilot program, these averages are still below the ideal amount of computer usage and other electronic technology teachers and students would like to have in the classroom.

The self-assessment instruments also asked teachers who were getting ready to implement the pilots what was hindering most of their students from making better use of technology to improve their academic achievements. One response was more pronounced by teachers than any other -- *lack of equal access to technology resources and equipment*. Thirty-five percent of the teachers cited lack of technology access as the major hindrance. According to the analysis of the assessments received at the end of the program, this remains the biggest obstacle for students, according to teachers responding. However, this obstacle is decreasing, since only 30 percent of teachers indicated this to be a problem at the end of the pilot implementation.

When asked to use a scale of zero to ten (with 10 being maximum effectiveness) to rate their current use of technology in the classroom to improve students' academic achievement, the average effectiveness rating these teachers gave to themselves prior to implementation of the pilots was a 5.4. Using a similar scale to rate their teachers' use of technology to help them to learn, students gave these teachers an average rating of 6.7 prior to implementation of the pilots. Further, when asked to compare these teachers with others they had in the past, 56 percent of the students reported that the teachers who were about to begin implementing the pilots were better teachers from whom they learned more in their classes. At the end of the pilot implementation teachers rated their average effectiveness at a 5.6. However, students rated their teachers a little lower at 6.4, and 46 percent indicated their better teachers were those from whom they learned more.

The self-assessment instruments also asked students to identify what they liked most and what they liked least about the computers and other technology that was used by these teachers before their implementation of the pilots. Exhibit 4-3 below compares students' responses from the beginning of the study and the end of the study.

EXHIBIT 4-3
WHAT STUDENTS LIKE MOST ABOUT TECHNOLOGY

	Baseline	End of Study
Helps learning and you learn more	7%	17%
Using the Internet	16%	15%
Projects and programs are fun	10%	15%
Working is easier and faster	17%	14%
Keyboarding and computer skills	0%	9%
Playing games	3%	6%
Digital text books	0%	2%
Individualized learning	0%	2%
Work is neater	0%	1%
We can work in groups	0%	0%
Designing Web pages	0%	1%
The computer replaces the teacher	0%	0%
Nothing/No response	2%	16%

According to the data in the chart above, the most significant improvement shows students have come to realize that technology assists with the learning process and they can actually learn more by using it. Students also reported they believe technology makes working easier and faster. In addition, students indicated that the projects and programs they are using are fun.

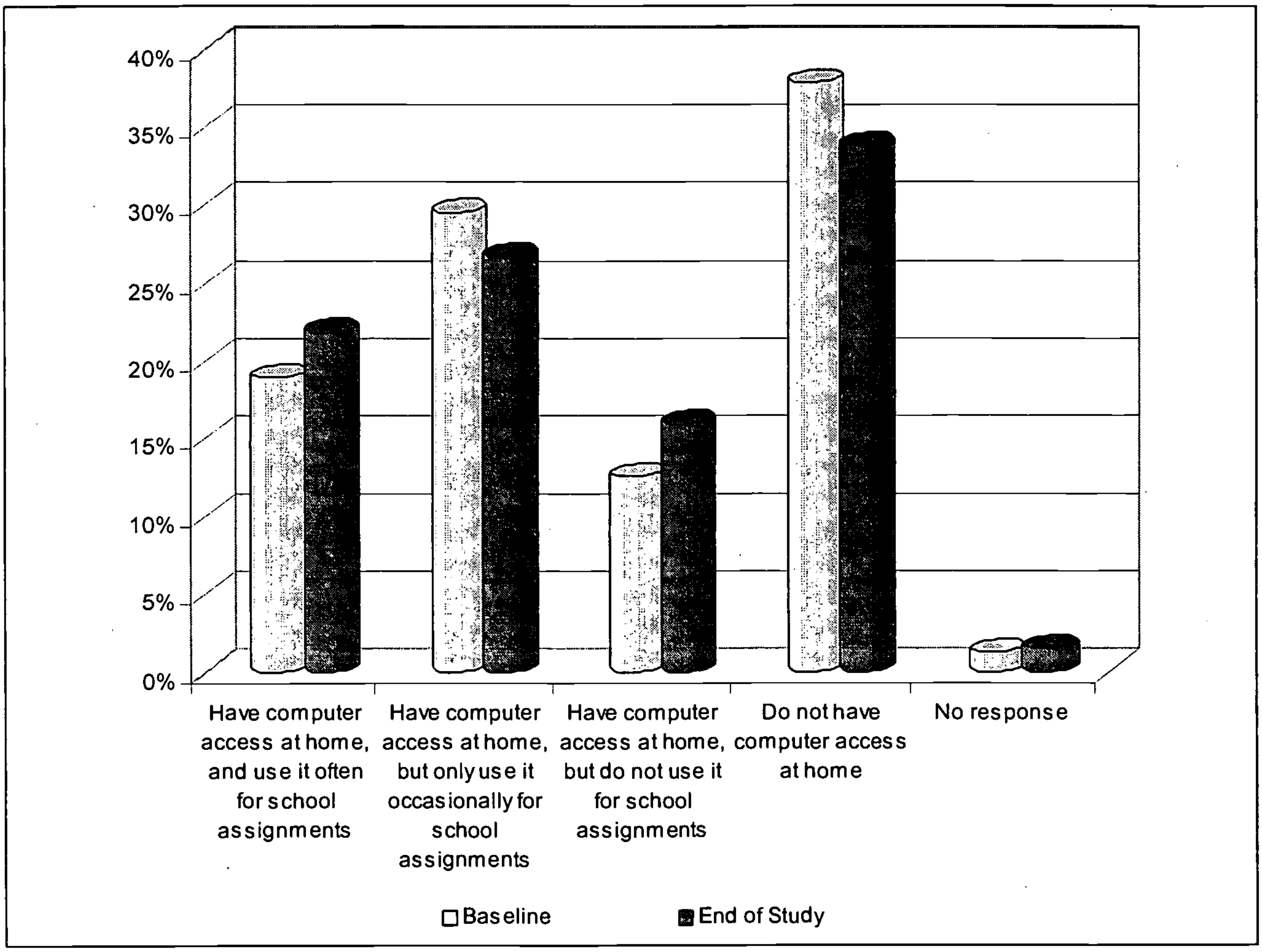
According to the baseline analysis, on the average, students participating in the pilots reported spending a total of 4.7 hours using computers in school during a typical week prior to the implementation of the pilot program. At the end of the program students reported using computers an average of 5.0 hours per week.

Finally, the self-assessment instrument asked students if they had access to a computer at home that they could use for doing homework or special school assignments. Exhibit 4-4 compares the responses from students for the baseline and end of the study.

As shown in Exhibit 4-4:

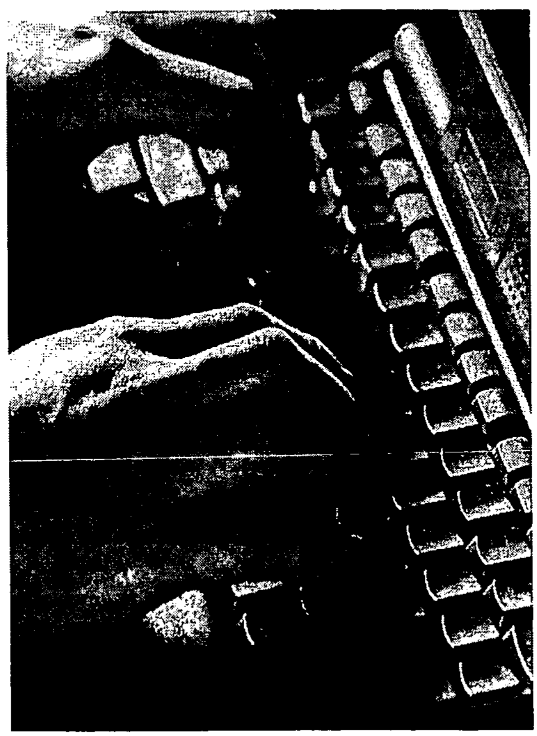
- there was an increase from 19 percent to 22 percent of students indicating they have access at home and use it often for school assignments;
- thirty percent of students had access at home and used it occasionally for school assignments before the implementation of the pilot, and 27 percent indicated they used their home computer occasionally for school assignments at the end of the study;
- thirteen percent had access, but did not use it for school assignments in the beginning of the pilot program, and 16 percent said they did not use their home computer for school assignments at the end of the pilot implementation; and
- there was a decrease from 38 percent to 34 percent of students who did not have access to a computer at home.

EXHIBIT 4-4
COMPUTER ACCESS AND USE AT HOME



Chapter 5

Related Research



RELATED RESEARCH

In addition to monitoring a number of other pilot projects, the TEA/MGT team is analyzing research conducted by others relating to the specific use of laptops in schools, as well as the successes identified through the use of desktop computers and other technologies. Summaries of some of that research are included in the remainder of this section.

5.1 Rio Bravo Middle School, Ysleta ISD

Rio Bravo Middle School in El Paso contracted with NetSchools, Inc. to implement the StudyPro Laptop Project in all grades. This project, intended to enhance student learning and teacher instruction, enabled every student and teacher to have a laptop computer assigned to them. Students could use the computers at school and at home.

As part of the project, NetSchools contracted with independent researchers to assess the impact of the project. The assessment included analysis of questionnaires completed by teachers and students, and data collected from the Texas Assessment of Academic Skills (TAAS) test.

From the analysis of the Teacher Questionnaire, researchers found the following:

- Teachers were using laptops daily to create lesson plans, develop homework assignments, do research, and for instructional delivery.
- A majority of students were using laptops two to three times a week to access the Internet for research, complete homework assignments, prepare presentations, and write papers. Students also used laptops for electronic learning activities, taking class notes, and participating in cooperative learning activities.
- Teachers believed the laptops assisted students in every core subject area. They indicated laptops helped the most in English/Language Arts and Science classes.
- Fifty-eight percent of teachers indicated the project had a positive impact on student achievement.

From the responses received from the Student Questionnaire, researchers found the following:

- There was an overall increase in student use of computers both at school and at home. Student use of computers at school before the project was 16 percent, while after the project student use increased to 77 percent. Eleven percent of students used computers at home before the StudyPro project and after the project student use increased to 56 percent.
- A majority of students reported they used laptops to access the Internet, complete homework assignments, take notes, write reports, and complete electronic assignments.
- A majority of students reported using laptops in every subject area at least two to three times a week.
- Fifty-one percent of students believe that as a result of using the StudyPro in middle school, their grades in high school would be better, and 82 percent stated that the laptop program had made a difference in their academic achievement.

When researchers compared the results of the 1998-99 TAAS scores against the baseline scores from 1997-1998, the gains in math and writing were impressive. Math scores increased 7.7 percent, and writing scores increase 11.7 percent. With these gains, Rio Bravo Middle School received the state's highest improvement designation.

5.2 *"Anytime, Anywhere Learning"*

"Anytime, Anywhere Learning" is a project implemented by Microsoft Corporation and Toshiba America Information Systems. This program provided laptop computers to students in grades 5 through 12 in participating schools. An independent research organization, Rockman, *et al*, was commissioned to evaluate the implementations of the project. Their findings pointed to significant learning and student and teacher accomplishments in skill development, applications of technology for schoolwork, and improved critical thinking. Specifically they found:

- Students in the program spent more time using computers. Middle school students spent on average two hours per day, and high school students spent three and a half hours per day.
- More computer use resulted in more proficient students. Students in the program had more confidence in their knowledge of software applications and most believed they were knowledgeable enough to teach others.
- Students in the program spent more time engaged in collaborative work, and participated in more project-based instruction.
- The laptops encouraged students to write more, and teachers found the writing was of a higher quality. Due to the greater efficiency laptops provided in the writing process, students had more time for research since they did not have to spend time actually rewriting drafts.
- The laptops increased student access to information, and resulted in improved research and greater analysis skills.
- Students in the program prepared more presentations that were organized, and the students became comfortable with presenting.

In addition to the above, the researchers found that teachers spend less time lecturing and more time facilitating. Students became collaborators and directed their own learning. As a result teachers believed students:

- had a greater interest in school;
- used computers to accomplish complex school tasks;
- increased the quality of their work;
- readily engaged in problem solving and critical thinking;
- searched for more information using a variety of methods;
- learned/understood more of the content; and
- enjoyed using technology.

Researchers found that computers benefit all students, and more computer use results in more proficient students.

5.3 NCREL Summary of Related Research

Many other studies have determined that the use of computers has had a positive impact on learning. The North Central Regional Educational Laboratory (NCREL) published a report in 1999 entitled *Computer-Based Technology and Learning: Evolving Uses and Expectations*[1]. This report identified numerous research studies that examined the effects of technology use in the classroom and found many instances where student achievement gains have occurred as a result. Some of those include:

- A comprehensive study of the effectiveness of using computers to increase student achievement by Kulik and Kulik[2] in 1991 found that in "81 percent of the studies examined, the students in the computer-based instruction (CBI) classes (experimental group) had higher exam scores than students who were taught by conventional methods without a computer."[3]

- A study conducted by Statham and Torell[4] (1996) "found increased teacher-student interaction, cooperative learning, and, most important, problem solving and inquiry. Technology tools could amplify, extend, and enhance human cognition. They could facilitate access to human, material, and technological resources and help students to store, reshape, and analyze information. They enabled students to be hypothesis testers, with the result that the knowledge that was acquired could be used more effectively."[5]

- An extensive study by Mann and Schaffer[6] (1997) of 55 school districts in the State of New York also concluded that technology use could have a significant effect upon student achievement. "This study involved 4,041 teachers, 1,722 students, 159 principals, and 41 superintendents. In schools that had more instructional technology teacher training, the average increase in percentage of high school students who took and passed the state Regents (college preparatory) exam in math was 7.5; the average increase in the percentage who took the Regents English exam was 8.8. More important, using the reports from teachers and principals to determine the amount of technology available and in use in the schools revealed that 42 percent of the variation in math scores and 12 percent of the variation in English scores could be explained by the addition of technology in the school."[7]

5.4 Additional Benefits of Laptop Use in the Classroom

In addition to the research findings that support the use of technology to improve student performance, there are a number of other benefits of using technology that should be cited. Some of those are described in a report provided by NetSchools Corporation, one of the largest

[1] Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M., & Raack, L. (1999). *Computer-Based Technology and Learning: Evolving Uses and Expectations, NCREL.*

[2] Kulik, C.C., & Kulik, J.A. (1991). Effectiveness of computer-based instruction: An updated analysis. *Computer in Human Behavior*, 7, 75-94.

[3] Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M., & Raack, L. (1999). *Computer-Based Technology and Learning: Evolving Uses and Expectations, NCREL.*

[4] Statham, D.S., & Torell, C.R. (1996). *Computers in the Classroom: the impact of technology on student learning*, Boise, ID: US Army Research Institute and Boise State University.

[5] Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M., & Raack, L. (1999). *Computer-Based Technology and Learning: Evolving Uses and Expectations, NCREL.*

[6] Mann, D., & Schaffer, E.A. (1997). Technology and achievement. *The American School Board Journal*, 22-23.

[7] Valdez, G., McNabb, M., Foertsch, M., Anderson, M., Hawkes, M., & Raack, L. (1999). *Computer-Based Technology and Learning: Evolving Uses and Expectations, NCREL.*

implementers of one-to-one e-learning installations in the K-12 environment. The benefits cited in their report are based upon experiences gained from providing laptops to students over the course of several years. Some of those benefits include:

- Standards Alignment. Implementing an effective one-to-one approach includes the establishment of a central database containing the school's curriculum. All available school resources and many thousands of Internet resources are correlated directly to the individual school learning objectives. Teachers who use such a database to ensure that every class lesson is directed towards a standard, and use appropriate standards-correlated resources, report higher levels of student achievement.

- Use of Primary Source Material. Recent learning theory research demonstrates that the use of real-time and primary source materials contribute to increased levels of understanding. Prior to now, this simply was not practical. The textbook was the main source of information. Teachers and students in one-to-one schools have found hundreds, if not thousands, of ways to incorporate Internet-delivered primary source materials into everyday lessons.

- Effective Reduction in Class Size. Teachers report that they spend substantially less time in lecture mode than they did previously. In addition, the system automates some functions such as giving assignments, collecting homework, scoring, and distributing graded homework. When all factors are considered, the teachers say the amount of time spent one-on-one with each individual student is double or triple that of previous practice. This gives the positive equivalent effect of a lower class size, but at much lower cost.

- Effective Lengthening of the School Day. Students (and parents) in one-to-one schools report that they spend more time after school doing homework and in independent study. Television watching is reduced. Students check more books out of the school library and read them. (One school reported a 60 percent increase in books checked out.)

- Collaborating and Communications. Continuous connectivity allows students and teachers to communicate with each other and with other important sources outside the classroom. Expert resources and mentors are available electronically, when they wouldn't otherwise be available. Socialization increases, with students working and interacting with each other more than they do in traditional environments.

Chapter 6

Austin ISD:
Bedichek Middle School

AUSTIN ISD: BEDICHEK MIDDLE SCHOOL

6.1 Description of the Pilot

Bedichek Middle School is part of the Austin Independent School District. Austin ISD serves nearly 77,000 students on 102 campuses. In addition, the district provides a Professional Development Site and two Science/Environmental Centers. Out of the 77,000 students, about 15,500 are middle school students. Austin ISD has 17 middle schools. The student ethnicity breakdown is 16.7 percent African American, 2.5 percent Asian, 46.8 Hispanic, .25 percent Native American, and 34.7 percent White.

In 1999–2000, Bedichek Middle School served about 1,150 students. Bedichek's ethnicity distribution is 8.9 percent African American, 56.2 percent Hispanic, 33.4 percent White, 1.1 percent Asian, and .3 percent Native American. Thirty-eight percent of the students are economically disadvantaged and 42 percent of all Bedichek students qualify for free or reduced lunches. The student enrollment for 1999–2000 by program is:

- Bilingual/ESL Education 7.6 percent;
- Career and Technology Education 33.7 percent;
- Gifted and Talented Education 8.6 percent; and
- Special Education 20.1 percent.

The primary purpose of the Bedichek Middle School pilot was to explore the impact of integrating technology across four core subject areas: mathematics, science, social studies, and language arts. A secondary purpose was to explore technology's impact on special education and English as a second language. The pilot investigated the impact that technology integration has on students' academic performance and attitudes toward courses that put them on the track toward college. Technology training and support in the evenings for parents of the target student population was also considered an important facet of this project. Four major goals of the Bedichek pilot were to:

- increase student learning across all disciplines and special populations through the effective integration of technology;
- provide training for teachers in the areas of technology integration and instructional innovation;
- research the effective use of technology within diverse instructional settings; and
- provide effective parent training and offer a variety of involvement opportunities to families.

A team of six teachers at Bedichek partnered with American Education Corporation, Apple Computer, Intelligent Peripheral Devices, and Lexia Learning Systems to work collaboratively on interdisciplinary units of instruction for students who were enrolled in the 6th grade. The project served approximately 145 students who were in 6th grade in 1999–2000. Bedichek tracked these students through the 2000–2001 school year.

Bedichek used Apple's iBooks as a mobile lab to rotate among the students and teachers on a scheduled basis. The iBooks allowed the students to work on collaborative design projects over the Internet with a local high school. Bedichek also used a portable word processing station called AlphaSmarts from Intelligent Peripheral Devices. For content, Bedichek used Lexia Reading Strategies for Older Students (S.O.S.) System and Quick Reading Time (QRT). Bedichek also intended to use American Education Corporation's A+LS software, but faced implementation problems with it throughout the year.

6.2 Outcomes

As a result of the cooperation and hard work from Bedichek Middle School's teachers, staff, students, and several vendors, the pilot achieved most of its goals. This section describes that success by summarizing the outcomes of the project.

6.2.1 Goals and Objectives

The primary goals of the Bedichek Middle School pilot were to:

- increase student learning across all disciplines and special populations through the effective integration of technology;
- provide training for teachers in the areas of technology integration and instructional innovation;
- research the effective use of technology within diverse instructional settings; and
- provide effective parent training and offer a variety of involvement opportunities to families.

Objective: Increase student learning across all disciplines and special populations through the effective integration of technology

Because of unavoidable delays in starting up the project, and other factors, the pilot was conducted for only one school year. Although that is not enough time to prove that the technology resources used by the school had the effect of raising student achievement, the results suggest that if the pilot had been conducted for a longer period, such proof might well have been demonstrated. The Bedichek Middle School pilot chose TAAS scores and assessment tools development throughout the project to act as performance indicators in order to see if there was an increase in student learning across the core curriculum areas through the integration of technology into the instructional process. Some of the assessment tools used were the Flynt-Cooter reading assessment, practice TAAS tests, and personal observation.

Exhibit 5-1 displays the core subject average GPA among the pilot students at Bedichek. Math and social studies scores showed minor increases in comparison with the previous semester, whereas science and language arts scores decreased slightly. These minor variations in scores reinforce the notion that the pilot was not continued long enough to provide meaningful results.

EXHIBIT 6-1

Core Subject	Average	Minimum	Maximum
Language Arts			
Fall 2000	83.85	60	97
Spring 2001	83.42	54	99
Math			
Fall 2000	79.64	50	97
Spring 2001	79.75	54	97
Science			
Fall 2000	84.82	67	99
Spring 2001	83.23	61	100
Social Studies			
Fall 2000	83.91	57	100
Spring 2001	86.61	58	100

Exhibit 6-2 also displays the assessment results for the school year 2000–2001. Using the Flynt-Cooter reading assessment, the pilot students showed an improvement from a 5th grade reading level in Fall 2000 to a 6th grade reading level in Spring 2001. The TAAS Reading results showed that the pilot students' average decreased from 82.5 in 1999–2000 to 78.9 in 2000–2001. The TAAS Math scores decreased significantly from 87.7 in 1999–2000 to 78.1 in 2000–2001. It should be noted, however, that the average scores among all 6th graders decreased significantly. In addition, more students' scores were included in the 2000–2001 average. For the 1999–2000 school year, only 107 6th grade students were tested in reading and 122 in math. In the 2000–2001 school year, 130 students were tested in reading and 135 students were tested in math.

EXHIBIT 6-2

Assessment Tool	Pilot Group	Entire 6th Grade
Flynt-Cooter		
Fall 2000	5th grade reading level	
Spring 2001	6th grade reading level	
TAAS TLI Data		
Reading		
1999–2000	82.5	82.4
2000–2001	78.9	80
Math		
1999–2000	87.7	82.1
2000–2001	78.1	77.7

Overall, the results were mixed, which is to be expected, given the short duration of the pilot. Even though some scores improved only slightly, the project coordinator and pilot teachers believe that those small increases are due to the use of the various tools provided by the partnering vendors. This is supported by the teacher self-assessments that were completed at the end of the year. These assessments showed that three of the six teachers believed that their current use of technology in the classroom had contributed to *substantial* improvement in academic achievement by most of their students. The other three teachers believed that technology had contributed to only minor improvements. At the beginning of the pilot, not one teacher indicated on the self-assessments that their current use of technology had any substantial impact.

A student survey conducted in February 2001 regarding the effect of technology use in their classrooms also reinforces the teacher beliefs that technology helped their students. Results show that 23 students said using a computer or AlphaSmarts had helped them in all of their classes. In addition, many students reported that using technology was beneficial in specific classes. For example, the numbers of students listed below cited technology use as a benefit in specific classes as follows:

- 73 students cited technology use as particularly beneficial in language arts;
- 77 students cited technology use as beneficial in science;
- 7 students indicated that technology use was beneficial in social studies;
- 66 students reported that technology use was beneficial in math;
- 15 students cited technology use as beneficial in their elective classes; and only
- 2 students reported that using technology did not help in any of their classes.

Eighty-five students also reported that using technology in the classroom made them better students, while 35 students disagreed.

Whereas the main purpose was to see an increase in student achievement, Bedichek also saw an increase in self-esteem, communication, cooperation, and team-building skills among students. Their students demonstrated these skills through the use of multimedia, collaborative design projects related to the thematic units of instruction.

During the summer of 2000, teachers acclimated themselves to the equipment, and as a team, planned how they would distribute the equipment and integrate its use into the various curriculum areas. They planned to use mini-interdisciplinary units and refine them as they received additional training. The science teacher trained the students in the use of HyperStudio so that all core classes could benefit. Language arts and social studies teachers worked with the students in research and presentations using the iBooks. Word processing skills were practiced in all classes using the AlphaSmarts. The goal was for the students to see connectivity in learning by having teachers use different technology resources in their respective subject areas.

Another resource used was Inspiration software. Each teacher had a project that would link to the other classes with a final interdisciplinary thematic project. The final products were individual student Web sites. To help achieve the interdisciplinary goals developed by the teachers for the project, a mobile computer lab was shared between teachers.

Exhibit 6-3 displays the results of a survey given to the pilot students in February 2001. These results reflect the students' feelings and opinions regarding the use of technology in the classroom.

EXHIBIT 6-3

QUESTION	YES	NO
I plan to go to college after I graduate from high school.	111	10
I believe that what I do in middle school gets me ready for college.	101	20
I believe my teachers use more technology than other teachers do.	69	42
I believe we have too much technology in our classes.	4	117
I believe we should use more technology in our classes.	114	7
I have learned more about using computers and other technology this year than I knew before.	89	31
I would like to use more technology in all my classes.	110	11
I use the Internet at home to conduct research for school.	62	59
I use the internet at school to conduct research for school.	109	12
I use the Internet at another location to conduct research for school.	56	65
I am more comfortable using the Internet this year than I was last year.	92	31

Objective: Provide training for teachers in the areas of technology integration and instructional innovation

The Bedichek Middle School pilot had a positive impact on the staff involved. Teachers had initial and periodic training on Lexia software, the use of AlphaSmart equipment and iBooks, Inspiration, HyperStudio, and Claris Works. The teachers also had initial training for the A+LS software and were planning to have additional training once the software was downloaded to the campus server. Additional training was conducted by Dr. Lynn Anderson-Inmon, Director, Center for Advanced Technology in Education at the College of Education, University of Oregon. Bedichek also partnered with Dr. John Slatin, University of Texas Institute for Technology and Learning, to attend workshops including inquiry based learning, and writing curriculum for thematic based units. In addition, teachers conducted weekly briefings on classroom use, challenges, and suggestions. The following chart displays the number of total hours the pilot teachers used for each professional development topic in Fall 2000.

Professional Development Topic	Total Hours
Computer-based Study Strategies	112
CMP follow-up	16
NJWPT follow-up	32
Project Read follow-up	8
Apple Computer Integration	112
Reading Strategies	64
Principles of Learning	56
PDAS	28
ARD/IEP	8

Objective: Research the effective use of technology within diverse instructional settings

The Bedichek pilot investigated the impact that technology integration had on student academic performance across the four core curriculum areas, special education, English as a second language, and within enrichment courses. As described earlier, Bedichek used students' grades, the Flynt-Cooter reading assessment, and TAAS scores as performance indicators. Other research tools included a survey on the use of technology in the classrooms and a study conducted by the Bedichek Middle School technology specialist. The study, *Student Perceptions of Inquiry-based Instruction which Incorporates Technology,* involved a group of pilot students.

The results of the study indicated that participation in thematic, inquiry-based instruction in two core academic disciplines helped students recognize learning connections between classes. In addition, 80 percent of the students indicated that if the students were the teachers, they would use technology to enhance learning. Internet research was recommended as a learning strategy and as a learning tool. The study also found that providing Internet research opportunities stimulates students to conduct unassigned Internet research after school hours, even when access to a computer is not readily available at home.

The Bedichek pilot also investigated the impact that technology integration had on student performance in courses that will put them on a track toward college. Surveys conducted by staff showed that pilot students were more likely to sign up for college readiness classes (Advance Placement courses) than before. The survey also revealed the impact that technology integration had on student attitudes toward pursuing higher education. At the beginning of school year 2000–2001, only 50 percent of the pilot students indicated that they planned to attend college, but that number rose to 91 percent by the time of the February 2001 survey. Of the 121 pilot students responding to the survey, 111 of them indicated that they planned to go to college. Another substantial majority (101) of the pilot students stated that they believed that what they do in middle school will get them ready for college.

Objective: Provide effective parent training and offer a variety of involvement opportunities to families

One of the reasons Austin ISD selected Bedichek Middle School as a pilot was because Bedichek is a Community School site and the school administration is very supportive of this program. Resources are openly shared so that valuable, relevant courses can be offered to community members in a convenient location. Bedichek is open until 10:00 P.M. each evening, Monday through Thursday. Bedichek's Community School program provides parents and their children access to computer equipment for exploration and learning activities.

The Bedichek pilot held a potluck dinner to meet with parents and students. The students were involved by creating the flyers and making presentations to the classes to generate interest and enthusiasm. The students demonstrated the use of the iBooks and AlphaSmarts. A "Back to School" night also discussed the pilot, but the potluck dinner allowed the teachers to talk to the parents more informally and answer questions. The pilot coordinator stated that more than 50 percent of the parents attended that event, but participation throughout the school year was limited.

6.2.2 Accomplishments

The Bedichek Middle School pilot achieved most of its goals. In addition, a number of other positive accomplishments are worth noting. Those include:

- The integration of technology helped to increase student self-esteem and confidence. Students developed a more positive attitude about attending college and wanted to take more challenging courses. While 50 percent of the pilot students indicated at the beginning of Fall 2000 that they planned to go to college, that number had risen to 91 percent by February 2001.

- The acquisition of digital cameras, iBooks, and AlphaSmarts through the pilot provided additional technology resources to participating teachers. During the course of the project, teachers became quite proficient in using these devices as a means of enhancing learning experiences for their students. At the beginning of the pilot, 55 students indicated that, compared to their teachers in the past, their pilot teacher was a better teacher because they learned more in his or her classroom.

Another 76 students indicated the pilot teacher was about the same, and 5 students indicated that they were not as good. At the end of the pilot, 75 students reported that their pilot teacher was a better teacher and 41 students indicated they were about the same. Only four students stated that the pilot teachers were not as good as previous teachers.

- As a result of the training available through the pilot, pilot teachers became more proficient at providing technical assistance. Teachers also trained other teachers on the hardware and software used for the pilot. At the beginning of the project, seven teachers submitted self-assessment forms. Using a scale of 1 to 10, with 10 being extremely proficient, the average these teachers gave themselves was 3.0. At the end of the pilot, six teachers completed the form and their average rating was 4.83, reflecting an increase of almost two full points on the scale.

- Even with the disappointments related to the use of the A+LS software, Bedichek staff members plan to use it next year. In addition, Bedichek plans to continue to use the pilot resources with other school programs and increase the offerings of its mobile lab.

6.2.3 Vendor Support and Product Reactions

A critical aspect of successfully carrying out the pilot projects was the level of support each pilot received from their vendor partners. Just as the original requirements for participation specified that vendors would supply their products at no cost, they also required that vendors provide training and technical assistance in how to use the products. As might be expected, some vendors were more supportive than others. Generally, Bedichek Middle School's experiences with their vendor partners were positive.

Apple iBooks

The Bedichek pilot used 25 Apple iBooks with wireless Internet access as a mobile lab to eliminate the need to hardwire the classroom. The lab was rotated among the students and teachers according to a schedule. The iBooks also allowed the students to collaborate on design projects over the Internet with a students from a local high school. They were able to incorporate HyperStudio and Claris Works into their lessons.

According to interviews, the Bedichek pilot received great support from Apple's vendor coordinator. There were three training sessions, and the coordinator provided ongoing assistance by making suggestions, giving advice, and offering materials. Bedichek's coordinator stated that the vendor was proactive in making sure the pilot was running smoothly and offering immediate technical assistance. The vendor offered to pick up, repair, and bring back any iBooks that had problems.

During one site visit to Bedichek, several students proudly showed off their ability to navigate the Internet and help other students. Many students indicated they liked using the iBooks but disliked the slow connections they sometimes experienced.

AlphaSmarts – Intelligent Peripheral Devices

Intelligent Peripheral Devices (IPD) provided 30 AlphaSmart 3000 units with one nonrechargeable storage cart; six Mac, USB, or PC cables; one printer cable; and one lab pack of utility CDs. The AlphaSmarts were used as word processing stations; Bedichek's experience with them was favorable.

According to interviews with the project coordinator, the four hours of training provided by IPD was very effective. In addition to instruction in how to operate the devices, the trainer provided a wealth of information about how to employ them in various reading and writing activities. The project coordinator reported that the units proved to be very reliable and easy to use.

Lexia Learning Systems

Bedichek staff members chose the Lexia Reading Strategies for Older Students (SOS.) System and Quick Reading Test (QRT) Learning System to benefit those students learning English as a second language (ESL) and with learning disabilities in reading and written expression. The vendor agreed to supply 42 copies of Reading SOS and 10 copies of QRT Learning Systems with manuals and support literature. Some problems occurred with the Lexia software simply because many of Bedichek's older computers could not support the software. The project coordinator indicated that the team of teachers had been very creative at solving those issues. Another issue that emerged was the need to have headphones for student use. Lexia Learning Systems provided two training sessions.

American Education Corporation (A+LS)Software

The Bedichek pilot team also intended to use American Education Corporation's (AEC) software, A+LS and the associated assessment module (A+SSESS). The plan was to use this software to individualize programs by allowing for both remediation and acceleration on their iBooks. Unfortunately, for a number of reasons A+LS software was not installed in a timely manner. At the beginning of the project, Bedichek received one day of training, but was unable to use the A+LS software because the campus server did not support the software. An AEC representative visited the campus to try to work around the problem, but Bedichek staff concluded that it would have to wait for the district to install a new server in January 2001. In Spring 2001, the project coordinator reported that for a period of time, contact with the vendor was very difficult and they could not reach AEC's tech support personnel. The A+LS software finally was installed in late March 2001. This date was too late to have a significant impact, since the pilot was to end when school closed. Although the formal part of the project would be over, the Bedichek team planned to have another training session and use the software in Fall 2001.

6.3 <u>Costs</u>

If it had been necessary for Austin ISD to pay the full price of the pilot, the following are costs that would have been incurred:

- For the acquisition of the 25 Apple iBooks and the associated supplies and training, the cost would have been $42,576.
- For the AlphaSmarts acquired for the pilot and training in their use, the cost would have been $8,000.
- For the acquisition of the Lexia Reading System software and training, the cost would have been $8,150.
- For the American Education Corporation A+LS software and training, the cost would have been around $155,000.
- For the consultant costs (for professional development), the cost would have been $3,000.

- For payroll costs associated with substitutes and extra duty pay, the cost would have been approximately $2,750.

The project coordinators emphasized that in addition to these out-of-pocket expenses, considerable staff time must be allocated to provide the training and support necessary to ensure successful implementation and operation of such a program.

6.4 Lessons Learned

The following factors should be considered by schools that want to implement a similar program.

- **The duration of the pilot is important**. A training and implementation phase is also critical. Time must be available for all the components to be implemented appropriately and then the pilot must last long enough to ensure that significant achievement gains do in fact result from the pilot.

- **Logistical arrangements are critical to the success of a pilot**. Bedichek staff members stated that this project was more complicated than they envisioned when the application was written. Some teacher assignment changes and the addition of new teachers to the pilot team made planning and implementing a challenge.

- **A good support system from the campus and district is essential.** For this pilot, school staff felt they did not have enough support from the district. They wanted a better support system to be available to listen, assist, counsel, and encourage. No Bedichek district personnel were assigned to the pilot. Bedichek's pilot coordinator was a teacher who taught full time while trying to fulfill the requirements of this pilot.

6.5 Conclusions

In addition to the lessons learned described above, conclusions can be drawn from the experiences of the Bedichek pilot that relate to the overall objectives of TEA's Ed Tech PILOTS Project.

1. **Bedichek Middle School pilot had an impact on several special populations of students.** Within the pilot student body, 24 students were classified as Special Ed and 80 students were eligible for free or reduced lunch. The pilot students of low socio-economic status had access to technology that they would not have had otherwise. There was also remarkable progress with special education students. Out of the 24 students classified as Special Ed, 11 students improved in TLI Reading, TLI Math or both, and only two students did not improve at all. Thirteen of those students did not have complete scores. The impact the pilot had on all students was demonstrated on the student assessments. In the beginning of the pilot, students believed that they should spend, on average, 44 percent of their class time using technology. At the end of the pilot, this average rose to 66 percent.

2. **Changes in school staff and the way the school staff uses its time to adjust to those changes may create a challenge when schools implement technology**. During Year 2 of the Bedichek pilot, the initial project coordinator (who also wrote the pilot) moved to another assignment, and another Bedichek teacher was appointed coordinator. The addition and reassignment of teachers added challenges to the implementation of the pilot. According to the project

coordinator, this disruption made it evident that a more extensive support system was needed. In addition to staff changes, the way teachers use their time changed because of the pilot. For example, it takes a significant amount of teacher and technology specialist time to keep the laptops functioning and to coordinate the use of the mobile lab among the pilot teachers. To resolve these challenges, the project coordinator suggested there should be a staff member dedicated to working with teachers to integrate the technology into the curriculum. This person must not only understand the technology, but also the principles of the instructional process. This support person would be responsible for such activities as teaching, modeling, and creating templates.

3. Accurately estimating a school's infrastructure and how much technology and content it can handle is difficult, but critical in ensuring a smooth transition and implementation. For example, the lack of network bandwidth has been a significant and ongoing challenge for Bedichek. Throughout the course of the pilot, the school was unable to use the A+LS software and had to wait until the district upgraded its Local and Wide Area Networks. However, even with the addition of significant bandwidth, it is difficult for hundreds of students to connect to the server and/or Internet with consistent success and adequate speed.

Chapter 7

Carrollton-Farmers Branch ISD:

Vivian Field Middle School

CARROLLTON-FARMERS BRANCH ISD: VIVIAN FIELD MIDDLE SCHOOL

7.1 ***Description of the Pilot***

Vivian Field Middle School is part of the Carrollton-Farmers Branch Independent School District. It is a majority minority school, including a student population that is roughly 58 percent Hispanic, 32 percent Anglo, 6 percent African American, 2 percent Asian, and 1 percent American Indian. Fifty-eight percent of the students are economically disadvantaged.

Vivian Field Middle School's pilot provided a laptop to all sixth-grade students (approximately 200) whose parents agreed to participate in Year 1. These students kept their laptops as they progressed to seventh grade in Year 2, while incoming sixth-graders (approximately 150) received laptops in Year 2. This process will continue until students at each grade level have laptops. The project required parents to attend technology training sessions and to contribute financially toward the purchase of their children's laptops, according to a sliding scale based on economic status. A local foundation supplemented parental funds. For those parents who could not qualify for financing for the purchase of laptops, Vivian Field purchased laptops and provided them to students for a monthly usage fee, which the parents continue to pay. Students whose parents purchase laptops, and who then move out of the school or district, will keep their laptops. Students whose parents could not purchase laptops, and instead lease them from the school, will not keep their laptops if they move out of the school or district. In addition to the student laptops, in Year 2 the district purchased a 24-station mobile laboratory for students and teachers. The station was used by students whose parents decided not to participate in the pilot.

The laptop program used wireless access to the school's Local and Wide Area Networks, enabling students to access the Internet and resources available on the school's server. Students are able to access resources at home using modems. In addition to the technology and content vendors selected through the application process, support to Vivian Field Middle School is granted by AT&T through its provision of broadband Internet access for 100 families. This arrangement enables students and their families to have a home-school connection free of charge.

To provide content through the laptops, Vivian Field collaborated with Glencoe/McGraw-Hill Company to provide anytime, anywhere learning opportunities in mathematics. The school also intended to use Decision Development Corporation's science and social studies materials. However, challenges in installing the software on the school's server prevented the use of these products. Decision Development Corporation made the commitment to continue working with Vivian Field beyond the pilot, helping to install the newest version of software.

The project also provided diverse staff development options consistent with just in time learning. The project adopted a train the trainer approach. Through professional development provided in person and online through *In Touch with Learning*, teachers received professional development on the successful integration of technology in the classroom.

The key goals of the program were to:

- provide anytime, anywhere learning to help close the gap between students who do and do not have access to technology 24 hours a day;
- improve students' academic achievement;
- help build and increase technology and skills of students, their parents and siblings;

- give the students' families the knowledge and tools needed to adapt to changes in technology; and
- provide opportunities for students and their family members to use the laptop together while learning about and becoming proficient in various computer applications.

7.2 Outcomes

Data on the progress of the pilots were obtained from a variety of sources, including surveys, student and teacher performance data, and periodic site visits. In addition, the pilot staff provided comparison data for pilot and nonpilot students.

7.2.1 Student Performance Data

Disciplinary Infraction Data

An area of significant impact seems to be disciplinary infractions. In Year 1 of the pilot, the school reported 313 total disciplinary infractions for the 172 students participating in the pilot. In Year 2, for the same group of students with some students leaving and some entering the program, there were just 164 disciplinary infractions reported for 173 total students.

Semester Grade Data

Semester grade analysis indicates no significant increase or decrease in student grades in the four core subject areas. In language arts, the mean semester grade decreased slightly from Year 1, Semester 1 (87.45) to Year 2, Semester 2 (84.03). Similarly, in reading, the mean semester grade decreased slightly from 85.57 in Year 1, Semester 1 to 84.49 in Year 2, Semester 2. The mean semester grade also decreased slightly in mathematics, from 83.89 in Year 1, Semester 1 to 82.75 in Year 2, Semester 2. Increases in mean semester grades were found in science, which increased from 82.11 in Year 1, Semester 1 to 85.49 in Year 2, Semester 2; and in social studies, which increased from 82.27 in Year 1, Semester 1 to 84.97 in Year 2, Semester 2. Review of data comparing laptop students with non-laptop students indicates that both groups encountered nearly identical rises and losses in grades, although laptop students, in general, maintained slightly higher grades throughout the pilot.

TAAS Data

In both mathematics and reading, the average TAAS score decreased slightly from 1999 to 2001. However, the greatest decrease occurred in the year in which the pilot was just getting underway (2000). Scores on both tests then increased in 2001, Year 2 of the pilot, nearly reaching the same level as the 1999 scores. It is noteworthy that the number of reported exemptions decreased dramatically from 1999 to 2001, which would explain why the mean scores would decrease. In 1999, 25 of the 173 students in the pilot project were exempted, either for LEP or ARD, in reading. In 2000, that number dropped to 6 exemptions, and in 2001, only two of the students in the pilot project were exempted in reading. In mathematics, 23 of the 173 students were exempted from the TAAS. In 2000, that number dropped to 5, and in 2001, only 2 students in the pilot project were exempted from the math TAAS. These figures indicate that during the term of the pilot project, while overall scores were nearly level, there was noticeable improvement in both reading and math in terms of the lowest-performing students.

Attendance Data

No significant change occurred in the mean number of days absent between Year 1 of the pilot project and Year 2. During the 1999-2000 school year, students in the pilot project missed an average of 7.19 days. During the 2001-2002 school year, students missed an average of 7.87 days. However, the number of total school days did increase from Year 1 to Year 2, which may explain the slight increase in days absent. In addition, the school does not track days absent with excuse vs. without excuse. Therefore, it is difficult to draw meaningful conclusions from this data.

7.2.2 <u>Observations</u>

During the initial site visit, in June of 2000, school staff described Vivian Field Middle School as a typical Texas middle school. Its diversity reflects the diversity of the state. The demographic make-up of the school did not change significantly from Year 1 to Year 2. For example:

- it is a majority minority school;
- many of its students are from single-parent families, often having no consistent place to study in the evenings;
- Vivian Field has had trouble with gangs in recent years; and
- the school has a large low-socioeconomic student population.

Over the course of the implementation, several changes took place related to classroom organization, student interaction, and instructional content. During the initial site visit, teachers reported that they were in the midst of the early learning stage during which the new, unfamiliar technology and content create a sense of controlled chaos in the classroom. This was evident in the observation of a sixth-grade math classroom. The arrangement of the furniture and location of the teacher's desk were not conducive to the kind of movement the classroom needed. As students moved from table to table to work with one another, and as the teacher moved around the classroom to observe students' work, the tangle of cords created a congested, chaotic atmosphere. In addition, the noise level of the class was extremely high.

During subsequent visits in the fall of 2000 and spring of 2001, rearrangement of classroom furniture and materials had alleviated some of the chaotic atmosphere, and the noise level had dropped considerably. While navigating through power cords was still an issue, the arrangement of classroom tables in rows, so that all computers were facing the same way, made it easier for students to work with one another with minimal movement. In addition, the teacher had set up various stations away from the classroom tables for use of peripherals, such as digital cameras and printers, which also lent more organization to the space.

During the beginning phase of this project, classroom observations showed that student collaboration was somewhat haphazard. Some students worked alone, while others worked in groups of up to five, gathered around a single laptop. Some laptops were left unused. Subsequent site visits indicated a change in the way collaboration occurred. It appeared that students worked in assigned groups of two to three students. Each small group sat together at a single table, and each student used his/her own laptop, instead of crowding around a single laptop. Collaboration across groups was still spontaneous and frequent, as one group figured out how to accomplish a task and others asked for their assistance. However, the collaboration appeared more purposeful than during initial site visits.

Observations also demonstrated that the complexities of assignments students were completing using the technology had changed. During initial site visits to a sixth-grade mathematics class, students were working almost exclusively using the CD-ROM mathematics software, drilling, playing games, or answering questions. During the final site visit, students were completing a complex investigation of geometric shapes and principles. Students were given a list of several terms, such as "congruence," "obtuse angle," etc. They were to develop a PowerPoint presentation that used graphics downloaded from the Internet or pictures taken with a digital camera to illustrate each principle or shape. Students were also required to write a brief explanation of how the graphic or picture illustrated the concept. Students' work demonstrated not only depth and breadth of the mathematical content, but significant cross-disciplinary understanding. For example, students incorporated images from classic and contemporary art. The composition of their presentations demonstrated a keen eye toward design. Their explanations and captions required the use of writing and grammar skills. Perhaps the most noticeable change observed between the initial and final site visits was the caliber of students' speech. Initially, as students were using the mathematics CD-ROM, their conversations tended to wander off subject, or be related to the graphics. During the observation of the geometry activity, students' conversation stayed remarkably on task, and showed interest in the project as well as maturity. They discussed approaches to designing the presentation, strategies for locating images that clearly illustrated the concepts. In short, the change in instructional material from rote to complex was matched by a change in students' motivation and maturity in completing the activities.

7.2.3 *Impact on Students*

School staff indicated that they attribute the leveling of TAAS scores to the fact that students have been distracted by the technology during these first two pilot years. As the program progresses, and students and teachers alike know what to expect, school staff anticipate seeing an increase in TAAS scores.

School staff also indicated that different levels of student proficiency with technology, as well as differences in the way technology is used and taught in various schools within the district, could be challenging. For example, as a middle school, Vivian Field receives students from a variety of elementary schools. Technology is not used to the same extent at each of these elementary schools. Therefore, incoming students have different levels of proficiency. In addition, different schools use different terms to refer to and teach technology. So it is particularly challenging in the sixth grade to get all students to the same starting point in proficiency with and understanding of technology. School staff is considering beginning the school year with a six-week, intensive orientation for sixth graders to address this challenge.

Perhaps the greatest impact the pilot has had on students is the increase in their self-confidence . School staff indicated that as students learned more and more about the technology, and realized that they had attained a level of knowledge equal to or greater than their teachers, their self-confidence soared.

Getting students to learn the technology was not a problem. School staff indicated that once students grasped the basics, they quickly self-directed their learning to more advanced topics and features. However, the learning curve is not only fast, but also unpredictable, which can be difficult in a class of more than 20 students, all operating at different levels of knowledge. Observations indicated, however, a notable eagerness among students to help each other.

The pilot project at Vivian Field Middle School has also had an impact on several special populations of students. First, for students of low socioeconomic status, the project has provided access to technology that they would not have had otherwise. Teachers have also seen remarkable progress with special education students. School staff described a borderline-autistic student who has turned out to be so good with the technology that he is helping other students troubleshoot during class. Other students can relate to him on this level—they will try to understand him because they know he can help them make their computers work. Some special education teachers have indicated that they have seen higher-quality products, in terms of content and style, when students key them than they do when students hand-write them.

7.2.4 Impact on Teachers

The pilot project has had a significant impact on teachers in a variety of areas, including instructional content, processes, personnel, and training.

School staff classified the curriculum used at Vivian Field prior to the commencement of the pilot as a polished, traditional approach, stemming from traditional print resources. Since the implementation of the pilot, school staff members have adapted their approach to instructional content. They are exploring more current information via the World Wide Web. The Web has also enabled students to engage in more real-world learning projects. For example, one project had students plan a trip, including finding real-time cost estimates for airfare, hotels, and other costs; identifying notable features of their destinations; finding maps; and planning itineraries. Teachers indicated that they have noticed that the types of activities students complete require more synthesis and high-level thinking skills than previously. Teachers did note that, at the beginning of the pilot, students were so excited by the technology available to them and what it could do that they tended to develop projects with more flash than substance. Teachers quickly learned that they had to use the bells and whistles (e.g., programs with animation, sounds, etc.) as a reward for the students who were able to do a good job presenting clear, accurate content.

When asked how the pilot changed the way the Texas Essential Knowledge and Skills (TEKS) are addressed at the school, school staff indicated that the TEKS have always been the driving force of instructional content, and that has not changed. School staff did feel that teachers have developed much more awareness about the Technology Application TEKS and how they can be integrated into content-area lessons. In addition, teacher training has evolved to focus on helping teachers create lessons and activities that truly integrate the technology into TEKS-based instruction.

As with the instructional content, school staff members describe teachers' instructional processes before the pilot as fairly traditional. However, with the implementation of the pilot, staff members almost immediately noticed a shift in the roles of students and teachers in the classroom. Students have become more independent, thus more in charge of their own learning. Teachers have become more like coaches, guiding students through their own processes. More pair and small-group work is happening. As early as May of 2000, observations of the classrooms confirmed that although each child has his or her own laptop, students tended to cluster in groups of two or three around a single laptop as they worked through mathematical problems together. The principal of the school has also observed that a key challenge for teachers related to this shift was overcoming the inherent embarrassment of having students know more than they do when it comes to technology.

Project staff has learned over the course of the pilot that in order for teachers to be successful, they must receive massive amounts of staff development, and that it must be ongoing—there is no saturation point. In terms of the content of staff development needed at Vivian Field, project staff has come to realize that the integration of technology into the classroom requires developing two different aspects of teachers' proficiency. Of course, teachers must learn the technology that is to be used in the classroom so that they can be confident as they use it to teach students. The confidence that stems from this basic technology proficiency leads naturally to the next phase of development, which is learning to <u>meaningfully</u> integrate technology in the classroom. There has been a shift from using technology to enhance classroom activities to creating high-quality, truly integrated activities that could not be done without technology. The more confident teachers are with the technology, the better they will be able to focus on the content and integration. School staff indicated that for teachers who are inexperienced with technology, the ability to learn the basics and to integrate it meaningfully would never happen simultaneously.

It is challenging to sustain the level of staff development needed to keep teachers functioning at a confident, proficient level. Timing of staff development was a significant issue. Pulling teachers out of class did not work for this school, in part because it was difficult to find substitutes. The school's answer to this dilemma was to provide training after school hours, giving teachers a small stipend to compensate them for the extra time. This issue is compounded by the fact that the intensive staff development teachers have been receiving is in addition to the standard staff development provided by the district.

In addition to periodic training by experts and in-house training by other teachers, school staff have been trying to develop their own online teacher training. However, copyright issues have been a real challenge. The school may have permission to use a printed version of training materials, but not permission to transform them to be delivered digitally. Therefore, the school is also looking into prepackaged online professional development services. The project director wondered whether teachers would actually make use of the resources, citing the volumes of staff development materials and videotapes that are housed in the district's library, but which do not get checked out. He did feel that teachers being able to easily access the information anywhere, any time might encourage teachers to use online training.

Teachers encountered a number of challenges as they worked through the pilot. School staff indicated that the most challenging aspect of the project for teachers was the learning phase, in which teachers struggled to keep up with the new technology and balance instructional content with delivery method, especially given the inevitable maintenance issues. The principal indicated that teachers were extremely frustrated with the difficulties they were experiencing in the classroom. However, as early as six months into the program, teachers began feeling much more comfortable, motivated and excited about using the laptops in the classroom.

Changes in school staff over the course of the pilot have also been a challenge. During Year 2, seven new teachers were added to the sixth and seventh grades, and three teachers were moved within the building to different grade levels. According to district staff, this disrupted the continuity in the program somewhat. Additional, unanticipated staff development time was needed to bring all teachers up to an appropriate level of comfort with the program and the technology. The school has been relying on longer-term teachers and school staff to train the new personnel. Although new teachers have come to the school with a good deal of basic hardware and software knowledge, the major challenge has been helping them to integrate technology into instruction in a way that produces real value. School staff feels that a key to helping teachers learn these strategies and develop high-quality lessons is setting realistic goals and coordinating efforts. For example, if each of three sixth-grade social studies teachers creates just two high-quality projects, by the end of the year they will each have access to six projects. As the years progress, the body of work will expand.

In addition to changes in staff, the use of school staff members' time has changed because of the pilot. For example, it takes a significant amount of the teachers' and technology specialist's time to keep the laptops simply functioning. The technology specialist has had to spend more time in the classroom than in the lab. Consequently, teachers have had to become more self-sufficient in running the lab and in troubleshooting their own classroom's technology problems.

Another challenge teachers encountered during the pilot was the frustration of unexpected technology failures. It was frustrating for teachers to work hard on a lesson plan integrating technology in meaningful ways, only to have that technology not work during class. The alternative of having to create two separate lesson plans—one with and one without technology—for each class period is unrealistic in terms of workload. Teachers admitted that they had not anticipated that the functionality of the technology would be as much of a problem as it has been.

Overall, district and school staff members do not feel that the technology has made teachers' jobs any *easier*. However, they indicate that whether the positive results they have seen with the technology are worth the frustration and work involved in using the technology really depends on the individual teacher. School and district staff all felt that there was no shortcut to working through the period of frustration.

7.2.5 *Impact on Families*

School staff indicated that the pilot has had a positive impact on students and their families. Students and their parents work together with the technology when students bring home their laptops. Being able to see exactly what their children are working on encourages parents to get involved with their children. Students also feel a sense of accomplishment when they are able to help their parents and siblings learn how to use the technology. Especially in low-income families, the laptop that the student brings home is usually the only computer in the household. One district staff member recounted a story of a student whose parent was able to get a better job because she had developed her computer skills with her child's laptop. The staff member also described the pride evident in the student, knowing that he had played a part in improving his family's situation.

7.2.6 *Technology*

The technology resources have certainly changed Vivian Field Middle School, as well as the students and families it serves. Prior to the beginning of the pilot, Vivian Field was essentially a "mid-tech" school. Teachers used a variety of computers in their classrooms, but there was no consistency to the operating system or software used. Currently, all teachers have access to a PC, with e-mail and Internet access. The school also has three full labs with upgraded equipment. Families that did not have access to home computers before to the pilot now do. Before the pilot, 28 percent of the students who were going to participate did not have access to computers at home. After the pilot, that percentage has dropped to just 14 percent.

Keeping the technology up and running was the most significant challenge of the pilot. However, it is important to note that the school experienced less breakage due to student neglect, abuse, or loss than anticipated. In Year One, only three laptops out of 150 were lost. The school did some inventive things to help students take ownership of their laptops, and to discourage theft. For example, in addition to assigning serial numbers to each laptop, school staff took digital pictures of the students, printed the pictures on label paper, and stuck the pictures to their laptops. School staff also feels that having parents train on the technology, and more importantly *pay* for the technology, helped to instill a sense of responsibility in students.

School staff also discovered that the laptops are more delicate than they had anticipated. For example, some rooms have slanted desks, and the laptops occasionally would slide off. Carrying the laptops in backpacks seemed to work fine until students added books to the pack. Placing the laptop and books in the pack together would cause the laptop screens to break. School staff also learned that not all laptops are rugged enough to handle all-day, every-day student use. By the end of the pilot, school staff indicated that although they have seen many types of laptops become more affordable in terms of cost, they have noticed a similar drop in quality.

Another challenge reported early in the implementation of the pilot was dealing with broken laptops. The school developed a procedure by which school personnel could attempt to fix the problem, and contracted with a third-party vendor to provide off-site repair and maintenance services. Initially, communication and timeliness of repairs was a significant issue with this vendor. However, by the end of the pilot, school staff indicated that the vendor had worked to improve both the speed of repairs and the communication with school staff. School staff can currently use a website set up by the vendor to view the status of any laptop being repaired. In addition, the school is training students to repair computers. Not only does this help the school make minor repairs with minimum turnaround time, but also it provides the students with valuable, real-world skills. The school purchased a few laptops to be used as loaners while students' laptops were being repaired.

Connectivity has also been a significant challenge in the school. In preparation for this pilot, the school upgraded its wireless connectivity speed, and has been working throughout the course of the pilot to upgrade its Local and Wide Area Networks. However, even with the addition of significant bandwidth, it is difficult for the hundreds of students to connect to the server and/or Internet with consistent success and adequate speed. There is also anecdotal evidence that some connectivity problems may reside with some content providers—not with the school itself. District staff gave the example of a state-of-the-art school within the district that had tried to use an online mathematics textbook with its students. It was extremely difficult for all of the students to connect to the textbook at the same time, and because the connectivity in the school was so good, district staff thought the problem might actually reside with the content provider's server—that it simply had not been set up with enough bandwidth to transmit the content to hundreds of students at the same time.

During the pilot, school staff also realized that they had not accurately anticipated the number and type of peripherals that would be needed by teachers to effectively use the core hardware and software. For example, classroom teachers needed projectors so they could demonstrate for students in a whole-class setting how to perform certain technology functions or access certain information. Teachers also needed printers so students could print out their technology projects and share them with the teachers and fellow students.

Vivian Field staff indicated that in terms of tech support, a school can never have enough. As time passes, teachers are becoming more adept at problem-solving technology challenges in the classroom, as are students. The project staff has come to realize that one full-time staff person dedicated solely to tech support would be sufficient for a school of Vivian Field's size. However, there also needs to be a staff member dedicated to working with teachers to integrate the technology into instruction. This person must not only understand the technology, but also understand the principles of the instructional process. This person would be responsible for teaching, modeling, creating templates, etc.

7.2.7 ***Content***

Vivian Field staff indicated that, for the most part, delivery of the content went according to expectation. School staff found most of the vendors to be quite cooperative, although there were some unexpected problems with the content provided. For example, the seventh and eighth grade Decision Development software, *Ancient World 2000*, could not be used in social studies classes during the pilot, because the topics covered in it do not match the content of the seventh and eighth grade social studies courses (Texas History at seventh grade and US History at eighth grade). In addition, *Science 2000*, a seventh and eighth grade course, could not be used in the first year of the pilot because the pilot began with only sixth graders. In addition, in the second year of the pilot, school staff had difficulty installing the software. Rather than ask science teachers to introduce new content in the middle of a school year, school staff asked Decision Development Corporation to work with them over the summer of 2001 to get the science software installed. The company agreed, despite the fact that, technically, the pilot would be over by the time the software was installed. In addition, Decision Development Corporation has offered the school copies of its new U.S. History product to be used in eighth grade social studies classes next year.

The school also encountered some challenges in implementing the Glencoe/McGraw-Hill mathematics CD-ROM, but the vendor was extremely cooperative throughout the project. Initially, teachers were surprised to find that the CDs do not contain the complete content of the print version of the textbooks, as they had expected. In several cases, there are fewer sections on a particular topic in the CD-ROM than in the textbook, and there are fewer practice questions. In addition, though the electronic content proved extremely successful with lower-level students, it was not challenging enough for gifted students. To address these challenges, Glencoe's staff went above and beyond by working with school staff to develop additional content, which was piped through Glencoe's web site, to augment the original CD-ROM content. The company also provided the school with CD-ROMs for the grade level beyond what was originally anticipated. In the first year of the pilot, sixth graders had access both to the sixth grade and seventh grade content. This helped to address the needs of those students who were performing above grade level. Overall, school staff was extremely pleased with the attentiveness of the vendor's staff, and with the results.

School staff also noted that during the pilot, teachers have tried to use content available over the Internet to augment instruction, which has produced some challenges. Although there is a wealth of instructional resources available over the Internet, teachers have found that it is difficult to use these resources with confidence. For example, most Internet-based content must be aligned to the curriculum, to ensure that it appropriately supports instructional goals. The content must also be aligned to the specific needs of students. It must be evaluated to see if it is truly an appropriate and effective resource. Frequently, there are no student classroom activities or rubrics with online materials, and teachers must fill in these gaps.

7.2.8 ***<u>School, Classroom, and District Management</u>***

One of the greatest challenges Vivian Field school staff encountered was managing the finances for the laptop program. A key goal of the program is to ensure that every student, regardless of economic status, is able to have a laptop. Some students' parents are able to pay for a laptop in full or in part, with support by the local foundation established. However, for recent immigrants who have no credit history, it is extremely difficult to get financing for the purchase of a laptop at a reasonable interest rate. Therefore, the school purchased laptops, and has been leasing them for a monthly usage fee to those students whose parents could not qualify for financing. Although there have been virtually no issues with failure to make payments, the time it takes school staff simply to keep up with tracking payments has been extremely burdensome. Currently, the school principal and secretary are handling this task. However, it takes time away from their other essential administrative functions.

School staff indicated at the end of the pilot that all teachers are using technology to perform basic classroom management functions such as taking roll, grading, creating lesson plans, disciplining students, communicating with parents, etc. Although teachers do not feel that this is any easier than handwriting the information, the principal of the school indicated that it is now much easier for her to analyze classroom and student data to make sound instructional decisions. The principal also indicated that the quality of teacher lesson plans has improved because they are all in a unified format. This also makes it easier for teachers to share lesson plans. Teachers using e-mail to let the school office know when a student is on his/her way makes organizing schedules much easier for office workers. Teachers also use e-mail to communicate with parents. By the end of the pilot roughly 70 percent of parents had access to e-mail either because they had it before or because they now can use their student's laptop. School staff did indicate that their dependence on technology for school management really shows when the technology is not working.

At the district level, staff indicated that communications among schools has become much easier. One district staff member indicated that you hear more because people feel freer to communicate more frequently. Communicating via e-mail also makes it easier to communicate the same information to many schools and school staff members simultaneously.

7.2.9 Costs

School staff indicated that the cost of this project has been far higher than they imagined it would be. In addition to simply purchasing the laptops and the content which was donated, there were unanticipated and very significant expenditures. For example, the personnel resources required to keep detailed financial and evaluation records was very costly. The school has also had to pay for outside consultant costs, as they worked to upgrade their equipment to solve the connectivity challenges. The school also needed to purchase insurance for the hundreds of laptops being used. Peripherals, as previously mentioned, added to the cost of the pilot. Finally, the cost to get teachers trained, both in terms of payment to outside contractors and payment to teachers for their time, was significant. District staff indicated that before replicating such a program, it is important to pinpoint these additional costs.

As discussed above, some families did not qualify for financing for their laptops. The school had to purchase many laptops for these families, leasing them back for a monthly usage fee. This was a tremendous, unbudgeted upfront expense, which district staff report could not be sustained by the district in the future.

7.2.10 Lessons Learned

Because of its aggressive approach to infusing significant technology into the school, Vivian Field experienced numerous challenges—and there are some things that project and school staff would have done differently. As an overarching conclusion, project staff felt that if they had the chance to do the pilot again, they would not have started with an entire grade level and added laptops to each grade level thereafter. The staff would have started with one or two classes, to test the water for significant challenges. That way, challenges could have been addressed before the entire school was using the technology. Additional lessons learned include:

- Project staff would not have developed such a complex system of parent payment for the laptops, and/or they would not have expected school staff to handle the tracking of these payments.
- Had project staff anticipated how significant the bandwidth problems would be, they would have addressed the improvement of access before any technology was introduced into the classroom, in order to minimize significant teacher and student frustration.
- Project staff felt that because the materials were donated from vendors, they did not have to do a great deal of research to select the best products for the school's needs. Although, ultimately, the content was important to the pilot, project staff indicated that they would have researched a far wider array of products to ensure that they would work well with the existing school technology.

Pilot staff indicated that if funds were available, based on what they know now, they would have hired additional staff to support the technology integration effort. They felt that while a single tech support person was sufficient for their needs, they would have hired a technology integration specialist to work with teachers exclusively on helping them develop high-quality, bound-for-success lessons to use in the classroom, and to help model the effective integration of technology in the classroom.

Chapter 8

Clear Creek ISD:

Ross Elementary School

CLEAR CREEK ISD: ROSS ELEMENTARY SCHOOL

8.1 Description of the Pilot

Ross Elementary School is part of the Clear Creek Independent School District (CCISD), which was formed in 1948 through the consolidation of schools in League City, Seabrook, Webster, and Kemah. By the end of the 1998–1999 school year, Clear Creek ISD was serving over 28,000 students. Clear Creek ISD supports 29 campuses, many of which are magnet intermediate schools, and is projected to add an additional seven campuses by 2008 to respond to the average annual increase of 600 to 800 students per year.

The ROSS-TIM pilot (CCISD's Reaching Our Students Successfully-Technology Instructional Model) was conducted at the third and fourth grade level. Enrollment at Ross at the beginning of the 1999–2000 school year was 820. The school also receives Title I and VI funding support. Its 1998–1999 accountability rating by the Texas Education Agency was "Recognized."

The socio-economic status of the student population averages from low- to upper-income with the majority falling in the low middle-income range. Twenty-five percent of the student population receives free and reduced lunches. At the start of the 1999–2000 school year, the ethnic diversity of the entire campus included 7 percent African American, 16 percent Hispanic, 72 percent white, 5 percent Asian, and .2 percent Native American. Of the 820 enrolled, 149 are in the third grade. The ethnic composition of the third grade is nearly a mirror image of the entire school.

The objective of the ROSS-TIM is to examine the effectiveness of using laptop computers, data projectors, software, and home playstation devices to deliver substantial curriculum content.

The target population began the pilot program in the third grade and continued into the fourth grade throughout the 2000–2001 school year. Due to the lateness of receiving the Notice of Grant Award (NOGA), which delayed the ordering of equipment, the Ross staff decided to conduct its Ed Tech pilot with the fourth grade only during the 2000–2001 school year. However, they also decided to implement the pilot's objective with the 2000–2001 third graders on their own as a district. The total number of pilot students in the fourth grade was 36. The ethnic composition of the pilot students was approximately 72 percent white, 11 percent Hispanic, 3 percent African American, and 14 percent Asian American. A total of 21 percent of the children received a free or reduced lunch; 16 percent received special education services; 12 percent received English as a second language services; and five percent were categorized as gifted and talented. In addition, 33 percent of these children lived in single-parent families, with 12 percent being nine years old and 88 percent eight years old.

The ROSS-TIM pilot consisted of two fourth grade teachers delivering 100 percent TEKS conforming curricula in math, science, language arts, and social studies through technology. By following CCISD's fourth grade curriculum guides, 36 students received this instruction through a technology rich environment that included 24 Apple iBook computers purchased by the district, 45 Lightspan playstation consoles, two printers, one data projector, headphones, and two teacher workstations. Two third grade classrooms also received instruction with 24 Apple iBooks, 45 Lightspan playstation consoles, two printers, one data projector, headphones, and two teacher workstations.

For content, The Ross staff selected Knowledge Adventure's Texas Edition Classworks Gold and American Education Corporation's A+dvanced Learning System (A+LS) and A+SESS. Due to technical challenges, the implementation of A+LS and A+SESS were delayed significantly.

8.2 Outcomes

Data on the progress of the pilots were obtained from a variety of sources, including surveys, student and teacher performance data, and periodic site visits. In addition, the pilot staff provided comparison data for pilot students. This baseline data includes the MAT 7, classroom performance, and satisfaction surveys.

8.2.1 Goals and Objectives

The ROSS-TIM pilot set out to accomplish the following objectives with its grant from TEA and support from its vendor partners:

- provide staff development to ensure that the staff has the skills and knowledge needed to deliver substantial curriculum content through technology;
- deliver substantial curriculum content through technology to 36 fourth-grade students;
- begin the program in the third grade and make the transition with the same students as they progress to the fourth grade; and
- collect data that will demonstrate the program's effectiveness.

Provide staff development that will ensure that staff has the skills and knowledge needed to deliver substantial curriculum content through technology

Staff development for the target third- and fourth-grade teachers occurred throughout the two-year pilot project. To ensure that teachers had the skills and knowledge needed to deliver substantial curriculum content through technology, the core curriculum coordinators provided staff development on the Technology Instruction Model (TIM). This model provided teachers with the format needed to ensure that technology instruction is delivered according to the district's scope and sequence and conforms 100 percent to the TEKS.

Significantly more technology training has been delivered to teachers as a result of the pilot, and because of CCISD's initiative to provide all teachers with a classroom computer. Lightspan and Classworks also provided training to the entire staff as well as the pilot teachers. Pilot teachers also received on-line staff development through Apple, attended two technology conferences during the 2000–2001 school year, and received technology staff development provided through the district. CCISD also provided staff on-site during the first week of classes to provide "real time" training to teachers and students. Other staff development activities included attending Midwinter Conference, TCEA, TECHNO Tour, and presenting the pilot at TEPSA.

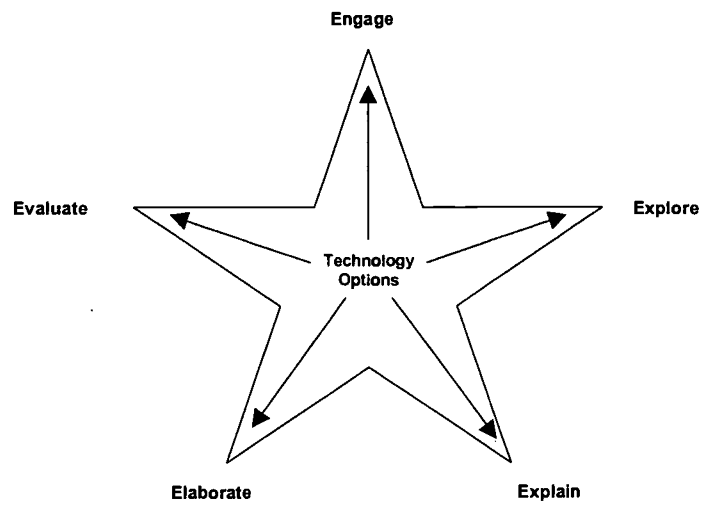
Deliver substantial curriculum content through technology to 36 fourth-grade students

The Ross pilot staff chose to successfully deliver substantial curriculum content through technology using the TIM model for their pilot. This model and selected software and hardware allowed teachers to make lessons more stimulating, interactive, and individualized. As part of the prepilot program implementation, The Ross staff took time to:

- assess the needs of the target student population;
- assess the teaching, administrative, and technical staff development needs;
- assess the current available technology and software and supplemental resource needs;
- redesign teaching to maximize delivery of curriculum through technology;

- identify control comparison groups;
- collect baseline information;
- finalize assessment tools and evaluation design; and
- negotiate with vendors.

The Technology Integration Model (TIM) ensured that curriculum was delivered through technology, and provided the teachers with a format to use software content according to the scope and sequence of CCISD's curriculum guides that encompass the TEKS and national education standards. TIM identified software content gaps, thus enabling teachers to augment the software through Internet access. TIM is portrayed by the diagram shown below.



Using TIM, the teachers provided a variety of student learning activities that:

- **engaged** student attention on the area of the lesson;
- allowed students to **explore** through activities related to the content;
- **explained** the content in terms of the students' experiences;
- allowed students to **elaborate** in their learning through extensions and connections; and
- **evaluated** students' learning in meaningful ways.

Integration between technology and content is important, so teachers also used instructional methods including direct instruction, manipulative, role-playing, discussion, and mapping.

Teachers no longer rely on textbooks to supply the majority of the curriculum content and practice. Teachers also physically rearranged their classrooms to allow for more effective use of the technology. The rooms no longer have rows of students. Teachers are also using technology to deliver instruction rather than just supplement instruction they've already received.

Teachers used the available technology and content to introduce math, language arts, science, and social studies TEKS in grades 3 through 4. Lightspan Adventure has been used for at-home practice. Classworks Gold and the Lightspan Network have been used for introducing TEKS as well as providing individualized practice, review, and, when needed, remediation. Reading has been the most impacted area of the language arts TEKS. Teachers have also used the Scholastic News Web site to supplement the social studies curriculum. One lesson example was the use of Lightspan activity sheets for students to learn and explore content on their own time and at their own pace. Another example was allowing the students to make their own Web trip using the iBooks and Internet and creating their own reports. Teachers stressed how excited and motivated students were when using the playstation at home. During class time, the students accessed the Internet and Lightspan Web site for activities integrated with their lessons. The teachers also evaluated the students' learning using assessment sheets at the end of each lesson. At the end of the year, the teachers created a project that tied together what the students had learned in regards to the science, art, math, and technology TEKS.

Begin the program in the third grade and make the transition with the same students as they progress to the fourth grade

During the summer of 2000, third- and fourth-grade teachers met to transfer the ROSS-TIM program from third to fourth grade. This meeting allowed the staff to review TIM, address lessons learned, provide training on software and hardware, and create a plan for ROSS-TIM implementation during the 2000–2001 school year.

Collect data that will demonstrate the program's effectiveness

Due to unavoidable delays in starting up the project and other factors, the pilot was conducted for only one school year. Ross school staff submitted data during the progress of the pilot that included a variety of sources, including surveys and student and teacher performance data. In addition, the pilot teachers kept a journal to write down their experiences using the various technologies. At the beginning of the pilot, seven teachers submitted a teacher self-assessment. Only one teacher stated that his/her current use of technology in the classroom is contributing to substantial improvements in academic achievements. Five teachers stated their current use is contributing to minor improvements, and one teacher stated that his/her current use is contributing to no improvements. At the end of the pilot, four teachers submitted teacher self-assessments. Two teachers stated that their current use of technology has contributed to substantial improvements in academic achievement, and only one stated that his/her use of technology has contributed to minor improvements. One teacher did not respond to the question. Not only do teachers believe that the program is effective, but they also believe that their technology proficiency has increased during the pilot. On a scale from zero to 10, teachers rated their current use of technology in terms of its effectiveness in improving academic achievement of most students. The average rating was a 6. This is a significant increase compared with the beginning of the pilot, when the average rating was a 3.

Although one year is not enough time to prove that the technology resources used by the school had the effect of raising student achievement, the results suggest that if the pilot had been conducted for a longer period, such proof might well have been demonstrated. The average GPA for students in the Ross pilot decreased slightly in comparison with the previous year from 90.64 to 89.05. While the GPA decreased slightly, Exhibit 8-1 shows that the MAT 7 Math scores increased greatly from an average of a 52 for 1999–2000 to an average of 71 for 2000–2001. It is also worth noting that the TLI Reading scores improved from an average of 87 for 1999–2000 to an average of 90 in 2000–2001. Moreover, it is probable that following a year's worth of experience using the technology resources, the teachers would be more adept at incorporating them into their lessons, which in turn should result in greater achievement gains.

EXHIBIT 8-1

	School Year	Mean	Minimum	Maximum
MAT 7 Reading	1999–2000	69	31	96
	2000–2001	58	1	95
MAT 7 Math	1999–2000	52	27	95
	2000–2001	71	3	96
MAT 7 Language Arts	1999–2000	67	29	97
	2000–2001	59	1	97
TLI Reading	1999–2000	87	67	94
	2000–2001	90	73	98
TLI Math	1999–2000	85	43	93
	2000–2001	83	67	90

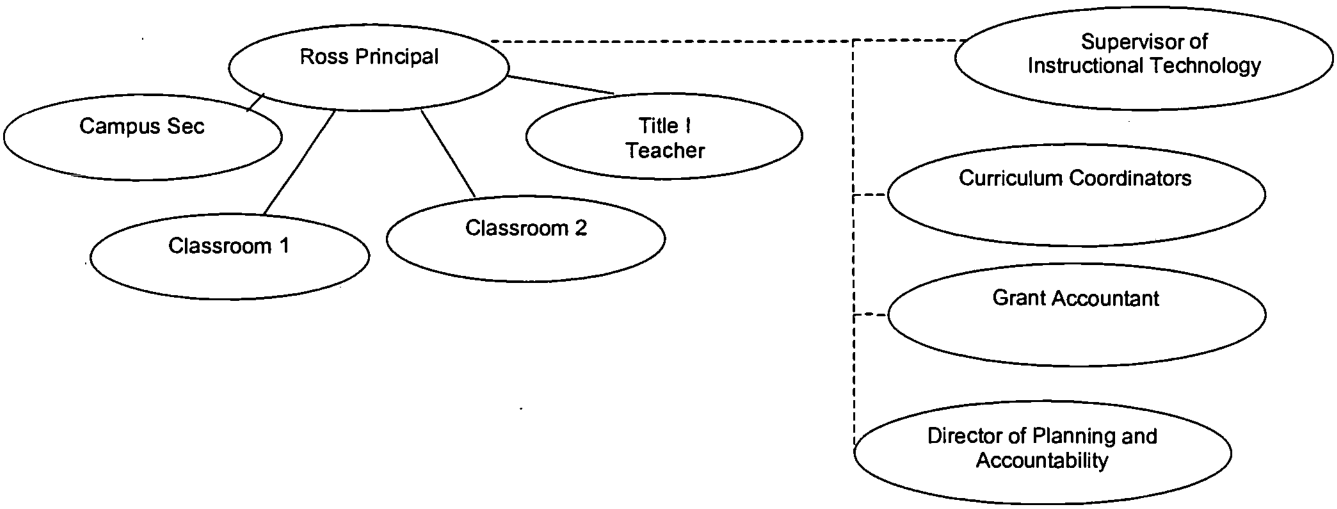
8.2.2 Accomplishments

As described above, the Ross Elementary School pilot succeeded in achieving its four major project goals. There were, however, a number of other positive accomplishments worth noting.

- In addition to preproject planning, the Ross pilot demonstrated a great collaboration and structure between the district and campus staff. This structure provided support to teachers and ensured that they had the skills and knowledge needed to deliver substantial curriculum content through technology. The ROSS-TIM team included the principal, the campus secretary, the pilot teachers, the Title 1 teacher, and the technology specialist. The team also included the CCISD supervisor of instructional technology; the curriculum coordinators for math, science, social studies, and language arts; the grant accountant; and the director of planning and accountability. Each one had certain project responsibilities. The management structure is portrayed below (Exhibit 8-2).

  All ROSS-TIM staff was accessible by e-mail through the WAN and the LAN, and homework assignments were available through the Web. This accessibility increased communication between staff and parents and the community.

EXHIBIT 8-2



- Given the district's and school's dedication to providing staff development for the pilot, teachers gained the skills and knowledge needed to deliver substantial curriculum content through technology. Initially, pilot teachers saw skepticism among other staff members while using this technology. As the pilot progressed, however, the pilot teachers saw increased curiosity from other faculty and students at the school. Other teachers not involved in the pilot showed more interest and asked more questions about how the technology was being used in the pilot classrooms. Other schools also began to express increased interest in the pilot.

- As a result of the technology available in the classroom, a significant increase in student collaboration as well as individualized instruction and practice took place in the pilot classrooms. Teachers were able to have multiple things going on in the classroom at once as a result of using the wireless laptops and classroom computers. Students were able to begin working collaboratively or independently without having to wait until the teacher could get to them. Students were more independent when they are using the available technology and seemed to be taking more ownership in their education. Students were very motivated and excited and at times wanted to learn more. The increase in the students' self-confidence had other students in the school asking questions. Parents were also asking questions about the technology and how their child could be added to the pilot classroom. Site visit observations revealed that students were eager to help each other.

- The pilot also had an impact on some special populations of students. First, for students of low socioeconomic status, the project has provided access to technology that they would not have had otherwise. With Classworks Gold, lesson review and practice was individualized. Teachers found differentiating the curriculum for gifted and talented students to be much easier using technology. These students were able to do more self-instruction and extension of the curriculum when using the technology. The teachers felt these students were no longer being held back. The challenge for special population students had been the instances in which students were pulled out of class as part of special programs. This caused those students to have less access to the technology used in the pilot, as it is not available in all teachers' classrooms. Teachers also stated that ESL students were doing very well with the program and felt that the Special-Ed teachers should have been included in the pilot.

- Parental participation was also important to the Ross pilot. A parent orientation was held at the beginning of the school year to provide information about the pilot as well as distribute playstations for home use. Teachers have seen an increase in parent communication during the pilot, with some of the increase attributed to communication about the pilot itself. One of the most positive outcomes teachers have seen as a result of the pilot is an increase in the number of families who have purchased home computers and/or added Internet service to allow students more opportunities to apply what they've learned in class.

8.2.3 <u>Vendor Support and Product Reactions</u>

A critical aspect of successfully carrying out the pilot projects was the level of support each pilot received from their vendor partners. Just as the original requirements for participation specified that vendors would supply their products at no cost, they also required that vendors provide training in the use of the products and technical support. Despite this requirement, as might be expected, some vendors were much more supportive than others. Generally, Ross Elementary School's experiences with their vendor partners were positive.

Apple iBooks

The most significant use of hardware in instruction includes use of wireless iBooks and iMacs shared by students in each pilot classroom. Clear Creek ISD purchased the Apple iBooks for Ross pilot students to continue learning outside of the classroom environment and eliminate the need to hardwire the classroom. The iBooks allowed teachers to access the student work and provide immediate feedback on student performance. The iBooks also enabled students to take teaming out of the classroom environment, enabled them to have access to the Internet, and increased ways to communicate with the teachers. Each pilot student had his/her own e-mail address. The school staff reported that, while there were some small technical problems with the iBooks, there were no major problems. Teachers noted that they would have to teach in small groups next time because having all the students on the same Web site slowed everything down and caused them to waste too much time. Pilot site observations included students using wireless technology with the iBooks to browse Web sites in order to complete an activity sheet. Overall, the school staff felt the vendor's support was good.

Lightspan

The Ross Elementary School pilot also used the Lightspan playstation consoles, which allowed students to take content outside the classroom and into the home. The equipment was received very early in the project and pilot classrooms were equipped with a television that could be used with a playstation as well as connected to the teacher's computer for demonstration purposes. School staff stated that there was an extremely high level of involvement with Lightspan throughout the pilot. Professional development was provided throughout the pilot for the teachers involved directly, as well as professional development for the entire faculty for the on-line portion of Lightspan. The Lightspan liaison participated in the parent orientations that were held during the pilot as well as assisted with pretesting and working with pilot teachers in their classrooms to assist with the initial activities that involved Lightspan. The staff also noted that parents were pleased with Lightspan.

Knowledge Adventure – Classworks Gold

Classworks Gold is a flexible and open instructional management and delivery system that includes comprehensive curriculum materials for language arts and math for grades kindergarten through eight. The program has over 1,000 learning objectives and 8,000 activities, taken from the best educational software available. A customized version has been created for Texas that incorporates the TEKS. Thus, Ross received the Texas Edition of Classworks Gold.

For the Ross pilot, Classworks Gold was implemented later than planned due to a delay in procurement and installation of the file-server needed to operate the software. Following the installation of Classworks Gold, the vendor was actively involved. Knowledge Adventure also provided professional development for the pilot teachers as well as the entire faculty. Despite the early operational difficulties, Ross staff described the Knowledge Adventure staff as being very helpful and considered their support to be good.

American Education Corporation - A+LS Software

Ross also intended to use American Education Corporation's software, A+dvanced Learning System, as the foundation for the presentation of math, science, social studies, and language arts. However, A+dvanced Learning Systems software was not installed due to a number of problems. School staff indicated that for a period of time, contact with the vendor was very difficult and calls were not returned. School staff later learned that professional development was not covered by the vendor as part of the pilot. After Ross agreed to pay for professional development, contact from the vendor increased. Although the wrong version of the software was initially sent, that was corrected.

Projectors were also purchased with the grant, which facilitated teaching the class how to use the computers; allowed collaborative teaching; and gave the students the opportunity to make class presentations.

8.2.4 *Costs*

The costs for implementing the pilot would have been as follows, had it been necessary to pay for the resources that vendor partners provided:

- Clear Creek ISD expended part of their technology allotment to acquire the Apple iBooks, which would have been approximately $79,360 for 48 iBooks.
- For the Lightspan resources, the cost would have been $89,600.
- For the acquisition of the Classworks Gold software and the associated training and support, the cost would have been $99,000.
- For the American Education Corporation resources, the cost would have been $76,000.
- For the payroll costs, including the technology application teacher and professional development, the cost would have been approximately $51,000.
- For utilities used while keeping the school open before and after normal school hours, the cost would have been $1,564.
- For supplies and materials such as teacher workstations, cameras, and printers, the cost would have been $28,300.

The project coordinator stressed that she and others devoted a substantial amount of staff time to ensure that the pilot was effectively administered. Of course, an extensive amount of teacher time was expended on professional development.

8.2.5 Lessons Learned

As a result of conducting this pilot, there are a number of things that can be considered lessons learned. The following factors should be considered by other schools that want to implement a similar program.

- Initial training and the installation of all equipment should occur beforeto the pilot is implemented. Care should be taken to ensure that: (1) all components of the program are implemented appropriately, and (2) the initiative lasts long enough to allow it to demonstrate that the technology-based resources have a positive impact upon learning.

- Plans for a pilot such as this should include strategies for accommodating personnel turnover should it occur. For Ross, between January 2001 and April 2001 three staff members were replaced, including one of the fourth-grade pilot teachers, the principal, and the project coordinator.

- All the components of the pilot, including staff development, should be in place before implementation. In order for this to occur, funds must be available early enough to acquire all the necessary resources. For this pilot, school staff felt that funds were not available soon enough.

- To ensure that the special populations have equitable access to the technology throughout the day, pilots must include teachers of special programs in all professional development related to the pilot. Similarly, pilots must provide the same technology resources for teachers of special programs.

- Ensure that the details of what is and is not provided by vendors are explicit. Pilots must evaluate each vendor's technical requirements before implementation to reduce time spent on technical support. For Ross, the technical support requirement increased during the pilot. However, due to staff turnover and an increase in available technology districtwide, some technology problems took longer to resolve than was desirable.

- Schools must evaluate their own technical capabilities and level of connectivity. Ross demonstrated that even schools that have among the highest levels of connectivity would be challenged to provide adequate access when hundreds of students connect to the Internet and server-based resources at once. Despite frequent upgrades to the school's connectivity, Ross still experienced slow connection speeds, which hinders students and teachers from getting the full benefits of the technology.

8.2.6 Conclusions

In addition to the lessons learned described above, conclusions can be drawn from the experiences of the ROSS-TIM pilot that relate to the overall objectives of TEA's Ed Tech PILOTS Project.

1. Significantly increasing technology resources in a school will (or should) change the way teachers teach and students learn. Students should become less dependent on teachers to provide content. During a site visit to Ross, students were using the wireless technology with the iBooks to browse Web sites in order to complete an activity sheet, and the teachers distributed Lightspan activity sheets for students to complete at home. Teachers stated that the new technology

in the classroom has motivated the students and they are excited and eager to use the technology. It has also changed the way families learn together. According to the project coordinator, there was an increase in the number of families who purchased home computers and/or added Internet service to allow students more opportunities to apply what they've learned in class.

2. In order to successfully implement technology, all teachers must receive massive amounts of staff development and have equitable access to the technology throughout the day. The pilot project at Ross impacted several special populations, but the challenge for the special population students occurred when students were pulled out of class as part of their special program(s). This caused those students to have less access to the technology used in the pilot, as it is not available in all teachers' classrooms. Therefore, it is critical to ensure that the special populations have equitable access to the technology and that special program teachers are involved in all professional development related to the technology.

3. Accurately estimating a school's infrastructure, and having timely technical support and continuous communication with the vendor partner is critical to ensure a smooth transition and implementation. During a site visit to Ross, all software and hardware were in place except for the American Education Corporation A+LS software. Throughout the pilot, Ross experienced technical difficulties with the A+LS software implementation. Since communication with the vendor's tech support was somewhat unsuccessful, the Ross pilot staff members soon lost interest and did not push for installation of the software. Therefore, it is important for schools to make sure details of what is and is not provided by vendors is explicit, which may include evaluating the vendor's technical requirements before implementation to reduce time spent on technical support.

Chapter 9

Dallas ISD:

Environmental Science Academy

DALLAS ISD: DALLAS ENVIRONMENTAL SCIENCE ACADEMY

9.1 Description of the Pilot

The Dallas Environmental Science Academy (DESA) serves seventh- and eighth-grade students in the Dallas Independent School District who are interested in science and environmental studies. Students in the district in good academic standing with an interest and ability to perform the program's specialized work are eligible to apply for admission. The program's population at the beginning of the pilot project included 51 percent economically disadvantaged students, 27.3 percent African American students, 43.4 percent Hispanic students, 20.2 percent White students, 4 percent Asian students, and 5 percent Native American students.

The DESA pilot project targeted seventh-grade teachers and their students. Components of the pilot included two years of study using Bricolage's *eeZone*, an online environmental education program; the use of 25 Dell laptops; and the use of 150 Softbook Readers. The *eeZone* materials were to be accessed via DESA's existing computer lab, via the laptops during the school day, and via the Softbook Readers. In addition, DESA had hoped to have its print Environmental Science text digitized by Softbook Press for delivery via the Softbook Readers. In addition, the laptops were also intended to be used during DESA's numerous field trips, to facilitate data collection and recording.

Due to several challenges, Softbook Press was not able to deliver the Softbook Readers as promised. Although publisher Holt, Rinehart, and Winston generously agreed to allow Softbook Press to digitize DESA's textbook, Softbook Press was not able to absorb the cost of digitizing. In addition, budgeting challenges resulted in the laptops being installed for use much later than anticipated (in the Fall of Year 2). The *eeZone* online learning materials were used beginning in Spring of Year 1.

The goal of DESA's project was to infuse this "mid-tech" program with significant technology that would be used to enhance the program's hands-on, experiential science curricula. Before the pilot, most of the instructional content for the program was delivered via print media. DESA students used the Internet periodically for science projects, weather-related study, and other research opportunities. However, the project staff felt that there was a need to offer more online instruction and to provide teachers an opportunity to deliver instruction using technology. The major objectives of the program included:

- determining the effectiveness of using various technologies to deliver substantial curriculum content to students;
- increasing teachers' and students' access to computers and Internet connections in their classrooms;
- increasing teachers' access to the training and support they need to effectively use computers and the Internet as a teaching and learning tool; and
- engaging students in interactive online learning opportunities.

9.2 Outcomes

Because of significant challenges in the start-up and ongoing implementation of the project, very few of the proposed project activities were accomplished during the pilot period. Site visits consisted primarily of interviewing school staff and troubleshooting challenges, and no student use of the technology was observed during the scheduled site visits. In addition, much of the data requested of the pilot site had not been received at the time of this report. Therefore, it is difficult to draw conclusions about the effectiveness or impact of the project activities.

9.2.1 Teacher Self-Assessment

Baseline data were collected from seven teachers, and end-of-project data were collected from three teachers. Initially, project staff anticipated that Softbook Readers would be used in many classrooms. However, because the Softbook Readers were not made available, only a few teachers used laptops during their classes. It should be noted that conclusions about changes in the Teacher Assessment data are limited, because the baseline and Year 2 data groups are different.

Comparing the teacher self-assessments from Year 1 to Year 2 indicates that there has been slight increase in the amount of time teachers feel technology should be used in the classroom and a significant increase in the amount of time teachers actually use technology in the classroom. In Year 1, teachers indicated that they felt technology should be used approximately 44 percent of the time, while in Year 2, the mean response increased to 60 percent. In Year 1, teachers indicated that they actually used instructional technology in approximately 25 percent of their students' instructional time. In Year 2, that number jumped to a mean response of 61.67 percent. Similarly, teachers' ratings of their own effectiveness in terms of technology use in the classroom increased from Year 1 to Year 2. In Year 1, the mean rating (on a scale of one to ten) was a 6.0. In Year 2, that number increased significantly to 9.67.

According to teacher responses, there was little change in the significance of technology's contribution to student achievement from Year 1 to Year 2. In Year 1, most teachers indicated that their use of instructional technology in the classroom contributed to substantial improvements by most students. A couple of teachers indicated that technology contributed to minor improvements by most students, and one teacher indicated that technology did not contribute to any improvements in most students. In Year 2, two of the three respondents indicated that their use of instructional technology in the classroom contributed to substantial improvements by most students. One teacher indicated that technology contributed to minor improvements by most students. None of the teachers indicated that technology did not contribute to any improvements in most students.

The factors hindering teachers in using technology more effectively changed from Year 1 to Year 2. In Year 1, teachers cited lack of computer access and wiring/slow computers as the major hindrances, followed by lack of training, no access at home for students, and program inconsistency. In Year 2, two of the three teachers indicated that nothing was hindering them from being more effective in using technology in the classroom. One teacher indicated that lack of time for teacher training was the main hindrance.

There was also slight change in the factors teachers indicated were hindering their students from making better use of technology to improve their academic achievement from Year 1 to Year 2. In Year 1, teachers reported that lack of computer access was the major factor hindering *most* of their students (4 of 7 teachers). Two of the seven respondents indicated that lack of basic skills was the major factor hindering most of their students. One teacher indicated that there was nothing hindering most students. In Year 2, one teacher indicated that different learning levels of students was the major factor hindering most of his/her students; one teacher indicated that long periods of time waiting to use computers was the major factor; and one teacher indicated that nothing was hindering most of his/her students. When asked to identify the major factor hindering a few students from using technology more effectively, Year 1 respondents again indicated access to equipment as the major hindrance (3 out of 6 respondents) for a few students, followed by immaturity and access to technology. In Year 2, two of the three teachers indicated that lack of student motivation was the major hindrance for a few students, and one indicated that lack of equal access to technology was the major hindrance for a few students.

9.2.2 <u>Student Assessment of Teachers</u>

At the beginning of Year 1, 144 students submitted responses to the Student Assessment of Teachers Involved in the Ed Tech PILOTS project. At the end of Year 2, 166 students responded to the same Assessment.

Responses indicate a slight increase in the amount of time students feel should be spent using technology in the classroom and a significant increase in the actual amount of time they use technology in the classroom. At the beginning of Year 1, student responses indicated that they felt they should be spending approximately 54 percent of classroom time using technology. At the end of Year 2, that number had risen to 60.63 percent. At the beginning of Year 1, student responses indicated that they felt they were actually using technology for just 14 percent of their class time. At the end of Year 2, that number had risen dramatically to approximately 42.27 percent. Yet, when asked how many hours they spend using computers in school during a typical week, students in Year 1 indicated an average of 4 hours per week. In Year 2, this number rose only slightly to 4.62 hours per week.

Responses indicated that students' perceptions of their teachers' effectiveness had changed somewhat during the pilot period. At the beginning of Year 1, 58 percent of respondents indicated that their teachers (those who were pilot participants) were better teachers compared to most other teachers they had in the past. At the end of Year 2, that number had increased slightly to 63 percent. In Year 1, 40 percent of respondents indicated their teachers were about the same; in Year 2, that number was approximately 34 percent. In Year 1, 2 percent of respondents indicated that their teachers were not as good; in Year 2, that number remained unchanged at 2 percent. In Year 2, one student did not respond to this question. When asked to rate their teachers' use of technology on a scale of one to ten, at the beginning of Year 1, respondents gave an average rating of 6.0. At the end of Year 2, the score had increased to 7.71.

When asked what they liked best about using technology in class, students gave a variety of responses, which changed only slightly from Year 1 to Year 2. Overall in Year 1, students indicated that they most liked using the Internet, which made information easier to access (31 percent); that computers made work easier (24 percent); and that computers helped you learn more (12 percent). Other minor responses indicated that students liked the resources/programs, that computers are fun, projects and reports, games, and "nothing." In Year 2, students indicated that they most liked that computers help you learn more (30 percent); using the Internet (25 percent); and that computers make work easier and faster (24 percent). Minor responses included that students liked playing games; keyboarding and computer skills; projects and programs; all of it; and individualized learning.

When asked what they disliked about using technology in class, responses included many issues during both years, though a few responses were most frequently given. There was also some change in the most significant student dislikes in terms of technology between Year 1 and Year 2. In Year 1, most responses indicated that not being able to spend enough time on computers was what students disliked most (23 percent), followed by the slowness of computers and Internet access (20 percent) and that computers are too complicated for students to use (14 percent). In Year 2, the most prevalent response was that there was "nothing" students disliked about computers (24 percent). Students also noted in Year 2 that computers breaking/freezing up, computers being too slow, and not having enough computers were issues (13 percent each). Eleven percent of responses indicated that computers are too complicated for students to use.

Slight changes in the availability and use of computers outside of school were noted between Year 1 and Year 2, although because this pilot did not include a home access component, this cannot be attributed to the pilot. In Year 1, 20 percent of respondents did not have access to a computer at home. That percentage decreased to 16 percent in Year 2. However, the amount of time students who had access to a computer at home actually used it for schoolwork increased from Year 1 to Year 2. In Year 1, 11 percent of the respondents who did have access to a computer at home did not use it for school assignments. This percentage dropped in Year 2 to just 4 percent. In Year 1, 52 percent used the home computer only occasionally for school assignments. This number fell to 45 percent in Year 2. In Year 1, only 37 percent used their home computer often for school assignments. This number grew significantly to 50 percent in Year 2.

9.2.3 Costs

Because many of the project objectives were not achieved, cost information for this pilot is not relevant. The core technology that was to be tested was not delivered and is not being manufactured at its originally stated cost. Most of the expenses originally planned for in the grant proposal were not incurred by the pilot, such as teacher training, administrative/clerical help, and outside evaluation resources.

9.2.4 Lessons Learned

The following are some lessons learned from this pilot.

- Technology Challenges. In the STaR Chart submitted with the original RFA, DESA was listed as "mid-tech" in terms of hardware, content, professional development, integration and use, and educational benefits; and "high tech" in terms of connectivity. Ironically, connectivity problems became one of the key challenges as teachers and students attempted to use the *eeZone* instructional materials and access information via the Internet. Connection speeds were incredibly slow, and it quickly became apparent that a major upgrade in connectivity was needed. However, again due to budgeting challenges at the district level, and the school's inability to order DSL or another option without a district purchase order, this upgrade was not able to take place prior to Year 2 of the pilot. The slow operation of the computers in the laboratory and of the laptops made taking full advantage of Bricolage's online content, and Internet content as well, extremely difficult.

- Content Challenges. Perhaps the most significant challenge of the project related to the inability of vendor Softbook Press to produce the promised 150 Softbook Readers, or to produce appropriate content to transmit through the Softbook Readers. Delivery of the Softbook Readers was delayed by the company several months. Delivery was finally slated for August 2000, just before the beginning of the 2000-2001 school year, although a few Softbook Readers were issued to the school for teacher training purposes. When the Softbook Readers did not arrive as scheduled, investigation revealed that the company was no longer producing the black-and-white model, and that new, color models would not be on the market until Autumn of 2002, too late for use in the pilot. The company has indicated that it intends to honor its commitment to the school, and the school does plan to continue the pilot project past its end date in order to use the Softbook Readers.

However, an additional concern regarding the Softbook Readers arose during the course of the pilot. Available through the company's website are numerous periodicals and books for free download. However, the majority of these resources is geared toward the adult marketplace, and are not suitable for use at the middle-school level. Additional materials are available for a fee; however, school staff indicated that the few school-appropriate materials are too costly for their budgets.

In addition, it was agreed by Softbook Press that, pending agreement from print publishers, textbooks would be digitized for delivery via the Softbook Readers. Print publisher Holt, Rinehart and Winston offered to allow Softbook Press to digitize DESA's Environmental Science text, *Holt Environmental Science*, for use during the pilot period at no charge. The caveat was that any text, photographs, or artwork that are not the property of Holt could not be digitized, as digital permissions had not been given to Holt for these items. The cost of repermissioning, which would be significant, would need to be covered by the school or the pilot. However, during discussions with Softbook Press representatives, it became clear that the company was not able to cover the cost of digitizing materials, not including permissions costs, and so this portion of the project did not proceed as hoped. Although as mentioned, DESA staff is committed to using the Softbook Readers, they continue to be concerned about the availability of school-appropriate content.

- Administrative/Management Challenges. Perhaps the most important lesson learned during the course of this pilot is that ongoing support from district and school staff and the availability of a trained staff member whose time is dedicated to administering the pilot are essential ingredients to the success of the project. From the beginning of the project, DESA staff was at an extreme disadvantage, in that the original author of the grant proposal, the district technology coordinator, left the district soon after the project was awarded. This left a huge void in terms of district support for the project. Compounding this problem, school staff encountered a great deal of difficulty in working with the district to make the grant funds available for purchase of key technology peripherals. Several times during the early stages of implementation, copies of the NOGA were misplaced at the district office, and budget line codes were activated and then unexpectedly de-activated.

  Because of the departure of the original grant author, all of the ongoing management and evaluation functions fell to school staff, who were not only extremely busy with their instructional duties, but were untrained in the management of large-scale, multi-year grants. Compounding this challenge, the school technologist left the district at the end of the 1999-2000 school year, leaving a gap in technology savvy that proved to be another significant challenge. So from the beginning of the program, school staff struggled to keep up with ongoing management and planning tasks. For example, an important early task related to the project was to review the project budget to ensure that cost allocations were accurate, and to reallocate costs if necessary, prior to the issuance of the NOGA. It took school staff most of the first semester of the pilot to provide a revised RFA in order to receive the NOGA so that funds could be disbursed. In another example, near the end of the second year of the pilot, school staff indicated in an interview that some of the laptops were broken, that the batteries were not lasting more than 20 minutes at a time, and that the laptops did not have enough memory to run all of the programs they wanted to run at once. However, when asked if Dell had been contacted regarding repair, school staff indicated that they had not.

In addition, this inexperience prevented school staff from reallocating funds in ways that might have helped address some of these management challenges. For example, school staff indicated that the field trips originally intended to be part of the grant would no longer be planned, and that although the grant originally included payment for an external evaluator, one would not be used. It was recommended that the school reallocate some of its funds to pay for part- or full-time clerical support to assist school staff in managing the grant. However, school staff opted not to make this change, and pilot management became an ongoing challenge for school staff.

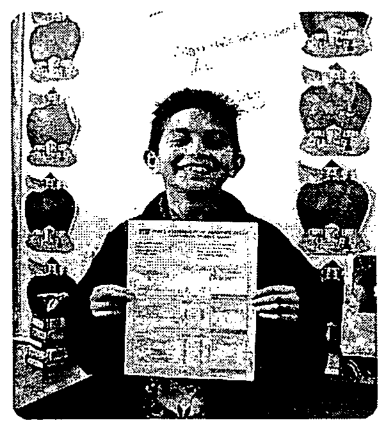
The fact that school staff did not identify a single person to be responsible for all aspects of the project compounded the challenge of inexperience. For example, the school principal was originally listed as the primary contact. However, he was not readily available via e-mail or phone. So one of the pilot teachers was then given the task of managing the grant. Toward the end of Year 2, another teacher was given the task of collecting evaluation data. However, this teacher did not complete the data collection, and this task was reallocated to the first teacher, who struggled to collect the data in time for publication in this evaluation report. Having a single person, with all or most of their time allocated to the project and with significant experience in managing multi-year grants, would have significantly reduced the management challenges that crippled the project in its early stages.

However, it is also important to note that what was accomplished during the course of the grant was due to the sheer determination and dedication of these school staff members. Despite the challenges encountered in district and vendor relationships, school staff persevered as best they could, and did accomplish some of what they had intended. They have expressed dedication in continuing the project, and anticipate receiving Softbook Readers in time for use during the 2001-2002 school year.

Chapter 10

Highland Park ISD:

Highland Park Elementary



HIGHLAND PARK ISD: HIGHLAND PARK ELEMENTARY

10.1 *Description of the Pilot*

Highland Park Elementary School is one of two schools in the Highland Park Independent School District (HPISD), a small rural district of approximately 870 students located on the east side of Amarillo. Its student population is roughly 68 percent white, 26 percent Hispanic, 4 percent African-American, 1.5 percent Asian, and .5 percent Native American. The elementary school has a student population of roughly 450 students, 55 percent of whom are economically disadvantaged. Over half of those students live in blended or single-parent families or with a relative. One-third of the fourth graders and two-thirds of the third graders are at-risk or pending.

In the Fall of 1997, Highland Park Elementary began to make a concerted effort to help its staff and students advance into the 21st century. Since that time, the primary thrust of the school's staff development efforts has been to help teachers learn to integrate technology into their curriculum. As part of that process, the school district provided a laptop computer to every teacher in 1998. Each classroom in the school has at least four student computers networked throughout the district. The Plato curriculum, which is 100 percent aligned with TAAS/TEKS objectives, is installed and networked.

HPISD's efforts to incorporate technology effectively have paid off. In 1999 Highland Park Elementary became an academically recognized school and they attribute at least part of that success to their use of technology. As the pilot began, one of the school's primary goals was to achieve exemplary school status.

Despite the school's academically recognized status, reading and writing skills were of concern. TAAS scores in these areas provided evidence of the need to address reading and writing skills. Consequently, this need motivated HPISD to seek an Ed Tech PILOTS grant from TEA.

The Highland Park program targeted students in the fourth and pre-fourth grades, giving particular attention to at-risk children. The primary emphasis focused on fourth-grade reading, writing, and technology objectives. The resources to be used were the Classworks Gold software from Knowledge Adventure and AlphaSmart data entry devices from Intelligent Peripheral Devices, Inc. (IPD).

Following training in the use of Classworks Gold, the fourth-grade teachers began to use that program to address reading, math, and language arts objectives. Similarly, IPD provided training in the AlphaSmart devices, including suggesting many ways of using them in reading and language arts.

Plans also called for carrying this project forward into the fifth grade the following year. The academic progress of the same students would be monitored and their technology and keyboarding gains would be assessed.

10.2 *Outcomes*

Thanks to the excellent leadership provided by the pilot's co-coordinators, the assistant superintendent, and principal; the dedication and hard work of the fourth-grade teachers; and the quality products and support received from Intelligent Peripheral Devices and Knowledge Adventure, the Highland Park Elementary (HPE) pilot was a success. This section summarizes the outcomes of the project as a means of illustrating that success.

10.2.1 *Goals and Objectives*

The following were the goals of the pilot:

- extend and enhance the existing student academic program;
- upgrade student technology and keyboarding skills;
- improve student achievement; and
- increase parental involvement.

All of these goals were met as described below.

Extend and enhance the existing student academic program

Classworks Gold has proven to be a significant resource. As one of the pilot co-coordinators pointed out, Classworks provides a comprehensive tool for differentiating instruction; that is, it allows students to progress at their own pace. The administrators and teachers believe that Classworks alone has enabled them to both extend and enhance the fourth-grade academic program.

However, Classworks was not the only means by which Highland Park expanded and enhanced the curriculum. A very significant addition to the learning strategies employed by the fourth-grade teachers was to develop some creative ways for the fourth-grade students to use their training and experience with the AlphaSmart devices to extend a helping hand to other students in the school. By brainstorming with other grade-level teachers, they collectively determined that they should use the fourth graders as mentors, aides, and helpers for students in the other grades. Consequently, they developed a number of innovative strategies for giving the fourth graders those responsibilities, including:

1. Help second-grade students write and publish books through their Balanced Literacy Program.
2. Write and submit news articles to the Highland Park Newsletter about school events.
3. Write reports about student field trips/activities.
4. Develop a "Seasonal Delight" Program on different seasonal projects across grade levels such as:
    - "Letters to Santa" for kindergarten students;
    - "Thanksgiving Cook Book" using family recipes, first grade;
    - "Favorite Family Traditions Christmas Book," second grade;
    - Original poetry and songs about Christmas or other holidays, third grade; and
    - Letter exchange to pals on the Internet from other countries about Christmas customs in their family, fifth grade.

Upgrade student technology and keyboarding skills

It is to be expected that when students are provided with instruction in keyboarding and given time to practice, they will develop keyboarding skills. Tests of HPE fourth graders confirm that the use of the AlphaSmarts in various ways did enable these students to develop keyboarding skills. All three fourth-grade teachers tested their students at the beginning of the year to obtain a baseline measurement of their students' keyboarding capabilities. On these baseline tests, the average student words per minute (WPM) score for all three classes was approximately six WPM. As students progressed during the year, their skills improved as illustrated by the fact that tests taken later in the year revealed an average for two of the fourth-grade classes that exceeded 21 WPM, while the average for the third class exceeded 27 WPM. In fact, 100 percent of fourth graders improved their keyboarding skills.

On several occasions the fourth-grade students were observed using the AlphaSmart devices in class. During every observation all the students were engrossed in the learning activity underway and seemingly oblivious to the fact that observers were present. On one such visit when students were asked what they were doing, they responded that they were writing a summary of the things they did over the past weekend. During that visit, students at the table where this question was posed not only described their activity but also proudly informed the visiting consultants that on a recent keyboarding test, their scores had ranged from 32 to 48 words per minute. Obviously these students were realizing significant gains in their keyboarding skills.

Improve student achievement

Highland Park Elementary teachers and administrators believe that when technology is used effectively in the classroom, student achievement improves. As indicated above, HPE attributes its becoming an academically recognized school at least in part to its use of technology. This belief was further reinforced by the school's experience with its Ed Tech PILOTS.

Although it is not possible to prove conclusively in only one year that the use of technology in a pilot such as this will, in fact, improve student achievement, the results HPE experienced seem to suggest that given more time, student achievement would indeed improve. One indicator of that potential is the fact that in one of the fourth-grade classes, both the math and language arts grades of 17 of the 19 students increased over the grades they received during the corresponding third-grade semester. There is a high probability that the use of Classworks Gold was the most significant contributor to these increases, especially to the improvements in math scores. Classworks Gold probably also contributed to the increases in language arts as well, as did the use of Accelerated Reader, a reading program that HPE has been using for a year or two.

Indicative of the problems with conducting a pilot for such a short time is the fact that in the other two fourth-grade classes, there appeared to be no significant effect upon the grades of students. For the most part the language arts and math grades of the students in those classes remained about the same or were slightly above or below the corresponding grades they received in the third grade. Thus, although these students also used Classworks Gold, and according to the teachers their students were also deeply engaged by the software, there seemed to be very little impact on grades.

While the impact of the technology resources was mixed with respect to grades, the impact seemed to be more favorable on TAAS scores. A majority of the fourth-grade students scored higher in math and/or reading than they had scored in the third grade. Overall, 38 of 52 fourth graders scored higher in reading and/or math than they had scored in the third grade. These results were about the same across all three classes.

The most significant results came in the area of TAAS writing scores. In fact, because writing scores had been low, a primary reason HPE applied to participate in this pilot was to facilitate the acquisition of AlphaSmart devices to help improve writing skills, and thereby raise TAAS writing scores. The results reflect that 97 percent of fourth-grade students passed the TAAS writing test, and TAAS fourth-grade writing scores increased from 90 percent to 97 percent passing. Moreover, Hispanic student scores increased from 88 percent to 100 percent passing, and economically disadvantaged student scores increased from 86 percent to 96 percent passing.

Although one year is not a long enough test to achieve definitive results, the initial outcomes are positive. Teachers and administrators agree that the Classworks software and the AlphaSmarts are tools that can contribute significantly to learning. Classworks in particular can be a very powerful resource when the teacher is well versed in its capabilities. It is unfortunate that the pilot cannot be officially continued for a longer period, because after a year's experience with Classworks, the participating teachers became quite proficient in its use, which suggests that the results from a second year might be considerably more significant.

Increase parental involvement

Increasing parental involvement has been a constant priority for HPISD. With the introduction of technology, Highland Park Elementary began to experience some real successes in this area—but only after first implementing some creative approaches. For example, they learned that when they offered snacks during evening gatherings, parents were much more likely to attend. In fact, they found that a number of families used the snacks offered at the event as their evening meal.

Given this propensity on the part of parents, they began to capitalize on it by conducting "Muffins with Mom" and "Donuts with Dad" sessions and other similar events in the evenings to attract parents to orientation and training meetings. As a result of these efforts, they have realized a much greater level of parental involvement.

10.2.2 Accomplishments

As described above, the Highland Park Elementary pilot succeeded in enhancing its academic program, upgrading its student technology and keyboarding skills, improving student achievement, and increasing parental involvement. Thus, because it achieved its goals, it can be deemed a successful pilot. However, even more was accomplished.

A comparison of the baseline teacher self-assessment responses to the end-of-pilot responses reveals that the two teachers who were with the program from its beginning believe their proficiency in using technology increased during the pilot. The third teacher rated herself highly at the conclusion of the year; however, since she was not on the staff at the end of the previous year when the project was initiated, baseline information for her was not collected. These gains were further confirmed by the results of the teacher survey, which reflected that the two who had been with the program from the start had progressed and that all three teachers were quite advanced in using technology.

One reason these teachers were relatively advanced technology users was that the school district had provided them with a laptop computer and encouraged them to use it. This allowed them to become comfortable using the technology, which in turn enabled them to gradually increase their proficiency. A second reason these teachers were more proficient than most others is that, during the pilot, they participated in considerably more staff development than they had the previous year. For example, two of these teachers had participated in 33 hours of staff development during the previous year, but during the pilot they participated in 48 and 60 hours. The third teacher had had 39 hours of staff development the previous year, but participated in 107 hours during the pilot. Therefore, by having a laptop computer available for use at any time and by participating in substantial amounts of staff development, it is not surprising that these teachers became proficient users of technology.

Other positive accomplishments resulting from the pilot include the following:

- The positive experiences with the AlphaSmarts in the fourth grade led to the acquisition of additional devices for use by other grades. By using funds from another grant, AlphaSmarts were made available for use by students in all grades PK-5. In addition, all teachers were trained in the use of these devices.

- The acquisition of digital cameras, projectors, and smart boards through the grant provided additional technology resources to participating teachers. During the course of the grant, teachers became quite proficient in using these devices as a means of enhancing learning experiences for their students.

- The pilot enabled Highland Park Elementary to build on its "technology cadre" concept, which is a strategy for providing technical support to teachers. The school had already established a cadre of teachers who were willing and able to help their colleagues resolve technology problems when they arose. A cadre member resided in each wing of the building, thereby making them more easily accessible when their help was needed. Through the additional training available by the grant, these teachers became even more proficient at providing technical assistance.

- The training offered to pilot participants and other teachers generally followed a strategy they had previously developed, which essentially limits training sessions to one and one-half hours. Their experience has been that longer sessions have not been as productive. The training associated with the pilot reinforced this approach and helped to institutionalize it.

Given the successes experienced by the pilot, it is not surprising that HPISD intends to find ways to sustain the pilot. Indicative of this intent is their use of other grant funds to acquire additional AlphaSmarts.

10.2.3 Vendor Support and Product Reactions

A critical aspect of successfully carrying out the pilot projects was the level of support each pilot received from their vendor partners. Just as the original requirements for participation specified that vendors would supply their products at no cost, they also required that vendors provide training in the use of the products and technical support. Despite this requirement, as might be expected, some vendors were much more supportive than others. Generally, HPISD's experiences with their vendor partners were very positive.

AlphaSmarts – IPD

From the beginning, HPISD's experience with IPD and the AlphaSmarts was most favorable. The training of teachers was very effective and included more than just instruction in how to operate the devices. The trainer provided a wealth of information about how to employ them in various reading and writing learning activities. The units proved to be so reliable that no problems arose that required a call to the IPD support site. Given this experience, it is not surprising that HPISD chose to acquire more AlphaSmarts.

Classworks Gold – Knowledge Adventure

All three fourth-grade teachers were very pleased with Classwork Gold as a learning tool. As one of the teachers said, their students "don't realize they are learning" because they enjoy the learning activities so much and are so engaged by the software.

Even though a few problems were encountered with the Classworks Gold software, Knowledge Adventure generally was quite responsive in providing the support necessary to resolve those problems. Based on their responsiveness, HPISD also considered Knowledge Adventure's support to be very good.

To summarize that support, Knowledge Adventure's training was excellent. Although the teachers using the system believed even more training would have been helpful, they were very complimentary of the training and the follow-up that was provided.

The technical problems HPISD encountered were primarily compatibility problems. For example, the Classworks Gold software seemed to have problems interfacing with Fortress, HPISD's Internet filtering software. However, the vendor's technical personnel spent considerable time interacting with HPISD staff to rectify the situation. Ultimately, satisfactory solutions to all these compatibility problems were found.

10.3 *Costs*

If it had been necessary for HPISD to pay the full price of the pilot, the following are costs that would have been incurred:

- For the acquisition of the Classworks Gold software and the associated training, the cost would have been $99,000.
- For the AlphaSmarts acquired for the pilot and training in their use, the cost would have been approximately $6,000.
- To contract with language arts curriculum experts to assist in curriculum development, the approximate cost was $3,500.
- The project coordinators estimated that another $2,000 was expended on supplies necessary to carry out the pilot.

The project coordinators emphasized that in addition to these out-of-pocket expenses, considerable staff time must be allocated to provide the training and support necessary to ensure successful implementation and operation of such a program.

10.4 *Lessons Learned*

As is always the case when a project such as this has been completed, participants are able to identify a number of things that, if done differently, would have made the pilot even more successful. For HPISD, those lessons learned included:

- While the training provided by Knowledge Adventure was very good, the software is so comprehensive that teachers believe they would have greatly benefited from additional training.

- By the time the school year came to a close, teachers had received so much exposure to Classworks Gold that they were much more proficient at integrating it into their curriculum. They believe that if the pilot had been extended another year, even greater benefits would have resulted.

- Despite the fact that Highland Park Elementary established a cadre of teachers who were charged with providing technical support to fellow teachers in their wing of the building, the coordinators of the pilot felt that they should have provided every teacher with some basic troubleshooting training. Such training would have significantly strengthened their technical support.

- The fourth-grade teachers concluded that the introduction of keyboarding would be better placed in the third grade. They felt that the necessity of teaching keyboarding took away from their teaching of other basic skills. Of course, offering keyboarding in the third grade might cause third-grade teachers to recommend it be placed in the second grade for the same reasons. Thus a key issue for a school or district contemplating implementing a program such is this is to judge where best to introduce keyboarding.

10.5 Conclusions

In addition to the lessons learned described above, at least one conclusion can be drawn from the experiences of the Highland Park Elementary pilot that relate to the overall objectives of TEA's Ed Tech PILOTS Project.

Based on the comments of the co-coordinators and the fourth-grade teachers who participated in the pilot, Classworks Gold is a comprehensive product that does deliver substantial curriculum content to students. They believe it enabled them to considerably enhance their academic program, and they attribute a good portion of the gains in TAAS scores to that product.

Chapter 11

Hillsboro ISD:

Hillsboro Junior High School

HILLSBORO ISD: HILLSBORO JUNIOR HIGH SCHOOL

11.1 Description of the Pilot

Hillsboro Junior High School is the only middle school in the Hillsboro Independent School District. The school population fluctuates between 400 and 450 students in grades 6-8. The population of the school is diverse, including 31 percent Hispanic students, 25-27 percent African-American students, and 75 percent students of low socioeconomic status. The school reflects its larger community, a close-knit, rural town.

In terms of technology, Hillsboro Junior High School can be described as a high-tech school. Before the start of the pilot, the school had a fairly large and advanced server, a teacher's computer in every classroom (for the last five years), Internet connection in every classroom, a few student workstations in some classrooms, and two computer labs of approximately 25-30 computers each. HISD staff felt that their teachers and administrative staff members were highly proficient in the use of technology. They have been required to use electronic grade books for several years, in addition to e-mail and a variety of applications to prepare for and deliver instruction. Students were also quite proficient in the use of technology before the beginning of the pilot.

The goal of Project LAPlink (Laptops And People Linked) was to infuse the school with wireless laptops and multidisciplinary content, to be used to develop interdisciplinary, extended projects. The project also provided access to school and Internet resources to students while they are at home through a "checkout" program. Parents of students who wanted to check out laptops were required to attend training sessions and to sign agreements to ensure that the laptops would be well cared for. Students had additional opportunities to extend their technology learning outside of school through summer science camps that would use the technology to help students study in-depth science topics. Students will also use the laptops to provide technology training to residents of a local assisted living facility.

Year 1 activities targeted seventh-grade students. In Year 1, the school purchased a classroom set of 25 laptops, anchored to a movable cart in which the laptops are charged. In addition, TEKS-aligned content was donated by Knowledge Adventure and installed on the school's server. The goal was for students to use this content both in the school's computer labs and through the wireless laptops. However, due to the size of the software files, and the laptops' and school server's connectivity limitations, the Knowledge Adventure software could not be accessed outside the school computer lab.

The key goals of the project were to:

- move current electronic science curricula from innovative to ideal;
- provide students opportunities and innovative tools to communicate through electronic writing projects and interdisciplinary (Science and Language Arts), independent study projects;
- extend student access to curriculum content and resources outside the school day and beyond the four walls of the classroom via technologies (laptop check out system and Summer Science Technology Camp);
- give teachers the means to successfully implement all of the innovative tools and strategies (just-in-time training);
- encourage parent participation (meetings, compacts, communications);

- provide students with opportunities to demonstrate Technology Application proficiencies;
- provide mobile access to the network from anywhere in the building and access from home; and
- create a custom learning path through technology-based resources for ALL students.

11.2 Outcomes

Data on the progress of the pilots were obtained from a variety of sources, including surveys, student and teacher performance data, and periodic site visits.

11.2.1 Student Performance Data

Disciplinary Infraction Data

No significant change in the number of disciplinary infractions was recorded by the school between Year 1 and Year 2. In Year 1, the school reported a total of 159 disruptive behavior infractions. In Year 2, the school reported a total of 173 disruptive behavior infractions.

Semester Grade Data

Semester grade analysis indicates no significant increase or decrease in student grades in the two subject areas addressed by the pilot—language arts and science. In Year 1, the average grade for language arts students was 84.52. In Year 2, the average grade was 83.10. In science, the average Year 1 grade was 86.86. In Year 2, the average grade was 87.56.

TAAS Data

TAAS Data for 2001 was not available at the time this report was written. However, there was no significant increase or decrease in Math TAAS scores from 1999 (prepilot) to 2000 (Year 1). In 1999, the average Math TAAS score for students was 85.17. In 2000, it was 85.10. There was a slight drop in Reading TAAS scores from 1999 to 2000, from an average score of 88.10 to an average score of 83.84.

Attendance Data

There was no significant change in the mean number of days absent between Year 1 of the pilot project and Year 2. During the 1999-2000 school year, students in the pilot project had an average of 2.37 days of unexcused absence. During the 2001-2002 school year, students had an average of 2.00 days of unexcused absence.

11.2.2 Observations

Pilot staff observed classrooms at Hillsboro Junior High School several times over the course of the 1999-2000 and 2000-2001 school years. Preliminary observations showed that installation of both the EarthWalk wireless laptops and the Knowledge Adventure software went smoothly. In fact, the consultant who installed the software felt it was one of the smoothest installations he had done. He attributed this to the preparation done by school staff, in terms of ensuring that the server capacity and connectivity were adequate for the content. He also felt that it was important to run through the installation of the software with the school technology specialist, then observe as the technology specialist completed the installations on additional machines. This helped the technology specialist form a strong working knowledge of the basics of the software, which facilitated on-site troubleshooting in the future.

Although some problems were experienced with the bandwidth of the wireless laptops, students were able to start up and work with them. A high level of excitement was evident, as students worked through the basic operating features of the laptops. In fact, students seemed to want to leap ahead of the teacher's instruction on certain topics. Later, in a reading classroom, the teacher and students worked through a PowerPoint presentation that provided an overview of the project. Again, students were extremely excited about the project. In this case, the students even seemed more confident in their knowledge of the software than the teacher did.

During the course of the pilot, observations indicated that students became much more self-directed in their learning and increased their time on task. By the end of the second year, students were able to come to class and begin working on their research projects immediately, with little or no teacher direction. The noise level decreased—students were staying very focused on their research. Students also naturally came together in pairs or small groups to compare notes and make suggestions for finding good research sources. The classroom talk became more learning-centered, rather than social. In fact, by the end of the class period, students were reluctant to leave their research projects, and the teacher had to remind them that it was time to leave and go to their next class.

Teachers also appeared to become much more comfortable throughout the pilot, both in terms of using the technology itself and in terms of allowing students to direct their own learning. The school technology coordinator agreed, stating that she has seen an incredible change in teachers in terms of operator confidence. She used to have to be with teachers in the classroom every day. Now, at the end of the pilot, she spends more time researching helpful information and providing it to teachers to use themselves.

11.2.3 <u>Impact on Students</u>

One of the primary and immediate impacts of the pilot project was that students became more self-directed in their learning. Even from the start of the pilot, students took great pride in their selection to participate, and this pride inherently motivated them to be responsible with the technology. Students almost immediately began exploring the capabilities of the laptops and software on their own, and even pushed teachers to take them further with the technology.

Interviews with students indicated that despite frustrations with slow or broken equipment, they prefer using a technology-based approach to learning. They find class more interesting because they can use different programs to build their own products. They also like the ability to relate classroom concepts to current events information—it makes school seem relevant to their lives. The school principal indicated he finds that students have become more interested in topics they have never shown interest in before. For example, they became intensely interested in keeping up with the changing results of the 2000 presidential election, and they show more interest in learning about statistics related to their lives. Teachers echoed this observation, indicating that, especially for students who simply do not like to conduct research in books, technology provides a highly motivational alternative.

There has also been a significant impact on students' confidence level, and thus their motivation to learn. Many students have become peer tutors. As one teacher described it: "If they know more than their neighbor, they are more willing to share their knowledge."

District staff also feels that this project has had a significant impact on special populations. First, the availability of laptops for checkout provided increased learning opportunities for students of low socioeconomic status. In addition, as students learned to direct their own instruction, teachers have spent less time on remediation with special needs students. Thus, the self-confidence and motivation of special needs students increased as they learned to take more ownership of and pride in their learning. For example, even early on in the project, the school principal described a low-level reader who was considered to be an at-risk student. The principal recently observed the student giving a PowerPoint presentation to his class. The confidence he observed in the student was overwhelming. One teacher indicated that a student in danger of failing had produced more research note cards for his interdisciplinary project than any other student. These students are having light-bulb moments with amazing frequency. Teachers indicate that students who never turned in written work before are submitting work using the computer. Teachers feel that the use of the technology in class has caused formerly unmotivated students to think, "Maybe school is not so bad."

The pilot project has also helped special needs students acquire real-world skills. The technology coordinator indicated, "They're going to have to get a job someday." The skills they learn using the computers will benefit them later in life. And teachers' grading rubrics are written to encompass these students who may not be able to produce stellar work on the computer, but can operate it well. As one teacher indicated, "Even my kindergarten-level student can turn on a computer and open an application."

Of course, a significant challenge is handling student frustration when the technology does not work the way it should. Teachers indicate that as attentive and focused as students are when they are using the technology effectively to complete their work, they can become unfocused and begin to be disruptive when they are not able to use the technology effectively because of computer malfunctions. During the initial implementation period, students experienced frustration with the technology, which was often slow or unable to connect to the school server due to bandwidth issues. However, by the fall semester of Year 2 of the pilot, the students had become more patient with the eBuddies, and were less frustrated with their slow speed. According to the school technology specialist, students seemed to understand technology better. Students were also eager to take the eBuddies home, and began seeing more uses for the eBuddies. Teachers felt that time was the key factor in resolving this challenge. The more students used the technology, the more they understood it. One of the teachers provided an apt analogy: "If you only play basketball once a year you're not going to be very good."

11.2.4 Impact on Teachers

The pilot project has had a significant impact on teachers in a variety of areas, including instructional content, processes, personnel, and training.

Prior to the commencement of the pilot project, teachers were somewhat isolated from each other, teaching their course-specific content without a great deal of interaction. One of the primary goals of the pilot project was to enable technology use to naturally stimulate more interdisciplinary class work. To achieve this, school staff created six cross-curricular projects for students over the course of Year 2. Each project included a language arts, science, and technology component. For example, for one project students used the Internet and Microsoft Excel to research and graph genetic traits for the science component; used prewriting software to create an outline; then used Microsoft Word to publish an autobiography and an "I Am" poem for the language arts component. In another project, students researched two topics and used HyperStudio software to develop a comparison/contrast presentation. These projects not only provided authentic learning experiences for students, but helped teachers across disciplines to work as an instructional team. Teachers have become interested in each other's work, and this is motivational for all. As the principal indicated, "The teachers like having someone else interested in their subject." Another benefit of the increased collaboration between teachers for this pilot is that content, as a whole, has become naturally spiraled."

The pilot also changed teachers' position in the classroom. With the infusion of technology, teachers were no longer able to hold back students until everyone was at the same level of competency. They needed to let more advanced students push forward while others focused on the basics. Though this was certainly uncomfortable, it yielded excellent results, as students not only were motivated by this freedom, but also began helping each other with more complex tasks. An excellent example of a successful coping strategy was given by a teacher who came to the school in the middle of the pilot. She told students that she was learning right alongside them, and when she encountered a problem with the technology, she would ask, "Who's my expert?" This was highly motivational for students, and enabled the class to continue as problems were quickly solved by the students.

In terms of instructional content, Hillsboro Junior High School staff indicated that the TEKS have always been the center of classroom instruction. The pilot did not represent a significant change in that respect. However, school staff did indicate that they have worked to incorporate the Technology Application TEKS into the instructional content of classes in all subject areas. In addition, the pilot enabled teachers to incorporate more content based on current events into the classroom. The resulting learning environment was inherently motivational to students, and enabled them to make connections between abstract concepts and real-life applications.

11.2.5 Impact on Administrators

The pilot also had an impact on the school principal. He indicated that he spends more time in the classrooms in which the pilot is taking place because he is so interested in what is going on. One teacher indicated, "It's great, because when he comes in, the students are on task." In addition, he has become involved in the day-to-day class work of students, because he is able to access much of it from home, rather than at school, where he usually spends most of his time on administrative tasks.

The principal did indicate that he had to shift his perception of good classroom instruction during the course of the pilot. He came into the project used to a high level of order in the classroom. During the implementation of the pilot, classrooms have become much more fluid and student centered. It has been a challenge for him to accept a new style of classroom management and trust that students are actually working independently with a purpose. However, the changes that he has seen in his students have helped him realize the benefit of this different approach. In addition, he appreciates the fact that discipline problems have dropped considerably in the pilot classrooms.

11.2.6 Impact on Families

Even from the start of the program, the pilot had an impact on parental involvement. Because students would be responsible for an expensive piece of equipment, parents were required to attend an orientation session. The school principal indicated that, following the initial parent training sessions, several parents asked for additional sessions so that they could be sure that their children would be eligible for participation. On an ongoing basis, having the laptops available for checkout also enabled parents to be more easily and regularly linked to their children's schoolwork. In addition, parents attended an open house, at which students provided "5-minute quick-tip training" to parents on a variety of technology topics.

In addition, the LAPlink project was designed to stimulate community involvement. Although the school was not able to meet its timeframe as aggressively as school staff had hoped, plans were underway to provide computer training for elderly community residents. Students from the school will take the wireless laptops to an assisted living community and teach its residents how to use the Internet, e-mail, and other software programs. This activity will complement a community grant that was recently awarded in Hillsboro to establish community technology centers.

11.2.7 Technology

Obviously, the most significant change in technology at the school was the addition of student laptops and the software. The school initially felt it would not need to make any significant changes in terms of connectivity or server upgrades, although school technology staff realized they would need to increase the capacity of the school's server. In addition, the school investigated signing up for a free e-mail system that would allow students to have individual e-mail accounts, and by the completion of the pilot, this objective was achieved. School staff also planned to provide student login access to the HISD intranet.

It was a challenge during the implementation of the pilot to keep the laptops up and running. Initially, the two-hour charge life of the laptop batteries had been an issue. The vendor came out with a new five-hour battery, which quickly alleviated the problem. In the fall of 2000, Hillsboro began discussing upgrades to the laptops with EarthWalk Communication, since the bandwidth and RAM of the laptops was not sufficient to accommodate simultaneous use by many students. Upgrades were scheduled to occur between Thanksgiving break and the beginning of spring semester. While students did not have access to eBuddies during that time, the computer labs were blocked off at certain times for students in the pilot to finish their projects. Upgrades included bigger screens, an addition of 128 RAM to the current RAM, and an increase to a 500 megahertz Intel Celeron processor. Reports from the pilot site indicated that these upgrades have substantially improved the performance of the laptops.

The pilot staff indicated that the communication with and responsiveness of the eBuddy vendor, EarthWalk Communication, has been fantastic. During the course of the pilot, a representative from the company visited the school several times to see how the laptops were being used and how they were withstanding that use. Thus, the school has had a great deal of input into the development of the company's next generation of laptops. School staff classifies this cooperative arrangement as an excellent example of vendor and district partnerships. In addition to the school receiving the benefit of EarthWalk's close attention, EarthWalk has learned a great deal about how laptops need to be constructed in order to be successfully used on a daily basis in schools.

In addition to upgrades needed for the pilot technology, after its initial installation Hillsboro staff realized that they would need to purchase additional peripherals in order to make full use of the laptops. The pilot team reviewed its inventory of peripherals and determined what more they needed. Based on their needs, they reduced the number of certain peripherals and reallocated those funds to purchasing peripherals or funding more training. For example, while they had budgeted for eight digital cameras, they decided that five were sufficient. However, they increased the number of external CD-ROMs by three—one for the science classroom, one for the language arts classroom, and one for the computer lab—to accommodate a portfolio project they planned for students to complete. They also opted not to purchase assistive technology, since they found that no eighth-grade students participating in the pilot would be served by assistive technology. They replaced these items in the budget with two new printers, three Quick Cams, five scanners, more batteries for the eBuddies, a class set of headsets to help classroom management, and two microphones.

Pilot staff anticipate several challenges in keeping up with the new technology once the pilot has concluded. They expect an increase in the demand to use laptops, since the pilot classes have been so successful. There is concern that the existing technology cannot be stretched to serve the entire school, and that funds will need to be found to increase the number of available laptops. In addition, keeping up with ongoing maintenance and training costs will be a challenge.

11.2.8 Content

In addition to the development of new instructional content by teachers using current events information from the Internet, Hillsboro acquired Knowledge Adventure's Classworks Gold series of software. The original project plan included student use in the computer lab setting, as well as access during and outside of class time using the wireless laptops. However, the software was so large that it was virtually impossible to access it successfully with the limited bandwidth of the laptops. Despite this issue, the school found the software to be extremely beneficial to students, and has indicated that its relationship with Knowledge Adventure representatives has been positive, from initial installation throughout the pilot. School staff indicates that the initial training provided by Knowledge Adventure was excellent, and that the vendor has been extremely responsive to questions throughout the pilot.

11.2.9 School, Classroom, and District Management

Pilot activities impacted several aspects of classroom management. For example, students' work was kept in electronic portfolios. District staff felt that this made it much easier for different school staff to access the work which proved especially crucial for projects graded by multiple teachers. In addition, school staff envisions that in the long term, student work will be more cumulative than it is in paper form. For example, as the pilot expands, students may be able to keep a portfolio that covers grades K-12, instead of just a few years. This will provide teachers, students, and parents with a better sampling of products, and may make these portfolio items a more important part of ongoing assessment.

Teachers already used computers for most of their classroom management tasks before the commencement of the pilot, so this was not a significant change. However, having all school staff use technology consistently for such management tasks as grading, attendance, interoffice correspondence, has made life easier and reduced the paperwork load. The school has created a central site for teachers to place their electronic lesson plans, which makes accessing the plans much easier for all school staff. In addition, district staff noted that laptop checkout was handled by the school technology specialists, not by teachers, so that aspect of the pilot did not significantly impact classroom management.

Two significant changes in district management had to take place during the implementation of the pilot. Before the pilot, students were not allowed to use e-mail in school. This was not a formal policy, but it simply had not been done before. The pilot has established an e-mail account for each student, and so this informal policy has had to change. Pilot staff indicates that those students who never had e-mail before seem to handle themselves much better than those who have it at home. The system is highly filtered, so that school staff can immediately become aware of inappropriate use. Thus far, only nine out of 150 students using the e-mail system have had blocked messages. District staff indicates that they have had to develop consequences for abusing the e-mail system, much like the consequences for abusing textbooks. Students are beginning to realize that if they abuse the system, there are consequences. District staff also indicated that using the e-mail system has put them in a position to teach ethics as well as discipline.

11.2.10 Costs

The core costs for implementing the pilot would be as follows, had it been necessary to pay for the pilot:

- For the EarthWalk eBuddies, the cost would have been approximately $23,000. Insurance cost was $90 for 24 laptops.
- For the Knowledge Adventure Software, the cost would have been roughly $101,000, including training costs.
- For the Microsoft Office Professional software, the cost would have been roughly $920. The district also purchased 24 Microsoft Office Premium Licenses, which cost roughly $1,500.
- For technical support (one tech support person for 50 percent of their time for two years), the cost would have been roughly $28,000.
- For administrative payroll (e.g., project director, clerical assistance), the cost would have been roughly $22,785.
- For substitutes (during teacher training), the cost would have been roughly $1,310.
- For extra duty pay (for teacher training), the cost would have been roughly $8,475.
- For professional and contracted services (e.g., for training), the cost would have been roughly $1,375.
- For general supplies, including extra peripherals (e.g., headphones, power adapters, CD writers), the cost would have been roughly $33,000.
- For travel costs (e.g., to regional conferences), the cost would have been roughly $6,600.
- For field trip expenses (for the summer science camps), the cost would have been roughly $200.

11.2.11 Lessons Learned

Hillsboro staff indicated that the pilot has been an excellent way for them to experiment with technology in the classroom, and have learned some valuable lessons. If they had the chance to reconceptualize and implement the project, knowing what they know now, they would not have made many changes. One thing they would have changed would be the timing of the project, starting the pilot at the beginning, rather than in the middle, of the school year. Of course, the timing of the award of the pilots was the significant factor in this instance. Because the project had to start late, its implementation conflicted with TAAS administration. In addition, several of the supplies that district staff had hoped to purchase to assist in data collection (e.g., software for data collection), could not be purchased when they had hoped, which further delayed the project. Beginning a pilot by training teachers over the summer would provide for more training and planning time, and would diminish the loss of knowledge over the summer months.

In terms of advice for schools considering implementing a similar project, Hillsboro staff highlighted several key strategies that led to the success of the school's project. For example, although not included in the original proposal, HISD staff held a planning retreat to plan for the implementation of the pilot. The district's curriculum coordinator indicated that this meeting was crucial to ensuring a well-planned project, and significantly contributed to the smoothness of installation and implementation. In addition, district staff indicates that there has been much more ongoing staff collaboration than anticipated. Key project staff meets at least once per week to discuss current and future activities. This planning time is crucial, both at the start and throughout the process.

Staff members also commented that the initial installation was easier than expected, and they felt that this could be attributed to the readiness of their infrastructure to receive the technology. Because the school server was adequate, the software was installed quickly and efficiently, and has been used with few problems except in relation to the limitations of the laptops. In addition, vendor participation was a key to smooth installation. Because the software product has been in existence for a long time, installation processes were almost totally automated, making the district's tech support smoother. The software installer also made sure to show the tech support staff how to run the installation, then observed the tech staff actually performing several installations. This approach ensured that the tech staff was better able to troubleshoot on an ongoing basis. The only glitch in installation is that HISD did not receive the laptop power cords (for home use) from the vendor as quickly as they anticipated. However, this was not a major stumbling block, as parent training was still ongoing at the time.

HISD staff members also emphasized that coordination of multiple school and district initiatives is essential. This coordination is important not only because it optimizes every technology dollar, but also because it ensures a unity of focus within staff members. Staff members indicated that a previously awarded TIE grant provided the technologies to pave the way for this Pilot Project, because it brought new technology and curriculum into the school. Over the course of the TIE grant project, staff began to see very clearly where their deficiencies were in terms of technology and training, specifically in supplementing classroom technology with more student technology. School and district staff did note that the Ed Tech PILOTS project grant was extremely timely because their TIE grant was a one-year grant. Typically, grants are awarded for several years on a sliding scale; for instance, full funding in the first year and reduced funding for several years thereafter. This arrangement allows the district to react to how the grant is going in the first year and make adjustments. The PILOTS project grant allowed HISD staff to extend their original TIE grant concept.

HISD staff members also noted the critical aspects of teacher preparation and staff development. In terms of staff development, HISD staff indicated that although it is impossible for all teachers to begin such a project with a complete knowledge of every aspect of the hardware and software, teachers must begin with enough expertise to at least move students in the right direction, even if they may not be able to answer all of the students' questions. Project staff must also help teachers understand that technology is inherently motivational to students and accept that students will move forward at a very fast pace. They must accept a loss of control to some extent, so that students are not held back.

HISD staff acknowledged that Hillsboro Junior High School is a small school. Scaling the project up to a school with a larger student population may present difficulties in procedural uniformity. For example, all teachers must be extremely well-versed and consistent in their laptop check-in and checkout procedures. With only a few teachers participating, this is a relatively simple task. In a larger school, it may require more supervision, such as a building team leader, as well as grade-level team leaders, to make sure that information about procedures is disseminated quickly and uniformly.

HISD staff also noted that in terms of laptops, it was more important than they originally thought to have spare laptops on hand. Even in the first month of implementation, the school had to have some eBuddies repaired, and especially during that early learning stage, it is important that all students be able to have access to a laptop during class time.

HISD staff stressed that it is extremely critical to have someone coordinate the technical and administrative aspects of the project, and to find ways to diminish the responsibilities teachers must assume in relation to the technology implementation. The person coordinating the project has to be a cheerleader. Project staff noted that, "Any time you approach teachers with another responsibility, there will be some for and some against." Having unified support from a central project manager, from district staff, and from the school principal helps teachers get on board.

In addition to simply providing technical support, HISD felt that it was also important to provide ongoing and just-in-time instructional support to teachers. Having the campus technologist available to teachers to help integrate technology into instruction and to help plan the interdisciplinary project was a key ingredient in the success of Hillsboro's project.

One challenge that seems to be out of the control of project staff, but one that will face any school affecting this kind of change, is what will happen to students once they leave the school. For example, this pilot project began with seventh graders during the 1999-2000 school year, who were eighth graders this year. These students will be moving to high school next year, and school staff indicates concern that the high school teachers will not be ready for students who are accustomed to using technology for a significant part of class time.

Chapter 12

Johnson City ISD:

L.B.J. Middle School

JOHNSON CITY ISD: L.B.J. MIDDLE SCHOOL

12.1 Description of the Pilot

L.B.J. Middle School (LBJ) is part of the Johnson City Independent School District (JCISD), which has approximately 660 students. LBJ Middle School serves about 200 students annually, which includes a student population of 21 percent Hispanic and 79 percent white. Fifty-eight percent of the students are economically disadvantaged.

LBJ's pilot focused on improving student achievement. The purpose of LBJ's pilot project was to offer students access to several selected computerized curricula before, during, and after school through a structured goal-oriented program.

The students targeted for participation in the pilots were at-risk seventh and eighth graders, which included special education, minority, and low socioeconomic students. The LBJ pilot staff decided to track two student groups to gain a better understanding of the impact of computer-delivered content. The two groups consisted of the 1999–2000 seventh graders going on to eighth grade in 2000–2001 and the 2000–2001 seventh graders.

Students used the desktop computers that were already in place at the campus. LBJ provided the following technology resources to every classroom:

- T1 Internet access;
- dial-in Internet access;
- a four-to-one student-to-computer ratio;
- all computers networked through a fiber optic backbone; and
- a variety of instructional peripherals.

The LBJ pilot staff selected three vendors: NetLibrary, Glencoe/McGraw-Hill, and Decision Development Corporation. They believed these vendors were the best qualified to their targeted population in the curriculum areas of science, social studies, and math. LBJ collaborated with Glencoe/McGraw-Hill to provide anytime, anywhere learning opportunities in mathematics. The school used Decision Development Corporation's resources to support science and social studies. The school also intended to use NetLibrary e-books (an electronic version of a print book); however, challenges in obtaining the publisher's permission to publish the content on-line prevented the use of these products.

Glencoe/McGraw-Hill and Decision Development Corporation provided software training to the seventh and eighth grade teachers in the spring of 2000. A small subset of new teachers to the district received training during the fall of 2000. Glencoe also provided LBJ with additional software for the sixth-grade students who were not part of the grant.

The project also allowed the LBJ teaching staff to complete 100 hours of technology training centered on the examples and suggestions from the CEO Forum's STaR Chart.

Build self-esteem of the targeted student population through academic success

LBJ was also committed to building self-esteem and confidence among the targeted student population. Using the grant, the computer lab at LBJ was kept open after school to extend the amount of time pilot students would have access to the resources. The project coordinator and school staff reported that as students learned more about the technology, their self-confidence soared. Some at-risk students were even allowed to work with just the software, since they seemed to participate more behind a computer. School staff also saw improvements in the quality of work the students submitted, such as PowerPoint presentations instead of book reports. Because of the effect on these types of students and their work, LBJ is looking into buying courseware and setting up the computer lab for all students who have problems learning in a classroom environment. Observers noted that LBJ students had an eagerness to help each other and stayed focused while in the computer lab.

Student self-assessments also suggest that the students felt that they were learning more in their pilot classroom compared with past teachers. At the beginning of the pilot, 48 students submitted a self-assessment. Eleven of those students stated that their pilot teacher was a better teacher because they felt that they are learning more in his other class. At the end of the pilot, 59 students submitted a self-assessment, and 25 of them stated that their pilot teacher was a better teacher because they felt they were learning more. There was also an increase (from 4 to 17) in the number of students reporting that using technology in the classroom had made their work easier.

Increase the technology proficiency of teachers through extensive training

The LBJ Middle School pilot staff was also committed to integrating technology into the curriculum and increasing teacher technology proficiency. LBJ initially started with five teachers in the pilot and dropped to three teachers at the beginning of the Fall 2000 school term. The pilot adjusted well to this shift, and new teachers to the district received training on the software from one of the original pilot teachers. The pilot allowed the teaching staff to accumulate 100 hours of technology-based training, whereas before the pilot, the teachers had only eight hours of training. With this training under their belts, teachers felt more comfortable and confident in adapting their skills to instructional content. Therefore, teachers as well as students felt a boost in confidence.

12.2.2 Accomplishments

In addition to the achievement of the project's stated goals as described above, the LBJ Middle School pilot project achieved other notable accomplishments, including the following:

- An area of significant impact seems to be disciplinary infractions. In fall 1999, the school reported 16 total disciplinary infractions for the students participating in the pilot. In Fall 2000, for the same group of students (with some students leaving and some entering the program), there were just 9 disciplinary infractions reported.

- It also appears that teachers have adapted well to the learning phase of the pilot and the challenge of effectively integrating the technology resources into the curriculum. Teachers reported that the new approach causes students to be more excited to learn and they tend to finish their assignments more quickly.

12.2 Outcomes

This section describes LBJ's goals and objectives and summarizes the outcomes of the project.

12.2.1 Goals and Objectives

The primary goals of the LBJ Middle School pilot were to:

- improve the targeted student populations' TAAS testing scores in the identified subject areas;
- build self-esteem of the targeted student population through academic success; and
- increase the technology proficiency of teachers through extensive training.

Improve the targeted student populations' TAAS testing scores in the identified subject areas

Identifying significant change in student achievement by examining such measures as semester grades and achievement test scores is practically impossible over just one year. To assess the impact of technology on student achievement, it is necessary to conduct a pilot for at least two years and preferably longer. Quantitative data collected by project staff reflect this. However, qualitative data gathered through observations and interviews provide a glimpse into other areas of student impact that have a direct bearing on how student achievement might change over time.

LBJ Middle School was committed to improving achievement among at-risk students in the areas of science, social studies, and math. The LBJ staff believed that using a computer environment to deliver grade-level curriculum would afford their target population the greatest chance for success. The pilot project offered students access to the computer resources before, during, and after school through a structured goal-oriented program led by the school staff. LBJ also intended to offer part of the resources in a Web format so that any of the students with Internet access could benefit, but the school experienced challenges in obtaining the publisher's permission to make the content available on-line.

According to the LBJ principal, all seventh graders were using the Glencoe software for math as a supplement to their books. The sixth and eighth graders were also using software that Glencoe provided, but not as often as the seventh graders. The class would use the software at the end of the chapter in the textbook. The principal believed that the Glencoe math software helped students prepare for the TAAS. In the 1998–1999 school year, the seventh-grade math TAAS percentage passing was 98 percent. For the school year 1999–2000, the seventh-grade math TAAS percentage passing was 100 percent. Students used the Glencoe software during the three months that preceded the TAAS test. The seventh- and eighth-grade students were also using the *Science 2000* software from Decision Development Corporation. School staff explained that they were not using the social studies software from Decision Development Corporation (*Ancient World 2000*) because it did not follow the social studies TEKS. LBJ would have to wait until Spring 2001 to receive another type of social studies software. LBJ was not using NetLibrary at all because of challenges to digitize textbooks.

12.2.3 *Vendor Support and Product Reactions*

According to LBJ staff, delivery of the content progressed according to their expectations. Most of the vendors were quite cooperative, although there were some problems with the content provided.

Decision Development Corporation

Decision Development's software, *Ancient World 2000*, could not be used in social studies classes during the pilot because the topics it covered did not match the content of the seventh and eighth-grade social studies courses (Texas History at seventh grade and U.S. History at eighth grade). Decision Development Corporation offered LBJ copies of its Early American History product to be used in eighth-grade social studies classes next year.

Although the *Science 2000* software, a seventh-and eighth-grade course, was used throughout the pilot, it was not identified as effective courseware by the staff. They also felt that the content was limited.

Glencoe/McGraw-Hill

According to the LBJ staff members, the Glencoe/McGraw-Hill Mathematics CD-ROM was very productive throughout the pilot and the vendor was extremely cooperative. Although the content proved to be not challenging enough for the gifted students, it was extremely successful with lower-level students. Glencoe also provided the school with CD-ROMs for the grade level beyond what was originally anticipated. In the first year of the pilot, sixth and eighth graders had access to the sixth-, seventh-, and eighth- grade content. Availability of this material helped address the needs of those students who were performing above grade level. Overall, school staff was pleased with the attentiveness of the vendor's staff.

NetLibrary

Unfortunately, the LBJ pilot was unable to incorporate NetLibrary into the project. LBJ intended to use NetLibrary e-books (configuring LBJ textbooks in a Web-based format). However, challenges in obtaining the publisher's permission to publish the content on-line prevented the use of this product. Therefore, the pilot was unable to provide curriculum access through the campus website. The principal felt this product offered significant potential since some students had access to a computer and the Internet at home. There was considerable disappointment in the fact that NetLibrary was not available.

12.3 Costs

The core costs for implementing the pilot would be as follows, had it been necessary to pay for the technology-based resources that were provided by the vendor partners and other resources:

- For the Glencoe/McGraw-Hill content, the cost would have been $21,000.
- For the Decision Development Corporation content, the cost would have been $1,500.
- For hardware used in the pilot, the cost was approximately $25,000.

- For utilities necessary to keep the school open before and after normal school hours, the cost would have been $1,740.

- For supplies and materials related to the project, the cost would have been $5,194.

12.4 Lessons Learned

The LBJ pilot illustrates how a project can have a positive impact on students and teachers. Even with the challenges they encountered, the project coordinator stated they would do it again. Some lessons learned from this project are:

- Sustained professional development should address not only basic technology proficiency, but provide a road map to help teachers integrate the technology into classroom instruction in a meaningful way.

- Adequate software content to be used as core instruction should be well organized and thoroughly evaluated. For LBJ, some software content was not as robust as the content available in print.

- Content that is to be used in a program such as this must be assured before the project begins. The inability of NetLibrary to produce the content LBJ had expected proved to be a serious shortcoming, since when the project began, this was considered the most valuable resource.

- A better relationship with the other pilots needs to be established so the school pilot coordinator knows where to turn for advice.

12.5 Conclusions

In addition to the lessons learned described above, several conclusions can be drawn from the experiences of the LBJ pilot that relate to the overall objectives of TEA's Ed Tech PILOTS Project.

1. Access to technology resources is a critical issue that must be addressed in order for technology integration in the classroom to be successful. Schools must be realistic about the time and resources needed within the school. It was obvious during a site visit that access to the computer lab was limited, since the entire middle school had to share the facility with the high school. School staff indicated that each classroom spent about one hour a week in the computer lab.

2. It is important to fully understand the products a school acquires for a program such as this. For example, LBJ staff found that Decision Development Corporation's *Science 2000* software was not as robust as its print counterpart. Even more significant was the fact that their *Ancient World 2000* software did not address the content needed in the seventh and eighth grades in Texas.

3. Increasing the technology resources within a school will change the way teachers teach and students learn. LBJ found that many students with low attention spans seemed to stay engaged in the computer-delivered lesson. Two specific students responded so well to the computer-delivered instruction that school staff removed them from the regular classroom. Those students are now completing their lessons on the computer.

Chapter 13

Lake Worth ISD:

Lake Worth High School

LAKE WORTH ISD: LAKE WORTH HIGH SCHOOL

13.1 Description of the Pilot

The Lake Worth Independent School District has approximately 1,900 students. Its only high school serves nearly 500 students annually. Lake Worth High School's student population is 60 percent Anglo, 33 percent Hispanic, 6 percent African American, and 1 percent Asian/Pacific Islander.

The purpose of Lake Worth's pilot project was to implement and evaluate the effectiveness of having advanced placement (AP) students use laptop computers and selected software to improve learning. The pilot began in the spring of 2000 with 23 students who were all expected to be taking eleventh grade AP English and/or history in the fall, and were currently enrolled in pre-AP English as tenth graders. By the end of the pilot, 22 of the original 23 students were still enrolled at Lake Worth and had fully participated in the pilot. They used their computers (Apple iBooks) for all of their classes in school and took them home each day for use in doing homework.

Lake Worth High School established a partnership with three vendors who provided hardware and/or software:

1. Apple provided 23 laptop computers (iBooks), one for each of the 23 AP students. Apple trained the teachers in the use of the iBooks. Teachers then trained their students to use the iBooks. Apple also provided a wireless network for use with the iBooks.

2. Microsoft provided 25 copies of Microsoft Office software for use on student and teacher computers.

3. NetLibrary trained two pilot teachers in the use of its online books and planned to provide online books and resource materials for the students to use. However, as the pilot progressed, none of the books that the teachers wished to use were available online from NetLibrary. Thus, students did not use NetLibrary resources in this pilot.

4. Lyceum Communications provided *Get A Clue*, which is a software and web-based instructional system that helps students develop and expand their vocabularies. Initially Lake Worth partnered with WorldView and hoped to use its interactive software program, called *World History: An Interactive Approach*. Unfortunately, the pilot staff discovered that this software could not be used on the iBooks, because it was only designed for use on Windows operating systems. Therefore, Lake Worth proposed, and TEA approved of, a change in Lake Worth's vendor partners, substituting Lyceum Communications for WorldView. Lyceum's *Get A Clue* was functional on the iBooks used by students in this pilot.

Lake Worth used part of its $90,000 PILOTS grant funds to purchase notebook computers, laser printers, and LCD projectors for the teachers involved in the pilot.

It should be noted that Lake Worth experienced a major change in project personnel part way though the pilot. The lead teacher, who coordinated all project activity, was not rehired for the 2000-01 school year and was replaced by another teacher who had no prior involvement with the project.

13.2 Outcomes

Lake Worth High School set out to accomplish the following objectives through the pilot funds and the support from the four different vendors noted above:

1. enhance student understanding of the use of research and study methods;

2. improve pedagogy;

3. encourage parental understanding of and involvement in their child's education; and

4. assess the financial and academic feasibility of using technology in delivering curriculum.

MGT's independent analysis of the extent to which each of the above objectives was accomplished is presented below.

13.2.1 Enhance student understanding of the use of research and study methods

MGT's many site visits to Lake Worth found the students involved in the pilot making extensive use of their computers to do Internet research and to take notes in class as a study methodology. Because students took their iBooks home each day, they were able to access and study the class notes they took on their computers. They also were able to access the Internet and do research at home just as they did in school except for a period of about one month when the Internet service provider (ISP) discontinued service and another ISP had to be obtained.

Thus, it appears that Lake Worth accomplished its objective of enhancing student understanding of the use of research and study methods as part of this pilot.

13.2.2 Improve pedagogy

Lake Worth submitted data that enabled pre and post comparisons to be made of only one of the five teachers involved in the pilot. Unfortunately, in the opinion of this one teacher, her use of technology in the classroom resulted in no improvement in the academic achievement of her students. In fact, using a 10-point scale to rate the effectiveness of her use of technology to improve students' academic achievement, she gave herself a higher rating (a six) before the pilot than she did near the conclusion of the pilot (a zero).

This teacher believed that frequent malfunctions in the wireless computer network that was established for the pilot led to much wasted class time and caused her to use technology less during the pilot than she had the year before the project began. Although she believed that about 15 percent of her students' instructional time should involve the use of technology, she reported reducing her incorporation of technology into her teaching from 10 percent of the class time in the year before the pilot to only five percent of the class time during the pilot.

Thus, with this limited data provided by only one of the five pilot teachers at Lake Worth, the school's goal of improving pedagogy was not shown to have been accomplished.

13.2.3 *Encourage parental understanding of and involvement in their child's education*

The Lake Worth pilot provided no data that compared parental understanding or involvement in their child's education before, during and/or after the pilot. Thus, this objective was not formally assessed. However, Lake Worth teachers involved in the pilot did report that they held two 2-hour meetings with the parents of all pilot students. At these meetings, Lake Worth staff informed parents about the pilot and how they and their children could use and care for the laptop computers when they were in their homes.

Although Lake Worth planned to establish e-mail communications between parents and teachers via the laptop computers brought home by students, parental objections to being bothered with more e-mail at home caused the Lake Worth staff to cancel plans for such communications. Further, none of the parents initiated any e-mail with the pilot staff, though parents were provided with their e-mail addresses.

Thus, despite the absence of any formal evaluation of the impact of this pilot on parents, there was evidence that Lake Worth did encourage parental understanding and involvement with their children who were involved in this project.

13.2.4 *Assess the financial and academic feasibility of using technology in delivering curriculum*

MGT provided self-assessment instruments for Lake Worth staff to administer to all of the students and teachers involved in the pilot. These self-assessments were to be administered both before the pilot began and again at the conclusion of the pilot. Unfortunately, both pre and post self-assessment data were not provided on the students and were provided on only one of the teachers (discussed above). The student self-assessments would have given students opportunities to rate their teachers' use of technology to help them to learn both before and near the conclusion of the pilot.

Additionally, at the time this report was prepared, Lake Worth High School had not yet provided student and teacher performance data that would assist in evaluating the impacts of using technology to deliver instruction.

Although Lake Worth found it to be financially feasible to use technology to assist in delivering the curriculum and plans to continue using the technology as a mobile laboratory available for checkout by any teacher next school year, the academic impacts of the technology could not be assessed.

13.2.5 *Costs*

At the time this report was written, Lake Worth had not yet been able to provide information on the cost of equipment and services that the school district would have had to pay had these not been donated by the vendors involved in this pilot. However, since all these were in place at the end of the pilot, Lake Worth decided that it would cost no more to continue using the technology in the coming school year. Thus, Lake Worth found it to be quite financially feasible to continue to use the technology after the initial costs (borne in this case by the vendors) were paid.

13.2.6 ***Lessons Learned***

The major lesson learned in this pilot was the need for schools to know more about the technologies they would like to use before obtaining these technologies. It was not until after beginning the pilot that these teachers discovered the limitations of using NetLibrary or the incompatibility of WorldView software with Apple computers. In the case of NetLibrary, the lack of availability of digitized books for use with the targeted population of AP students also should have been determined prior to the partnering of that vendor with the Lake Worth pilot.

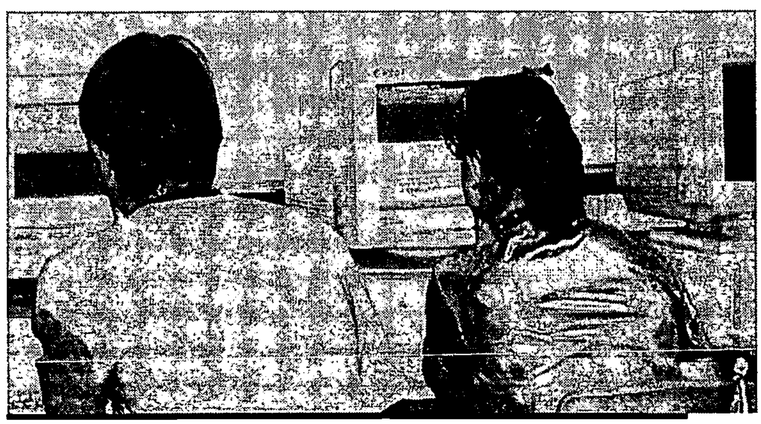
Another lesson learned is the need for continuity in staffing a pilot project such as this one. Some of the lack of evaluation data that was to be provided at the conclusion of the pilot was due to changes in personnel midway through the project. These changes included the project coordinator as well as some of the teachers.

Finally, conducting a needs assessment before the project to determine whether parents would be willing to communicate with teachers via e-mail, would have identified the lack of support for this means of communication. Thus, making e-mail communications between teachers and parents one of the unsuccessful goals of the pilot could have been avoided.

Chapter 14

Midland ISD:

Coleman High School



MIDLAND ISD: COLEMAN HIGH SCHOOL

14.1 Description of the Pilot

Coleman High School is an alternative school in the Midland Independent School District, which has approximately 21,000 students. Coleman serves about 320 students annually, and all are at-risk as defined by House Bill 1010 to mean that these students either:

- failed one or more sections of the Exit Level Texas Assessment of Academic Skills (TAAS);
- failed one or more courses or grade levels;
- are special education students, pregnant, teen parents; or
- had previously dropped out of school or are at-risk of dropping out.

Coleman's student population is 43 percent Hispanic, 42 percent Anglo, and 15 percent African American.

Since its opening nearly 10 years ago, Coleman's primary education delivery system has been computer-assisted instruction (CAI). Coleman students work in a self-paced, teacher-monitored environment. In recent years, the staff grew dissatisfied with the Plato CAI system they had been using and sought a better system. When the opportunity to participate in the Ed Tech PILOTS became available, Coleman applied and was granted the opportunity to try NovaNET as its new CAI system. NovaNET delivers online diagnostic pretesting, instruction, posttesting, and (if needed) remedial instruction via a Wide Area Network (WAN).

The purpose of Coleman's pilot project was to implement and evaluate the effectiveness of using NovaNET to deliver instruction and improve student learning. The students initially targeted for participation in the PILOTS were tenth and twelfth graders taking English or social studies courses at Coleman. However, by the second semester of the 2000-2001 school year, the program was expanded to students in all content areas at all four grade levels (9-12). By March 2001, NovaNET reported that usage of its CAI system by students at Coleman had peaked at 1,663 hours for that month.

NovaNET provided training to the principal and all Coleman teachers in the spring of 2000. The principal and a small subset of teachers received additional training from NovaNET during the summers of 2000 and 2001. This subset then provided additional training to the remaining teachers each fall. Training that would have cost the district $4,200 per year was provided to Coleman staff by NovaNET at no charge as part of NovaNET's participation agreement with the PILOTS. NovaNET also provided Coleman (at no cost to the school or district) a WAN initial connection valued at $4,000, and $37,800 worth of continuing connections ($1,260 per port per year for 30 ports). Thus, NovaNET donated a total of $42,000 worth of services to Coleman High School for its staff and students to be able to appropriately use NovaNET.

14.2 Outcomes

Coleman High School set out to accomplish the following objectives with its $90,000 pilot funds from TEA and the support from NovaNET:

1. establish a NovaNET CAI that would provide 30 learning stations for students in a variety of courses;

2. obtain the professional development needed by Coleman teachers and principal to successfully use NovaNET to instruct and test students and to manage the learning environment;

3. set and attain goals and objectives for improved academic performance by students; and

4. collect and use data to evaluate the extent to which the new CAI is effective.

MGT's independent analysis of the extent to which each of the above objectives was accomplished is presented below.

14.2.1 Establish a NovaNET CAI that would provide 30 learning stations for students in a variety of courses

In April 2000, 30 NovaNET WAN connections were established via the PILOTS grant for use at Coleman High School. English and social studies teachers were the first to begin using the new system with their students in three different classrooms. As the pilot program continued, Coleman expanded its capabilities so that NovaNET was available to all teacher and student workstations (approximately 240 computers) in every classroom in the school.

Although no more than 30 users could be on the NovaNET system simultaneously because 30 was the number of ports donated by NovaNET for this pilot, accessibility to NovaNET was never a problem because of the small numbers of students present in this alternative school on any given day. Whenever students needed to connect to NovaNET they could do so in any classroom in the school.

As the 2000-2001 school year progressed, teachers in all subject areas and students in all of the school's grades of 9 through 12 began to use NovaNET. However, the initially targeted group of tenth- and twelfth-grade students continued to be the subjects of the evaluation of the effectiveness of NovaNET system.

Thus, Coleman's goal of providing NovaNET learning stations for students in a variety of courses was fully accomplished before the conclusion of the PILOTS.

14.2.2 Obtain the professional development needed by Coleman teachers and principal to successfully use NovaNET to instruct and test students and to manage the learning environment

The Coleman principal and teachers received their initial NovaNET training on April 11, 2000. They then embarked on a limited pilot test of NovaNET during the last six weeks of the school year with nine twelfth-grade students and nine tenth-grade students. Although the teachers were able to use NovaNET with these students, the teachers found that they needed more training to be able to use the many advanced features of the NovaNET system. Therefore, the principal and a subset of teachers participated in a full week of advanced NovaNET training during the Summer of 2000. When the new school year began, the subset of teachers who received the advanced training trained the remaining teachers at Coleman.

The combination of the initial and advanced training received by the staff at Coleman prepared all Coleman teachers to effectively use the NovaNET system. MGT's site visits to Coleman found that teachers and students were very comfortable using NovaNET. Thus, the objective of obtaining the professional development needed to use and manage the new learning system was fully accomplished.

Teacher self-assessments that MGT administered at the very beginning of the PILOTS and again near the conclusion of the PILOTS revealed virtually no differences in Coleman teachers' judgements about the effectiveness of their use of technology to improve student achievement. MGT attributes the lack of any difference to the high level of technology usage by these teachers before the PILOTS began. These teachers had operated in a CAI teaching and learning environment for many years before they switched from their former CAI system (Plato) to the one used in the pilot (NovaNET). Thus, it is not surprising that both before and after the PILOTS, all five Coleman teachers who participated in the PILOTS and completed both the pre and post self-assessments attribute improvements in academic achievement by most of their students to the teacher's use of technology in the classroom.

It should be noted, however, that before the PILOTS, these five teachers reported that they incorporated appropriate electronic technology into approximately 40 percent of most students' instructional time. Near the conclusion of the PILOTS, these same teachers' averages had increased to 47 percent of students' instructional time involving appropriate electronic technology.

14.2.3 <u>Set and attain goals and objectives for improved academic performance by students</u>

The Coleman staff set the following six goals for improved performance by students involved in this pilot:

1. all students will improve a minimum of 1.5 grade levels as measured by the Test of Adult Basic Education (TABE);

2. eighty percent of the students will earn credits equal to the number of failed classes on their transcripts;

3. ninety percent of twelfth-grade students will earn high school diplomas;

4. attendance will improve by 30 percent;

5. disciplinary referrals will decrease by 50 percent; and

6. the dropout rate will decrease by 50 percent.

The next subsection discusses the extent to which each of the above goals was attained.

14.2.4 <u>Collect and use data to evaluate the extent to which the NovaNET CAI is effective</u>

Although Coleman's grant application stated that data collected to evaluate the effectiveness of the NovaNET CAI would be shared with TEA and MGT, at the time this report was produced Coleman had not yet provided all of the evaluation data needed to compare changes in teacher and student performance before and after the PILOTS. Instead, Coleman provided its own internal evaluation of the extent to which it had attained one of the goals listed above, plus some additional internal evaluation information:

- The goal of improving the attendance rate by 30 percent was not attained. Only a three percent improvement in student attendance was realized.

- No information was provided about the extent to which any of the other five goals listed above was attained. However, the following improvements are noted in the end-of-project brochure produced by Coleman High School:

  - Students enrolled in NovaNET courses consistently score higher grades than students enrolled in other CAI programs.

  - All students enrolled in NovaNET courses score 80 percent or higher on the first attempt when tested for mastery. Students enrolled in other CAI programs required two or more attempts to score at or above the 80 percent mastery level.

  - Grade point averages (GPAs) of graduating seniors who used NovaNET improved. (No further information was provided regarding the extent of these GPA improvements.)

  - TAAS scores for tenth-grade students who had previously failed one or more sections of the exit level of TAAS increased by nine percent in reading, and increased by six percent in mathematics, but decreased by one percent in writing.

  - The average Texas Learning Index (TLI) improvement in reading was 6.11 and in mathematics was 2.83. (The TLI is a student's score on the TAAS reading and mathematics tests. To pass these tests students must achieve a TLI of at least 70.)

14.2.5 Costs

NovaNET provided training to the principal and all Coleman teachers in the Spring of 2000. The principal and a small subset of teachers received additional training from NovaNET during the Summers of 2000 and 2001. This subset then provided additional training to the remaining teachers each fall. Training that would have cost the district $4,200 per year was provided to Coleman staff by NovaNET at no charge as part of NovaNET's participation agreement with the pilots. NovaNET also provided Coleman (at no cost to the school or district) a WAN initial connection valued at $4,000 and $37,800 worth of continuing connections ($1,260 per port per year for 30 ports). Thus, NovaNET donated a total of $42,000 worth of services to Coleman High School for its staff and students to be able to appropriately use NovaNET.

14.2.6 Lessons Learned

Although Coleman High School staff believes the switch to a new CAI system was highly successful, few of the initial goals that school established for this pilot were met. School-based projects that are supported by grants sometimes set unrealistic goals in their grant applications. The lesson to be learned from this is that initial goals need to be revisited and revised, as needed, after more is known about a new technology that is being used with students.

Another lesson learned is that grants to school districts should include some penalty for districts that do not provide data to external evaluators in a timely manner. Although this school claimed great success with its PILOTS, because the school did not provide sufficient evaluation data to the external evaluator, the evaluator was unable to provide an independent assessment of the effectiveness of the new technology. This lack of an independent evaluation prevented certification of the claims for effectiveness of the new CAI made by the school.

Chapter 15

Pharr-San Juan-Alamo ISD:

Austin Middle School

PHARR-SAN JUAN-ALAMO ISD: AUSTIN MIDDLE SCHOOL

15.1 Description of the Pilot

Austin Middle School is part of the Pharr-San Juan-Alamo Independent School District (PSJA ISD). This district has an enrollment of over 21,000 students. It encompasses three communities located 5 miles north of the Mexican border. The unemployment rate in the tri-city area exceeds 15 percent. Statistics reflect a district per capita annual income of less than $6000. Fifty-two percent of all household income is derived from public assistance or social security.

Austin Middle School is located in San Juan, a rural community which has a population of approximately 8,500. Enrollment for the 1999-2000 school year is about 1700 students. Ninety-eight percent of this population is Hispanic and 87 percent are economically disadvantaged. Because of the proximity to the Mexican border, approximately 500 new students enroll in the district every year. Forty-one percent have been identified as LEP and 68 percent are considered at risk of dropping out of school. The district has more than 4,000 migrant students, a factor which greatly adds to the loss of instructional time provided to students. The migrant students spend the first and the last two months of every school year on the migrant farmworker trail.

The primary purpose of the Austin Middle School (AMS) TEKS 2000 Pilot was to improve student achievement by fully integrating technology into teaching and learning by delivering curriculum content in the four foundation content areas of science, language arts, social studies, and math. Three major goals of the AMS TEKS 2000 Pilot were to:

- use technology to support student performance of an authentic task;
- integrate technology use into activities that are a core part of the classroom curriculum; and
- support teacher innovations and professional development.

Austin Middle School's TEKS 2000 Project focused on improving student and community awareness of environmental issues surrounding the Rio Grande, while implementing 100 percent of the TEKS into the curriculum. A cluster of 7th grade teachers, consisting of the four core subjects, taught a six-week thematic unit on the pollution of the Rio Grande River. The program targeted a cluster of 145 students from the 7th grade to the 8th grade, but the number fell to 123 students in 2000 because of school zoning. For the 1999-2000 school year, the project centered on the environmental impact of the upper Rio Grande, from Falcon Dam to Anzaldua Dam. During the 2000-2001 school year, the project centered on the pollution and diseases found in the lower Rio Grande, from McAllen to Brownsville, Texas. Different technologies and staff development were vital to this project, as students and teachers prepared presentations and designed a website to publish their findings on pollution to the community.

The resources to be used were 30 Dell laptop computers and the campus computer. The Dell laptop computers were used for data collection in the field, data analysis, multimedia presentations, research, and Internet access. Bricolage ActiveInk software was also used and installed in the computer lab and laptops. As a result of the pilot, Austin Middle School was able to purchase other supplies and materials such as scientific calculators, microscopes, RA readers for the library, Iomega Zip drives, and Zip disks for students to use as an electronic portfolio.

The Austin Middle School pilot staff also intended to use 150 Softbook electronic books to provide students with access to newspapers, periodicals, literature, textbooks, and current magazines. Unfortunately, the vendor did not deliver the product.

15.2 Outcomes

Data on the progress of the pilots were obtained from a variety of sources, including surveys, student and teacher performance data, and periodic site visits. In addition, the pilot staff provided comparison data for pilot students.

15.2.1 Observations

MGT's initial site visit to Austin Middle School was on May 8, 2000. A follow-up visit was conducted on May 31 and June 1, 2000 to observe Bricolage and Softbook training. The teachers were trained for two days on the ActiveInk from Bricolage. At the time of the visit, the Austin MS staff was planning to purchase laptop computers for school and home use. School staff was excited about using the Softbook e-books, but the pilot coordinator noted that vendor negotiations would be a major challenge.

During a third visit on January 12, 2001, the eighth-grade classrooms continued to use the Dell laptops, and the campus computer lab used Bricolage (ActiveInk) software. The laptops were not used at home. Saturday training for all teachers continued on laptops, Office 2000 and Bricolage software. The Softbook readers had not been received and the vendor still did not know a delivery date. The school and staff were feeling very frustrated about the Softbook situation and were disappointed because they felt they were letting the students down. Each student was using his or her own Zip file (electronic portfolio) to record his or her work regarding the environment project of the Rio Grande. One teacher noted that the students' attitude and motivation were up because of the new technology and supplies used for the project. Observations included students using the computer lab to browse websites in order to complete their PowerPoint presentation. The pilot students were competing to see who could produce the best presentation so they would be allowed to travel to Austin to showcase their work at the Commissioner's Midwinter Conference sponsored by the Texas Education Agency.

MGT and TEA conducted a joint site visit on March 1, 2001 to check on the pilot's progress according to their NOGA. All software and hardware was in place except for the Softbooks, which continued to be an issue. Austin MS planned to purchase the RCA version of the e-books at the end of Year 2.

15.2.2 Goals and Objectives

As indicated above, the following were the goals of the pilot:

- use technology to support student performance of an authentic task;
- integrate technology use into the activities that are a core part of the classroom curriculum; and
- support teacher innovations and professional development.

All of these goals were met as described below.

Use technology to support student performance of an authentic task

Authentic uses of technology mean that students will be using technology for the same kinds of purposes and in the same ways that adults use technology outside the school walls. This concept is illustrated by the way the students presented their work on the environment project. The Dell laptops and computer lab tools proved to be a significant resource in the Austin MS pilot environment project. The project allowed the students to select the appropriate technology tools and to apply technologies such as word processors, spreadsheets, hypermedia, and network search tools to their work. Students used spreadsheets and databases to help with data collection and analysis. The pilot's goal was to treat technology as a tool to help accomplish complex tasks rather than a subject of study. Some of the teachers noted that students' presentations and work looked better than work they have seen by professionals, and that student confidence had increased as a result of interacting with technology. During a site visit, reviewers noted that most of the students did not hesitate to proudly explain their presentations. Teachers feel that most of the pilot students will have more and/or better technology skills than some of the high school students.

Integrate technology use into activities that are a core part of the classroom curriculum

The environment project also allowed the students to perform authentic tasks involving multiple disciplines. The teachers worked together in planning and implementing the environmental project. The illustration below is a one-week sample of the interdisciplinary project in which the students actively participated. Each content area addressed 100 percent of the foundation area TEKS.

Environmental Water Study
Week 1

	Topic: Formation of the Rio Grande River Falcon Dam
Math	Objective: TSIET to use statistical procedure to describe data collected from water and soil pH test.
	TEKS: 2b, 3b, 4a, 5b, 8b, 12a, 12b, 12c, 13a, 13b, 13c, 14a, 14b, 14c, 14d, 15a, 15b, 16a, 16b.
Science	Objective: TSIET to conduct environmental testing of water and soil samples collected from the Rio Grande River at Falcon Dam.
	TEKS: 1a, 2a, 2b, 2c, 2d, 2e, 3d, 4a, 4b, 5a, 5b.
Language Arts	Objective: TSIET to plan and generate research on the development of the Falcon Dam.
	TEKS: 1a, 1b, 1c, 1d, 2b, 2c, 2f, 4b, 5a, 5b, 5c, 7a, 8b, 8c, 8d, 10d, 10e, 10f, 11a, 11d.
Social Studies	Objective: TSIET to gather data pertaining to the formation of the Falcon Dam.
	TEKS: 1a, 1b, 1c, 2a, 2b, 2c, 7a, 7c.
	* Water and Soil Test Kits * Library-Internet Search Engine * Softbook Reader

For each content area, students used the Dell laptop computers and computer lab for data collection out in the field, data analysis, multimedia presentations, research, and Internet access. Teachers maintained students' projects and presentations using an electronic portfolio (Zip file). Teachers also created rubrics to assess authentic student projects and presentations.

Unfortunately, a major piece of the pilot project's support—Softbooks, to be used with the Softbook Readers—were never delivered. However, the school successfully adjusted to the resources it had in place and continued with the project.

Support teacher innovations and professional development

Although PSJA ISD teachers have gone through many professional development activities, much of this training was not necessarily in line with the current effective research-based strategies, but rather pieces of various programs. The Austin MS pilot decided to use the ***Transfer Theory*** (Joyce, Hersh, and Mckibbon [1983]), which describes a process of conducting professional development to increase the chances for application success. Some of those pilot staff development activities included:

- weekly professional development within the context of a classroom;
- teachers designing, as a team, the curriculum and the lesson plans for the first six weeks, all written in ways that model creative and effective uses of appropriate instructional technology;
- weekly reflective conversations among teachers;
- teachers trained on the software and hardware training other teachers at the school; and
- use of online resources for technology-related professional development, lesson plans, technology integration tips, and even technical content.

PSJA ISD was also committed to the pilot and to the technology effort. The district had restructured or created various positions such as networking specialists, computer specialists, district trainers, and an MIS coordinator. The district also employs a full-time director of technology who coordinates district technology efforts, including installation and maintenance of district and campus equipment. The following is a list of support provided to the pilot by district personnel:

- staff development at the campus or district technology training facility;
- training one or more technologists on network specific hardware and software;
- maintenance of campus hardware and software inventories;
- standardization of campus hardware, software, and networking purchases; and
- purchase of appropriate installation, maintenance, and troubleshooting tools for campus in-house staff.

15.2.3 *Accomplishments*

As described above, the Austin Middle School pilot succeeded in using technology to support student performance of an authentic task, integrating technology use into activities that are a core part of the classroom curriculum, and supporting teacher innovations and professional development. Thus, because it achieved its goals, it can be considered a successful pilot.

Other positive accomplishments resulting from the pilot include the following:

- The acquisition of scientific calculators, Zip drives, Zip disks, digital cameras, and projectors through the grant provided additional technology resources to participating teachers. During the course of the grant, teachers became quite proficient in using these devices as a means of enhancing learning experiences for their students.
- The pilot enabled Austin MS teachers to support and work together to resolve technology problems. As a result of the additional training available through the grant, teachers became even more proficient at providing technical assistance. It was very positive for teachers to train other teachers.
- Even though they were greatly disappointed that the Softbooks never arrived, Austin MS adjusted and continued to strive to achieve their goals.

15.2.4 *Vendor Support*

A critical aspect of successfully carrying out the pilot projects was the level of support each pilot received from vendor partners. Just as the original requirements for participation specified that vendors would supply their products at no cost, they also required that vendors provide training in the use of the products and technical support. Despite this requirement, as might be expected, some vendors were more supportive than others. Generally, Austin Middle School's experiences with their vendor partners were fair, at best.

Dell Laptops

PSJA ISD ordered 30 Dell laptops for pilot students to use for data collection out in the field, data analysis, multimedia presentations, research, and Internet access. Training for the laptops was conducted by the pilot staff as Saturday training for teachers. With only 30 laptops, teachers had to coordinate the times each would use the laptops for their classes. Students also had to team up to share the laptops.

Bricolage (ActiveInk) Software

The Bricolage ActiveInk software application was also installed and used in the computer lab and laptops. Initially, there were issues with staff development, since the vendor only wanted to train four teachers, but the grant called for training ten teachers. The pilot staff did receive one full day of training on the software in May 2000. Because the training came so late, the software was not used until August 2000. Representatives from the Bricolage company followed up with a visit in November 2000. The staff felt that software content was below the level of the students and made sure Bricolage was aware that the pilot was not using the software as much as they had anticipated.

Softbooks

Since problems were encountered with Softbooks from the beginning of the pilot, Austin Middle School never received the 150 Softbook readers. School staff was frustrated by the company's inability or unwillingness to fulfill the commitment it had made by responding to TEA's RFSOI. Not long after the pilot program began, Softbook Press was purchased by Gemstar and communications with the company essentially ended.

15.2.5 Costs

If it had been necessary for Austin Middle School to pay the full price of the pilot, the following are costs that would have been incurred:

- For the ActiveInk resources, an annual license fee would cost approximately $5,000.
- For the Dell laptops, the cost would have been approximately $55,000.
- If Austin Middle School had received the 150 Softbook readers, they would have represented a cost of $60,000.
- For the payroll costs, which included a stipend to teachers for Saturday training, the cost would have been $38,000.
- For professional services and development, the cost would have been $2,000.
- For equipment such as cameras, and materials for setting up the science laboratory, the cost would have been $26,500.

15.2.6 Lessons Learned

The Austin Middle School pilot is a great example of both the successes and challenges associated with implementing an innovative technology pilot into a school. Some lessons learned from this project are:

- The duration of the pilot is important and should be longer. A training and implementation phase is critical for the success of the pilot. Time must be available for all the components to be implemented appropriately and then the pilot must last long enough to allow for an evaluation that is of sufficient duration to effectively determine whether achievement gains do in fact result.
- All the components of the pilot including staff development should be in place before implementation. In order for this to occur, the funds must be available early enough to acquire all the necessary resources. For the PSJA pilot, school staff felt that funds were not available soon enough.
- Details of what is and is not provided by vendors must be explicit. For this pilot, one vendor did not deliver their product, which was vital to the project. The pilot coordinator felt vendor specific donations and training were not in place before the grant started. This caused the coordinator to play a negotiator role throughout the pilot.

Chapter 16

San Antonio ISD:

Rhodes Technology Academy

SAN ANTONIO ISD: RHODES TECHNOLOGY ACADEMY

16.1 Description of the Pilot

Rhodes Technology Academy (RTA), a technology magnet school, is one of more than 90 schools in the San Antonio Independent School District (SAISD), an urban district of approximately 56,000 students. Its student population is roughly 85.3 percent Hispanic, 10.0 percent African American (non-Hispanic), 4.4 percent White (non-Hispanic), .3 percent Asian and .1 percent Native American. Over 78 percent of SAISD students are classified as economically disadvantaged. More than 90 percent of RTA's approximately 650 students are economically disadvantaged.

Rhodes Academy is situated in a very low-income area and, according to the project coordinator, its neighborhood is among the 10 most poverty-stricken areas in the country and has one of the highest juvenile crime rates in all of North America.

Because RTA is a technology magnet school, the campus possesses a tradition and culture that supports technology use more than most schools. The academy relies largely upon a constructivist, project-based approach that allows technology to contribute more extensively to the learning environment. Technology-supported core courses are complemented by "exploration" courses as electives. During each of the student's three years in the magnet program, he or she will take one or two electives from an "Exploration" area, a special area of interest. Each of the three exploration areas offers a unique look at the functions and application of technology in the real world.

The Ed Tech PILOTS program at Rhodes was a multigrade effort in constructivist project-based learning with a primary emphasis on the critical academic areas of mathematics and language arts. Technology resources that supported the program were acquired from vendor partners ActiveInk, BigChalk, Knowledge Adventure, and Softbook Press. In this effort, over 600 students in the sixth, seventh, and eighth grades participated in a technology-enriched and extended project-based curriculum augmented by a variety of the latest software products on the market. These include products such as BigChalk Library, The ActiveInk Online Project Curriculum, and Classworks Gold Texas Edition.

Students took learning beyond the boundaries of the normal class day by taking home and into the field laptop computers and Softbook readers that opened up whole new avenues of learning. Students were also able to work in depth with probeware, digital cameras, digital video, graphing calculators, and many other devices in ways that fostered learning across all subject areas.

Most teachers who participated in the RTA pilot received training in the use of these curriculum products during the last part of the 1999-2000 school year and the summer that followed. Some additional training was provided at the beginning of the 2000-2001 school year.

16.2 Outcomes

As a result of the excellent leadership provided by the pilot's coordinator; the support received from the principal; the dedication and hard work of the pilot teachers; and the high quality products and support received from ActiveInk, BigChalk, Knowledge Adventure, and Softbook Press, the Rhodes Technology Academy pilot was successful. This section describes that success by summarizing the outcomes of the project.

16.2.1 *Goals and Objectives*

The primary goals of the Rhodes pilot were to:

- improve student achievement through the use of technology, particularly in the areas of mathematics and language arts; and
- evaluate the impact of the use of innovative technologies on the school's academic program.

Improve student achievement

Because of unavoidable delays in starting up the project and other factors, the pilot was conducted for only one school year. While that is not enough time to prove that the technology resources used by the school had the effect of raising student achievement, the results suggest that, if the pilot had been conducted for a longer period, such proof might well have been demonstrated.

As shown in Exhibit 16-1, the average GPA for students at Rhodes increased in comparison to the previous year from 85.83 to 86.37. Exhibit 16-1 also reflects that TLI Reading and TLI Math scores improved schoolwide. While these scores improved only a small amount, the project coordinator and pilot teachers believe that these increases are largely due to the use of the various tools provided by the partnering vendors through the grant. Moreover, it is probable that following a year's worth of experience using these technology resources, the teachers would be more adept at incorporating them into their lessons, which in turn should result in greater achievement gains.

EXHIBIT 16-1

	School Year	Mean	Minimum	Maximum
Grade Point Average	1999-00	85.83	70	98
	2000-01	86.37	70	96
TLI Reading	1999-00	79.47	21	100
	2000-01	81.22	38	100
TLI Math	1999-00	77.71	0	93
	2000-01	79.27	42	96

After working closely with the teachers and students during the course of the pilot, the project coordinator, who is also the school's technology coordinator, described the accomplishments of students as follows: "They succeeded beyond our wildest dreams in mastering the technologies and taking the program beyond what we ever thought we could accomplish." Obviously, from his perspective, the pilot was very successful.

Evaluate the impact of the use of technology

With the help of evaluators at the University of North Texas (UNT), Rhodes developed an evaluation process that to augment MGT's evaluation of the pilot. That process was a sound approach and, given time to follow the pilot longer, very likely would have provided conclusive evidence that technology had a favorable impact upon student achievement. The short duration notwithstanding, however, the results of the analyses of the UNT researchers coincide with those of MGT, both of which suggest that achievement gains did result from the pilot activities.

16.2.2 Accomplishments

As indicated above, Rhodes was successful in addressing the primary goals of the project. There were, however, a number of other accomplishments worth noting.

One such accomplishment was the fact that the technology proficiency of participating teachers increased during the pilot. At the beginning of the project, 14 teachers submitted self-assessment forms. Using a scale of 1 to 10, with 10 being extremely proficient, the average these teachers gave themselves was 5.0. At the end of the pilot, nine teachers completed the form. Their collective average rating was 5.86, reflecting an increase of almost one full point on the scale. Even more significant was the fact that, of the five teachers who submitted forms at both the beginning and the end of the pilot, their average ranking increased from 5.2 to 6.4, an increase of over 20 percent.

Part of the reason teachers improved their proficiency was the fact that they received training in the use of some very powerful products. As already mentioned, BigChalk Library, ActiveInk Online Project Curriculum, and Classworks Gold are all products that the teachers found to be very constructive resources in their classes.

Below are comments from two of the teachers at Rhodes who participated fully in the pilot. Their comments reflect the level of proficiency that at least some of the teachers at RTA have achieved.

- "I would not want to teach mathematics without the advantage of technology in the classroom. The advantages to the students are too great to do without."

- "Technology has become an integral part of my science instruction; furthermore, since I have begun integrating technology... I have seen great improvement in my students." In particular, my students "have gained a better understanding of concepts and problem solving skills necessary for their future endeavors."

Other accomplishments resulting from the pilot include the following:

- The original pilot application sought laptops to support some of their proposed activities. However, that component of the pilot was not approved. As a result, in order to address all the areas it planned, RTA was able to convince SAISD to provide the necessary funds to acquire laptops.

  The school purchased 18 laptops. Sixteen of the 18 were used primarily by students for the express purpose of assessing the long-term impact of these devices on learning. These laptops were also made available to other students occasionally as an information-gathering device for use on field trips. The two remaining laptops were available for teacher and parent checkout to facilitate extended professional development for teachers and parental tutorials for students.

  During one visit to Rhodes near the end of the year, MGT and TEA consultants were able to observe and interact with a few of the honors students who had been using these laptops. These students were very pleased that they had had the opportunity to use these computers during the year and described them as excellent tools for learning. They said that the laptops had enabled them to progress much further than would have been possible if they had not had the computers. To illustrate their work, they demonstrated several very sophisticated websites they had constructed. The web pages summarized research they had conducted and conclusions they had reached on various projects they had carried out as part of the pilot.

- The Rhodes pilot received significant parental support for the programs that were conducted as part of the pilot. Below are a few comments and quotes from parents that illustrate their favorable reaction to the use of technology at the school.

  – "Using technology is essential for my girls. It is preparing them for the world they will enter after high school."

  – "Using technology has been the best thing my daughter could have done. Her "knowledge of computers has surprised me. Her grades are great...I don't have to worry about failing grades because she knows what is expected of her."

  – "This program is very important and interesting to my son. These classes will help him get a better education for his future."

  – "So far I have had nothing but good comments from my daughter. I was able to observe one of her classes and all the students were involved and enjoying their class. I am pleased with the learning environment."

Based upon the outcomes and the gains in achievement they attribute to the pilot, the principal wants very much to continue all of its activities, providing he can find the funds to do so. Before school was out last spring, discussions had begun with vendors to explore ways of continuing.

16.2.3 <u>Vendor Support and Product Reactions</u>

Of critical importance to every pilot was the extent to which vendor partners provided support. Although all vendors operated under the same guidelines, such as the necessity to provide training and support as needed, there was considerable variance in the levels of support provided by different vendors. For the most part, RTA was satisfied with the support they received. Below is a description of the support received and some reactions to the products provided by vendors.

ActiveInk

ActiveInk Corporation provides online supplementary curriculum products for K-12 schools. This curriculum is delivered over the Internet, which means that teachers and students can access the resources from home. Teachers use the interactive resources in the classroom to supplement their regular teaching activities. Currently, the company offers two sets of online curricula: English language arts projects based on critically acclaimed literature, and a suite of environmental science projects. RTA used both the language arts and science projects.

According to the pilot staff, support provided by ActiveInk was very good. Their training was effective; their products were very reliable; and their online mentoring program was described as being very helpful.

During one site visit to Rhodes, a reviewer noted that a student who was in the midst of using ActiveInk resources was asked whether he preferred to use his textbook or the ActiveInk resources. Without hesitation he responded that he much preferred the ActiveInk resources to his textbooks.

BigChalk

BigChalk provides online access to content from over 3,300 publications, multimedia sources, and other sources such as newspapers, photo archives, map collections, etc. Their teacher materials were described as very good by pilot teachers. One teacher described the BigChalk resources as being particularly good at helping students improve their reading capabilities.

While BigChalk products were widely complimented by pilot participants, they received their most glowing praise for their training. Numerous participants described the BigChalk training as outstanding. Undoubtedly part of the reason for these positive comments was that the company provided an extensive amount of training. In fact, they provided more training than had originally been anticipated.

In addition to the above, there was one more reason why the BigChalk support was viewed so favorably. Unlike any of the other vendors, a BigChalk representative either called or came by periodically to check on the pilot's progress.

Knowledge Adventure – Classworks Gold

Classworks Gold is a flexible and open instructional management and delivery system that includes comprehensive curriculum materials for language arts and math for grades kindergarten through eight. The program has over 1,000 learning objectives and 8,000 activities, taken from the best educational software available. A customized version has been created for Texas, which incorporates the TEKS. Thus, Rhodes received the Texas Edition of Classworks Gold.

Rhodes experienced a number of problems with the operation of Classworks. Most troublesome was the tendency of the system to lock up, which of course prevents students from using it until operations have been restored. The problem arises when 11 or more students try to use the system concurrently. Upon being informed of the problem, Knowledge Adventure very promptly supplied a fix that had to be installed on the LAN that supported Classworks. Because it is a Novell network, and the school's technology coordinator is not trained in that environment, the fix had to be installed by the district's technology support office. For unknown reasons, however, the rest of the year passed without the necessary assistance being provided by district staff. Thus, it became a nuisance they learned to live with.

Despite these technical problems, the teachers and students have become very attached to the software. The teachers indicate that their students love it, parents are very favorably impressed with it, and all of the teachers describe it as an extremely valuable resource. Some of the comments about the package include:

- "it reinforces concepts;"
- "it is very kid friendly;"
- "it helps students meet the TEKS;" and
- "it helps students prepare for TAAS."

Despite the difficulties, Rhodes personnel describe the Knowledge Adventure staff as being very helpful and consider their support to be good.

Softbooks – Softbook Press, Inc.

Softbook Press provided 150 Softbook readers to Rhodes for the purpose of storing various information such as magazine articles, newspapers, and public domain books to facilitate language arts teaching. These readers hold up to 50,000 pages of content, including text and graphics.

A Softbook reader was provided to every special education student in the school and students became very fond of them. They proved to be very useful tools and students came to believe they were better than books.

Although there were some difficulties arranging for the training at the beginning of the project, Rhodes finally was able to schedule the training, which proved to be adequate. Probably because Softbook Press was bought by another company soon after they submitted their response to TEA's RFSOI, Softbook did not provide any additional support.

The general reaction to the Softbooks by Rhodes staff was summed up by the principal who described them as useful tools but their functionality was severely impaired due to the fact that very little of the promised content was ever delivered. In fact, only two novels were made available for use in the pilots. While there was a favorable reaction to those two novels, their usefulness did not last long. Clearly, Softbooks was not able to obtain the content that they had envisioned during the early stages of the project.

16.2.4 <u>*Costs*</u>

If it had been necessary for Rhodes to pay the full price of the pilot, the following are costs that would have been incurred:

- For the ActiveInk resources, the cost would have been $40,000.
- For the BigChalk resources, the cost would have been $55,000.
- For the acquisition of the Classworks Gold software and the associated training and support, the cost would have been $99,000.
- For the acquisition of the 150 Softbook readers, the cost would have been $60,000.
- Rhodes spent $23,800 for the 18 laptops.

The project coordinator stressed that he and others devoted a substantial amount of staff time to ensure that the pilot was effectively administered and, of course, an extensive amount of teacher time was expended on professional development.

16.2.5 <u>*Lessons Learned*</u>

As a result of conducting this pilot, there are a number of things that can be considered lessons learned. The following is a list of factors that should be considered by other schools that want to implement a similar program.

- While the Classworks Gold training provided by Knowledge Adventure was rated very highly, several teachers indicated that they would have benefited from more training on the product. They found that Classworks Gold was so comprehensive that in some instances it was very late in the year before they fully grasped some aspects of it and how best to employ it in their lessons.

- For a technology implementation such as this to be successful, the principal must be a strong technology proponent and provide the leadership necessary to ensure that all participants effectively fulfill their roles.

- According to the principal, the project would not have been successful without an on-site technology coordinator. Given the variety of products that were used in the pilot, the number of teachers that participated, and the normal amount of technical support that teachers require, much of the pilot's success was attributed to the on-site coordinator.

- The content that is to be used in a program such as this must be assured before the project begins. While there were very favorable reactions to the Softbooks, their usefulness was quite limited because Softbook Press was unable to obtain the content that Rhodes had understood would be available when they selected that resource.

Chapter 17

Spring Branch ISD:

Spring Woods High School

SPRING BRANCH ISD: SPRING WOODS HIGH SCHOOL

17.1 Description of the Pilot

Spring Woods High School in Houston, in the Spring Branch Independent School District, has approximately 32,000 students. Spring Woods serves about 2,100 students annually. Its student population is 53 percent Hispanic, 29 percent White, 10 percent African American, and 8 percent Asian/Pacific Islander.

The purpose of Spring Woods' pilot project was to implement and evaluate the effectiveness of using several new technologies to deliver instruction and improve learning by a small group of students who were recent immigrants to the United States. The pilot began in the Spring of 2000 with 20 students. All had been in the United States for less than two years. Most had been in the United States less than one year. By the end of the pilot, six of the students were no longer at the school, leaving 14 of the original 20 students participating throughout the pilot.

The Spring Woods pilot used a wider variety of technologies and had support from a greater number of vendors than did any of the other Ed Tech PILOTS. A total of nine different vendors provided technologies and support to Spring Woods during this pilot:

1. Intelligent Peripheral Devices provided AlphaSmart units (small portable remote keyboards with memory) for each student to use for note taking and word processing. These devices allow files to be transferred to each student's laptop computer or to printers.

2. Casio provided eight digital cameras for students to use in presentations they created as part of their classwork.

3. E-Instruction provided the Classroom Performance System, an infrared technology that enables teachers to get immediate feedback from every student in the class via their student response pad.

4. NetLibrary planned to provide on-line books and resource materials for the students to use. However, as the pilot progressed, none of the on-line books available from NetLibrary were found to be suited to the ESOL population that was targeted in this pilot.

5. NovaNET provided access to its Wide Area Network (WAN) of over 1,000 on-line courses. This vendor trained the Spring Woods PILOTS' teachers in the use of the NovaNET system. However, the teachers made little use of NovaNET because they judged that the NovaNET computer-assisted instruction was not ideal for the targeted population of students because of their limited English proficiency.

6. Prentice Hall provided an interactive biology textbook on CD-ROM for each student in the pilot. This technology was used during the first semester of the 2000-2001 school year, the only semester in which biology was taught to the students participating in this pilot. Because of the school district's network firewall, students were not able to have Internet access to *The Biology Place,* which Prentice Hall also planned to make available to this pilot as a supplement to its CD-ROM software.

7. Riverdeep provided a file server and networking to run its computer-assisted mathematics instructional system on each of the wireless laptop computers (Apple iBooks) that the school district purchased for the students involved in the PILOTS.

However, the file server was not installed until near the completion of the PILOTS. Therefore, Riverdeep's mathematics CAI received relatively little use in this school.

8. Vocabulary Enterprises provided *What's the Word?* This is a vocabulary building program that provides video and audio streaming, interactive testing, and online mentoring/tutoring over the Internet. However, due to technical problems with the website, Spring Woods was unable to make use of this technology.

9. WorldView provided the interactive software program called *World History: An Interactive Approach*. It addresses 80 of the 81 TEKS for world history. This software was used during the second semester of the 2000-2001 school year, the only semester in which world history was taught to the students participating in this pilot. Unfortunately, the pilot staff discovered that this software could not be used on the iBooks (i.e., it was designed for use on Windows operating systems and could not be used with the Apple operating system). Therefore, the WorldView software was loaded onto four Dell notebook computers and made available to students.

The Spring Branch ISD purchased Apple laptop computers (iBooks) for in-school use only by students involved in this pilot. The district also established wireless networks for these computers. Shortly after this purchase, the school district decided that all future computers purchased would have to operate on the Microsoft Windows operating system rather than on the Apple operating system. This change presented an additional challenge to teachers and staff involved in this pilot.

17.2 Outcomes

Spring Woods High School set out to accomplish the following objectives with its $90,000 pilot funding from TEA, the Apple iBooks purchased by the school district and provided to the targeted students, and the support from the nine different vendors noted above:

1. prepare to teach classes using laptop computers and other hardware and software provided by the participating vendors;

2. increase the academic achievement of students in core academic courses;

3. increase the percent of ESOL students passing the TAAS Reading, Writing, and Mathematics Tests and lower ESOL students' dropout rate; and

4. study the effects of using technology to deliver substantial amounts of curriculum.

MGT's independent analysis of the extent to which each of the above objectives was accomplished is presented below.

17.2.1 Prepare to teach classes using laptop computers and other hardware and software provided by the participating vendors

In April 2000, the five Spring Woods teachers involved in the pilot received their initial training regarding the various hardware and software they would be using. Ongoing technical support and assistance followed this initial training from the vendors. With minor exceptions, the Spring Woods teachers were satisfied with the training and technical support provided by vendors.

During the last six weeks of the 1999-2000 school year, teachers were able to begin using the new technologies with the 20 ninth-grade students targeted for this pilot. The schedules for these students were coordinated so that they would be together as a group in all four core subjects (English, mathematics, science, and social studies) for the entire pilot (i.e., for the remainder of their time in ninth grade and throughout their time as tenth graders).

MGT's many site visits to Spring Woods found each of the teachers and students involved in the pilot making extensive use of the new hardware and software that was available to them.

Thus, with the exception of a few software resources that were not used (as noted above), Spring Woods' goal of preparing to teach classes using laptop computers and other hardware and software provided by the participating vendors was accomplished.

17.2.2 Increase the academic achievement of students in core academic courses

Spring Woods submitted data that enabled pre and post comparisons to be made of the report card grades in math and English for some of the students who participated in the PILOTS:

- Of the eleven pilot students for whom English grades were available for the first semester in both the 1999-2000 school year (i.e., before the PILOTS), and the 2000-01 school year (i.e., in the middle of the PILOTS), three students' grades had improved and eight students' grades had gotten worse. The average English grades for these students in January of 2000 was 86.5 versus 84.2 in January 2001.

- Of the seven pilot students for whom math grades were available for the first semester of both school years, three students' grades improved and four students' grades declined. However, due to a very large improvement in one student's grades and only slight declines in two student's grades, the average math grade for these students actually improved from 72.1 in January of 2000 to 75.7 in January of 2001.

Thus, using the limited measure of report card grades, Spring Woods did not achieve its goal of demonstrating increased academic achievement by a majority of the students who participated in the PILOTS. Further, the school will not have information until the beginning of the 2001-02 school year to determine if it met its objective of reducing the dropout rate among ESOL students.

17.2.3 Increase the percent of ESOL students passing the TAAS Reading, Writing, and Mathematics Tests and lower ESOL students' dropout rate

Spring Woods compared the TAAS performance of students who participated in this pilot with their peers (i.e., other tenth-grade ESOL students). Exhibit 17-1 shows that the average score of students who participated in the pilot was substantially higher than that of the peer comparison group on the TAAS reading and writing tests.

EXHIBIT 17-1
COMPARISONS OF TAAS PERFORMANCE OF PILOTS STUDENTS WITH THEIR PEERS

TAAS Subtest Statistic*	Pilot Students	Comparison Group
Mathematics Avg. Score	82	Not Available
Mathematics % Passing	100%	Not Available
Reading Avg. Score	79	67
Reading % Passing	86%	Not Available
Writing Avg. Score	1563	1513
Writing % Passing	43%	Not Available

*A score of 70 or higher is needed to pass the mathematics and reading subtests. A score of at least 1500 is required to pass the writing subtest.

Although all PILOTS students passed the mathematics portion of the TAAS and had an average score of 82 on this subtest, Spring Woods did not provide data to compare these statistics from PILOTS students with those from their peer comparison group. Similarly, no data were provided to compare the dropout rates of students in the pilot with their peers.

17.2.4 Study the effects of using technology to deliver substantial amounts of curriculum

MGT administered self-assessments to all of the students involved in the pilot at Spring Woods High School. These self-assessments were administered both immediately before the pilot began and during the last month of the pilot. When MGT analyzed and compared students' responses, we found that these students reported nearly doubling the number of hours they spent using computers in school during a typical week as shown in 17-2.

EXHIBIT 17-2
STUDENTS' SELF-REPORTED WEEKLY USAGE OF COMPUTERS IN SCHOOL BEFORE AND AFTER THE PILOTS

Student Self-Assessment Question:	Average of Students' Responses Before the PILOTS	Average of Students' Responses After the PILOTS
About how many hours do you spend using computers in school during a typical week?	7.5 Hours	14.0 Hours

The self-assessments also gave students an opportunity both before and after the PILOTS to rate their teachers' use of technology to help them to learn. Exhibit 17-3 shows that the students of three of the four teachers who were involved in the pilot during the 2000-2001 school year perceived improvements in the effectiveness of their teachers' use of technology. The fourth teacher was rated highly before the implementation of the PILOTS and received an identically high rating at the end of the PILOTS.

EXHIBIT 17-3
STUDENTS' AVERAGE RATINGS OF THE EFFECTIVENESS OF THEIR TEACHERS' USE OF TECHNOLOGY BEFORE AND AFTER THE PILOTS

Students' Responses to Assessment Item:	Teacher A		Teacher B		Teacher C		Teacher D	
	Before	After	Before	After	Before	After	Before	After
On a scale of zero to 10, I believe this teacher's use of computers and other technology in the classroom should be rated a ___ for the way it helps me to learn.	7.9	9.7	8.1	8.1	4.3	8.3	8.4	9.0

Three of the five PILOTS teachers at Spring Woods completed self-assessments both before and at the end of their implementation of this project. Exhibits 17-4 and 17-5 compare these three teachers' responses to pertinent questions on the self-assessment instrument before and after their participation in the PILOTS.

Exhibit 17-4 compares teachers' self-assessments before and after the pilot. Two of the three teachers, when questioned at the end of the project, believed that students should spend less time using technology to learn. Although both before and after the pilot, all three teachers incorporated electronic technology into at least 50 percent of their students' instructional time, only one of the three teachers increased his or her use of technology in the classroom as a result of the pilot.

EXHIBIT 17-4
CHANGES IN TEACHERS' PERCEIVED IDEAL AND ACTUAL USAGE OF TECHNOLGY BEFORE AND AFTER THE PILOTS

Items on Teacher Self-Assessment Instrument:	Teacher #1		Teacher #2		Teacher #3	
	Before	After	Before	After	Before	After
Students like mine would be ideally served by teachers who incorporate appropriate electronic technology into approximately ___% of most students' instructional time.	75%	85%	80%	50%	100%	90%
Presently, I incorporate appropriate electronic technology into approximately __ % of most of my students' instructional time.	75%	75%	50%	20%	75%	90%

Exhibit 17-5 shows teachers' self-assessments before and after the pilot. One teacher believed he/she was more effective in his or her use of technology to improve student achievement; another believed he/she was less effective; and the third self-assessed no difference in his or her effectiveness. At the end of the project, two of the three teachers believed that students should spend less time using technology to learn. Although both before and after the pilot, all three teachers incorporated electronic technology into at least 50 percent of their students' instructional time, only one of the three teachers increased his or her use of technology in the classroom as a result of the pilot.

EXHIBIT 17-5
CHANGES IN TEACHERS' SELF-ASSESSED EFFECTIVENESS IN USING TECHNOLOGY TO IMPROVE STUDENT ACHIEVEMENT BEFORE AND AFTER THE PILOTS

Item on Teacher Self-Assessment Instrument:	Teacher #1		Teacher #2		Teacher #3	
	Before	After	Before	After	Before	After
On a scale of zero to 10, I believe my current use of technology should be rated a ___ in terms of its effectiveness in improving the academic achievement of most of my students.	8	8	8	5	8	10

The lack of self-assessed improvements by all teachers may be due to the high level of their effective technology usage even before the PILOTS. Two of these three teachers indicated that even before the PILOTS they attributed "substantial improvements" in the academic achievement of their students to the teachers' use of technology in the classroom. It is also important to note that five of the six ratings shown above are quite high, indicating that these teachers believe their use of technology is having a very positive impact on improving student achievement.

17.2.5 __Lessons Learned__

The major lesson learned in this pilot was the need for schools to know more about the technologies they would like to use before obtaining these technologies. It was not until after the beginning of the pilot that these teachers discovered the limitations of using NetLibrary or NovaNET instructional materials with this targeted group of ESOL students. This was especially unfortunate after the investment that NovaNET had made training the teachers to use its system. In the case of NetLibrary, the lack of availability of digitized books for use with the targeted population of students also should have been determined before the partnering of that vendor with the Spring Woods pilot.

Similarly, the incompatibility of some of the technologies provided by Prentice Hall, Riverdeep, Vocabulary Enterprises, and WorldView with the hardware used at Spring Woods should have been identified before making the decision about the vendors with whom the school would partner.

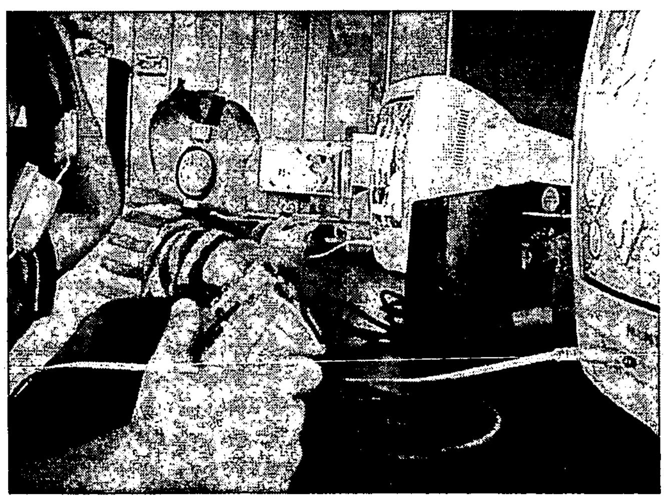
On a more positive note, this pilot did demonstrate that ESOL students could quickly learn to use a variety of technological tools that were made available to them including laptop computers purchased by the school district; peripheral devices provided by the vendors Intelligent Peripheral Devices, Casio, and e-Instruction; and software that included word processing and presentation programs. These students significantly increased their usage of computers from an average of 7.5 hours per week before the pilot to 14 hours per week near the conclusion of the pilot. They also gave their teachers very high ratings for the ways they used technology to help them learn.

This pilot also demonstrated that grouping ESOL students and having them work exclusively with a team of teachers who have been trained to use a variety of new technologies resulted in improved outcomes on the tenth grade TAAS examination.

Chapter 18

Tuloso-Midway ISD:

Tuloso-Midway Primary and Intermediate Schools



TULOSO-MIDWAY ISD: TULOSO-MIDWAY PRIMARY AND INTERMEDIATE SCHOOLS

18.1 Description of the Pilot

Tuloso-Midway Independent School District (TMISD) is a small district located in the northwest industrial section of Corpus Christi. It has slightly over 3,000 PK-12 students. The district follows a year-round calendar with intercession offerings for remediation and enrichment and is organized by grade centers rather than neighborhood schools. With respect to demographics, 51 percent of all students are Hispanic and 46.4 percent are white. Two percent of students are classified as "other." Limited English proficient students represent 3.5 percent of the total student population, and 43.8 percent of all students are economically disadvantaged.

Tuloso-Midway (T-M) Primary School serves all of the Pre-K, K, first-, and second-grade students in the district, while T-M Intermediate School serves all third, fourth, and fifth graders. T-M Primary has approximately 760 students, 60.3 percent of whom are economically disadvantaged. T-M Intermediate has about 670 students, and 62.6 are classified as economically disadvantaged. The ethnic breakdown of both schools is roughly the same as the district as a whole. The pilot was conducted in grades 2, 3, and 4.

The goal of Tuloso-Midway's pilot was: "Through the use of Lightspan technologies, an increase in academic achievement, improved parental involvement, and literacy development will be accomplished through an extended-day program."

The objectives of the pilot were:

- 80 percent of the students enrolled in Lightspan will increase their mastery level of TAAS;
- 100 percent of teachers directly involved with Lightspan will participate in the staff development program;
- Lightspan will be offered outside of the traditional school day;
- Lightspan will be set up in satellite sites to reach economically disadvantaged students; and
- through the use of the parent component of Lightspan, 85 percent of the parents of students in the program will increase their involvement in the educational process.

TMISD identified four special student populations whose needs the pilot was to address. Those four populations were title students, economically disadvantaged students, at-risk students, and special education students. Both third- and fourth-grade students in these special groups have scored significantly lower on TAAS tests than students who are not in these groups. Consequently, the pilot was designed to raise the scores of the students in these special population groups.

TMISD partnered with the Lightspan Partnership to address the needs of these students. Lightspan provided the equipment, the software, and the training that the teachers required in order to integrate a comprehensive curriculum program. The program was offered during an extended-day program and also during an extended-year program. In addition to the program at the Primary and Intermediate Schools, the district also planned to set up two satellite programs in a federal housing project and in a community hall in economically disadvantaged neighborhoods.

18.2 Outcomes

As a result of the leadership provided by the pilot's coordinator; the support received from the principals; the dedication and hard work of the pilot teachers, and particularly the lead teachers at each school; and the quality products, training, and support received from Lightspan, the Tuloso-Midway staff believes the pilot was successful. This section summarizes the outcomes of the project.

18.2.1 Goals and Objectives

As identified above, the following are the objectives of the Tuloso-Midway pilot:

1. 80 percent of the students in the special population groups, enrolled in Lightspan, will increase their mastery level of the TAAS test;
2. 100 percent of the teachers directly involved with the Lightspan program will participate in the staff development program;
3. Lightspan will be offered outside the traditional school day;
4. Lightspan will be set up in satellite sites to reach economically disadvantaged students; and
5. through the use of the parent component of Lightspan, 85 percent of the parents of students involved in the program will increase their involvement in the educational process.

80 percent of the students in the special population groups enrolled in Lightspan will increase their mastery level of the TAAS test

Although teachers contend that students have improved academically, at the time of this report data identifying the achievement status of students had not been received by MGT. TAAS results were to have been received by Tuloso-Midway ISD in July.

100 percent of the teachers directly involved with the Lightspan program will participate in the staff development program

This objective was fully achieved. The majority of training was provided in the Spring of 2000. Additional training has been offered for teachers new to the project. The Lightspan training has also provided follow-up as needed.

All participants in the pilot describe Lightspan's training as excellent. Moreover, the individual who provided the training has been a great resource for the schools, and she has always been available when they have needed her.

Lightspan will be offered outside the traditional school day

This objective was accomplished and was ongoing throughout the pilot. In fact, this program was entirely an after-school program; the resources were not used during classes. Second-grade students used the equipment after school on Tuesdays, Wednesdays, and Thursdays at Tuloso-Midway Primary, while third and fourth graders also used it after school on Tuesdays, Wednesdays, and Thursdays at the Intermediate school.

Lightspan will be set up in satellite site(s) to reach economically disadvantaged students

At the beginning of the pilot, two satellite sites were established, one at the LULAC housing complex and the other at Our Lady of the Rosary church. The LULAC site had very good success throughout the pilot. Five to nine students (second, third, and fourth graders) typically attended from 3:30 to 5:00 in the afternoon on Mondays and Wednesdays.

Soon after it was opened, attendance began to drop off at Our Lady of the Rosary. The pilot staff concluded that it was located too near the schools and the students preferred to stay at school rather than go to that site. As a result, TMISD abandoned the idea of holding a Lightspan session after school at that location.

Through the use of the parent component of Lightspan, 85 percent of the parents of students involved in the program will increase their involvement in the educational process

Parental response to the Lightspan program has been very good. Teachers report that parents want their children in the program and are very disappointed if they are not included. Some parents have even inquired about buying the program themselves.

While the interest and support from parents has been very high, at the time of the report no data had been received from TMISD that indicated whether this objective had been met.

18.2.2 Vendor Support and Product Reactions

An obviously critical part of every pilot was the nature of the support provided by the vendor partners. As might be expected, some companies provided considerably better support than others. Tuloso-Midway was totally satisfied with the support they received.

Lightspan

The Lightspan interactive curriculum is a comprehensive set of software designed to meet most needs in the core subject areas of mathematics and reading/language arts for grades K-6. It includes many tutorials geared to review skills introduced in the regular classroom. It also provides positive feedback to students to improve their skills and confidence. The program is supported by Internet resources that provide daily learning experiences, classroom activities, curriculum-enhancing tools, and communication with other Lightspan schools. It also includes a parental and family involvement component that allows students to use the program at home.

The Tuloso-Midway pilot participants praised the Lightspan products and support. They were very pleased with the training that was provided and were especially complimentary of the follow-up that the Lightspan representative offered.

Administrators, teachers, students, and parents all liked the products very much. After they had the opportunity to observe their students use the Lightspan resources, teachers began to lobby to have them placed in their classrooms so they could use them during the regular school day. Students became very enamored with both the language arts and math programs, to the point that often teachers had to ask them two or three times before they would allow another student to use the workstation.

Parents were provided training that allowed them to take the resources home so that together they and their children often became actively involved in learning. As indicated above, parents whose children were not designated to use the products tried to have their children placed in the program, and some even explored the possibility of buying the products.

The one difficulty TMISD encountered with the system was that they originally thought they could use computer monitors with the Lightspan products. However, they soon learned—after a trial period—that they would need to use television monitors instead. Thus, this caused an unexpected expense and some delays in initiating the program.

18.3 *Costs*

If it had been necessary for Tuloso-Midway to purchase the Lightspan resources required to conduct this pilot, that cost would have been approximately $150,000. In addition, because of the nature of the project—that is, it was an entirely after-school program—TMISD incurred several out-of-pocket expenses that could not be covered through the allocation of regular staff development funds. Included among those costs were extra-duty pay for teachers who worked with students in the afternoons from 3:30 to 5:00 during the pilot, and pay for bus drivers who provided transportation for the extended-day program. The total of these expenses was approximately $56,000.

Another cost that was incurred was the acquisition of the television monitors that were necessary to operate the Lightspan software. At the time this report was prepared, TMISD had not provided those cost figures to MGT.

Like the other pilots, TMISD provided a considerable amount of in-kind support in the form of administrative oversight and staff development that was necessary in order to ensure that the pilot operated effectively.

18.4 *Lessons Learned*

There were two items that could be characterized as lessons learned that came out of the TMISD pilot. They are described below.

- It is important to fully understand the products a school acquires for a program such as this. Because TMISD did not fully appreciate or understand the Lightspan products, they thought they could implement it using computer monitors. When they began to initiate the program, however, they found that television monitors would be needed instead. Hence, they were delayed in starting the project due to this lack of full understanding.

- The successes TMISD experienced with parental involvement confirmed the criticality of providing access to classroom materials at home. After parents had been trained in the program and exposed to its use, they frequently joined with their children in the evenings to work on math or language arts lessons. One principal indicated that on several occasions she heard a parent of one of her students declare, "I am learning too!" Needless to say, this parental involvement also had a very positive effect on the learning experiences of their students.

18.5 *Conclusions*

In addition to the lessons learned described above, at least one conclusion can be drawn from the experiences of the Tuloso-Midway Primary and Intermediate pilot that relate to the overall objectives of TEA's Ed Tech PILOTS Project.

Based on the comments of the second and fourth grade lead teachers who guided the efforts of their respective schools in the pilot, the Lightspan resources represent a comprehensive product that delivers substantial curriculum content to students. Not only did the product prove to be highly motivational and engaging for students, but many parents reported that it enabled them to help their children and some even admitted that it helped them learn as well. Regardless of whether it helped parents learn, it prompted them to become more involved in their children's learning activities.

Chapter 19

Lessons Learned

LESSONS LEARNED

This chapter provides some insights into a number of factors that influenced the implementation of the pilots and amplifies upon the lessons learned identified in the *Interim Report on Ed Tech PILOTS* (Chapter 6.0), dated December 1, 2000.

19.1 Lessons Identified Earlier

There were five factors addressed in the Interim Report:

1. **The level of private sector participation in pilot projects is subject to a significant number of variables**. This addressed the concern that the involvement of the private sector was significantly less than expected.

2. **When educational technology resources critical to a project are dependent upon donations from vendors, two outcomes are probable.** Those are:

   - the number of resources provided will not satisfy the requirement; and

   - significant delays will occur while efforts are made to adjust to the changes.

3. **Careful planning and flexible implementation greatly enhance the opportunities for success**. This addressed the need for planning at schools related to turnover in staff, the transition from traditional to technology-rich classrooms, compatibility with both technology and other existing school structures, and comfort with new approaches to teaching and learning.

4. **The transition from providing content via print to providing content via technology requires a shift in perception from all stakeholders**. Both content providers and schools are faced with unexpected challenges in this transition.

5. **Replication of the pilots may not involve some of the challenges encountered by pilots**. The pilots (by their very nature) and the demands of data gathering, etc., are encumbered by challenges that schools seeking to implement similar models may not encounter.

19.2 New Insights into the Earlier Lessons

Study of the pilots since the *Interim Report* was issued yields additional insight into each of the identified factors.

1. **The level of private sector participation in pilot projects is subject to a significant number of variables.** The *Interim Report* addressed the less than anticipated number of technology and content providers, especially traditional textbook companies, that chose not to participate in the pilots and the reasons they did not participate. Since the *Interim Report* was issued, additional Lessons Learned about private sector involvement have surfaced.

   - **Changes within a company or with its partners can significantly affect its customers.** The TEA/MGT team went to great lengths to qualify participating companies and products in this project. The thinking was that schools will be concerned with unavoidable disruption trying to install new technologies, train personnel to use these new technologies, and demonstrate how to teach with them. Thus, working with unproven companies and technologies would not inform the study and would place an undue burden on the schools. Strict criteria were therefore created for private sector participation. Even with these cautions in place, significant problems arose. One company (Softbook Press) promised 150 devices per district for use in the pilots. While three schools selected the Softbook Readers, only one of them received the products. About the time the project was beginning, Softbook Press was purchased by another company and as a result, its commitment to the project vacillated over the time of the pilots.

Another company, NetLibrary, anticipated being able to deliver hundreds of print titles electronically for schools involved with the pilot project. Due to breakdowns in negotiations and other problems, schools choosing to use NetLibrary resources had only a limited set of materials to use during the term of the pilot. As a consequence, most schools opted not to use the NetLibrary resources.

The lesson is that school districts should be as fully informed about a company and its products as possible and have back-up products and services in mind, even as they purchase.

- **Companies are willing to "go the extra mile" to serve school districts.** This pilot study is filled with stories of teachers, administrators, and students praising the involvement of their private sector partners. These partners provided training, installed products, and provided technical support at no charge to the state or the districts as required by the terms of participation in the project. They provided these products and services in a high quality manner. Almost without exception, the training was rated as excellent. Even when there were server problems or other technical problems, they were addressed fully and completely. Representatives of several companies showed up from time to time simply to check on how things were going, thereby reflecting their true interest in making the project a success for students and teachers.

  The lesson here is that the members of the private sector that participated in this project, even some of those who had difficulty as described above, were willing to do everything possible to make the pilots a success. While cynics may argue that success in these projects would garner positive publicity and free marketing for their products and services, reports from school districts affirmed true caring and concern for the welfare of the students and teachers.

2. **Careful planning and flexible implementation greatly enhance the opportunities for success**. Most of the school districts represented in the pilots characterized themselves as above average in use of technology in education. Yet, even among these relatively sophisticated school districts, there were some problems with implementation that careful planning could have avoided. (In all fairness, some of these problems were a result of timing that could not be avoided due to the circumstances of the study.)

   - Some school districts implemented software such as Classworks Gold on their own servers. In some cases, this resulted in server capacity problems. While the system needs for the software were explained in information provided to the school districts, there were installation problems. Knowledge Adventure was prompt and thorough in addressing the issue. Nonetheless, it caused some delays and additional expenses for server upgrades in some sites.

- In another example, one district using Lightspan found they had to purchase TV monitors to use instead of relying upon computer screens. Information provided by Lightspan noted this potential problem. In another instance, a school that used only Apple Macintosh computers selected software that ran only under the Microsoft Windows operating system. Other schools chose Decision Development Corporation (DDC) software for middle school social studies, only to find that the TEKS for middle school social studies do not match the objectives of DDC's software. To DDC's credit, they provided other software for use in the project that did match the TEKS.

- The lesson is that careful planning and attention to all details of the specifications of the products and services is critical in selecting and purchasing those products and services. School district personnel often have not received sufficient training, nor do they have sufficient time to thoroughly investigate all aspects of specifications prior to purchase. They often rely on references from neighboring school districts or the vendor (who may not know all the specifications of the school's installed base of equipment). Some of the most valuable aspects of technology—vast power allowing for access to a broad array of information, flexibility in how this information is stored, accessed and displayed, etc.—is a result of how the hardware, content, and infrastructure work together. This complexity requires school districts to take more time in selection of all components. Textbooks require less time and planning in that they are known, they have gone through a preliminary screening process by the state, and they are limited in quantity and flexibility.

- On the technology side, there were a number of things that school districts did not plan for, because they did not know or anticipate the problems. This is where the flexibility comes in. For example, much of the software today is written for state-of-the-art hardware. However, in a typical school, there is a wide range of computers, both in terms of age and capacity. Implementing projects with current software in some cases would require technology upgrades. One of the challenges encountered with the wireless technology was that it was very difficult to get a whole classroom full of wireless laptops to connect to the server at any one time. Battery life of laptops also was an issue. All participants agreed that at some point during the school day the laptops would have to be plugged in. It was difficult to find enough outlet space to do so. As technology becomes more pervasive in schools, these logistical issues will need to be addressed carefully in the planning process.

- Another critical area for planning involves personnel. In several pilot sites, key staff left the project for a variety of reasons. The result was everything from minor delays and disruptions during the transition to new staff to virtual collapse of the entire pilot study at that site. Personnel redundancy is critically important to success in implementing any major change. When "the champion" of a project leaves, other staff must be ready to "pick up the charge." In the literature on change, one benchmark of success of a program or innovation is the extent to which the program or innovation survives its founder or champion leaving.

- Training is another area where planning is key. While teachers and other pilot participants universally praised the training they received through the pilot program, they also universally asked for more training. Educational research on professional development is clear: professional development must be on-going. In addition, even those not directly associated with the pilots wanted training as they began to see the excitement in students who were coming from classes which were using technology from the pilots.

3. **The transition from providing content via print to providing content via technology requires a shift in perception from all stakeholders.** The *Interim Report* explored in detail the lessons learned with brokering agreements between print publishers and intermediaries. The further experience of the pilots has borne out the concerns addressed in the *Interim Report*. Whether the intermediary was a service such as NetLibrary, or a technology such as Softbooks, the promised result was slow to come, if it did at all. Unfortunately, experience with traditional textbook publishers was somewhat limited in this pilot. The lesson learned here is that the jury is still out on the extent to which intermediary products and services can bridge the gap between electronic and print content in the K-12 schools. It may be that the need for intermediary products and services will diminish as traditional content providers wade into the technology delivery role.

4. **Replication of the pilots may not involve some of the challenges encountered by pilots.** The *Interim Report* addressed the challenges that school districts had in being involved with these pilots, including the application and selection process, the availability of specific content, providing detailed evaluation documentation, etc. In addition, it noted some of the benefits of participating such as the provision of detailed descriptions of the content and capabilities of content or technology, the facilitation of communication between and among the private sector participants and between and among participants in the pilot project. This pilot was envisioned as more of a research study than most other pilots that have been initiated by the Legislature or TEA. To that end, money was provided to school districts to assist in whatever way they deemed necessary to gather data for the project. A system of surveys and other measures was created by the TEA/MGT team to gather information that would inform public policy. Yet, as of this writing, there are gaps in the data to be collected from districts. Some districts provided partial data, some provided none. In spite of clear expectations at the beginning of the project, both in writing and in meetings, the data set is incomplete. The lesson here is that if school districts are to be a part of research studies, additional emphasis, training, incentives and sanctions need to be implemented to ensure that all data necessary to completion of the research is provided.

19.3 Additional Lessons

There are other lessons learned from the pilots project beyond those discovered early on and reported in the *Interim Report on Ed Tech PILOTS*, lessons that should prove useful to policy makers, school districts and members of the private sector serving school districts.

1. **Additional and different measures of technology's impact on students and teachers are needed**. The TEA/MGT team created instruments and gathered other data intended to measure various aspects of the impact of technology on students, teachers, parents, the school, and the teaching/learning process. In that process, care was taken to make the instruments easy to use and to gather data that is commonly found in schools.

   As occasionally happens in educational research, some of the data gathered conflicts with anecdotal information. For example, in one site, survey data from teachers showed a significant decline in the amount of time they thought students should be using technology in schools as well as a lower rating of their own effectiveness with technology. Yet interviews with these same teachers indicated a strong belief that technology was helping the students learn more and better, that students were more excited about learning since they were able to use technology, and story after story of student epiphanies. It may be that the surveys, designed to take a relatively short amount of time, were not able to tease out key answers, or it may be that teachers, frustrated by the occasional technical problem or other implementation issue, used the surveys to reflect that frustration. Starting innovative projects always creates a certain level of discomfort and some disruption until teachers and students get comfortable using the new tools. One reason for gathering various types of data, and especially going on site visits, is to ensure that one gets a complete picture of what is happening in the study. Pulling together and interpreting these sometimes conflicting data from a variety of sources can be a challenge.

In other cases, anecdotal data gathered through interviews was the only way to understand the nature of what was occurring in the classroom. One of the most frequently cited benefits of using the technology in the classroom over time was the growing self-confidence of the students. Measuring a student's self-confidence is a rather sophisticated and complex activity, and does not show up on an easily administered instrument. Yet teachers who work with students on a day-in day-out basis can see minor changes in students' behaviors in the classroom, in the hallway, or on the playground that clearly show increased self-confidence. The extent to which this newly gained self-confidence can be clearly documented and attributed to technology use in the classroom is difficult, yet the teachers who know the students have little doubt. A related issue is teachers' self-confidence, particularly in using technology. Principals often cited this as an additional benefit as well, and some principals thought the self-confidence with the technology carried over into other aspects of the teaching. The lesson learned here is that while this project gathered more data than most pilot projects, there always is a need for more data to get an even more complete explanation of what has resulted from an implementation of any innovation.

A final piece of information relative to the success of individual pilots is the extent to which the pilots will be carried forward and expanded after the grant and support from TEA ends. At a May 8, 2001 meeting of representatives from all the pilots, this was discussed. Virtually every pilot site was making plans to extend and/or expand the pilot efforts. Much of the discussion actually focused on how they were going to expand, what they were going to do differently, how they were going to get additional funding, etc. Some may call this the ultimate measure of success—the commitment of local dollars toward an innovation.

2. **Involving parents can increase with technology.** A number of pilots specifically wanted to involve parents in the school through the use of technology. Virtually all sites had a parents' night or similar event to kick off the pilot activities. The principals' survey indicated there was a significant increase in communicating successes with technology to both the home and the community and technology is often or extensively used to communicate with parents. In one of the schools, teachers wanted to increase e-mail between the school and parents, and the parents did not care to do so. They did not want additional e-mail added to their current load. Other sites, especially those using the Lightspan technology, were more successful at involving parents. This could be attributable to the age level (elementary), the software, or the persistence of the teachers.

3. **Support for teachers is critically important.** Support in this case is of two kinds: administrative support and technical support. In the most successful pilots, principals showed great interest in what was going on in the classroom and supported teachers in a variety of ways. In addition, the district administration was interested and supportive and at times provided additional equipment, and occasionally personnel. Technical support is equally important. The technology must work for students and teachers to be successful. In one site where it did not work well at first, a teacher became so discouraged that she felt any effort to use technology was not worth the trouble. Other teachers went so far as to create two lessons -- one to use when the technology worked and one to use if the technology did not work.

   To address this support issue, one pilot created a system where a cadre of teachers, one for each wing of the building, was trained to do troubleshooting and fix minor problems. While this worked rather well, the principal still felt that training for all teachers in minor troubleshooting would have been very beneficial. Thus at this school, as with all other pilots, technical support arose as one of the most important issues for teachers.

4. **Professional development is the keystone for success.** While some term professional development as another component or aspect of support, we believe it deserves special mention. Professional development needs to be of two types—learning to use the technology itself, and integrating the technology throughout the teaching and learning process. When both of these elements are provided to teachers, the teaching and learning environment becomes more exciting, students are more involved, and the technology is used and used effectively.

5. **Different populations of students can flourish with technology**. As has been noted elsewhere, the impact on student achievement as measured by such traditional measures as standardized test scores and grades, tends to show up much later after implementation of an innovation. Other attributes of student achievement such as enthusiasm, self-confidence, motivation to do well in school, higher ambitions, etc. are less easily measured. However, comments by teachers on visits strongly indicated that low socio-economic status students and ESOL students tended to gain significantly from their use of technology. Achievement data from some of the pilots support these observations by teachers. For example, in one elementary school, where writing had been a significant problem, Hispanic 4^{th} grade student TAAS writing scores increased from 88 percent passing to 100 percent passing. Similarly, economically disadvantaged student TAAS writing scores increased from 86 percent passing to 96 percent passing.

   Some schools cited in their "lessons learned" a wish that they had made a more concerted effort to include special education teachers and students in their pilots as they saw enormous interest and potential with these students.

6. **Technology does change the teaching and learning environment**. In spite of the fact that the pilots did not run for much more than a year, observations from researchers showed that often there was significant change in the teaching and learning environment as a result of the use of technology. To illustrate, this example comes from a middle school observation: "Although....significant change in classroom instruction can be daunting for teachers, with time, support and training, they can achieve a new level of creativity and satisfaction in their development of learning experiences for students. Once a teacher is able to feel comfortable using technology, she or he can find satisfaction in creating innovative, cross-disciplinary and meaningful lessons."

And, "In addition, observations showed significant change in students' social skills, in terms of how they were able to work cooperatively on technology-based projects. During the beginning phase of this project, classroom observations showed that student collaboration was somewhat haphazard. Some students worked alone, while others worked in groups of up to five, gathered around a single laptop. Some laptops were left unused. Subsequent site visits indicated a change in the way collaboration occurred. It appeared that students worked in assigned groups of 2-3 students. Each small group sat together at a single table, and each used his/her own laptop, instead of crowding around a single laptop. Collaboration across groups was still spontaneous and frequent, as one group figured out how to accomplish a task and others asked for their assistance. However, the collaboration appeared more purposeful than during initial site visits."

Another example from one of the pilots: "During the course of the pilot, observations have indicated that students became much more self-directed in their learning and increased their time on task. By the end of the second year, students were able to come to class and begin working on their research projects immediately, with little or no teacher direction. The noise level decreased—students were staying very focused on their research. Students also naturally came together in pairs or small groups to compare notes and make suggestions for finding good research sources. The classroom talk became more learning-centered, rather than social. In fact, by the end of the class period, students were reluctant to leave their research projects, and the teacher had to remind them that it is time to leave and go to their next class."

Chapter 20

Recommendations

RECOMMENDATIONS

This chapter provides recommendations that will enable similar projects to operate more effectively in the future and that will enhance education in Texas through the use of technology.

20.1 Recommendations

Based on the experiences of the pilots and a review of the relevant research in technology and education, the following recommendations should enable similar projects to operate more effectively, and enhance education in Texas through the use of technology.

Recommendation 1:

Create a new process to fund and carry out research that is different from the current grant process.
The purposes of grants and the purposes of research often are very different. As such, they should have different processes for involving school districts. The **competitive grant process** has been refined over many years to ensure that the competition for funds is fair and equitable, yet still meets the requirements of the grant.

A research process would have different purposes and hence a different process. This process should be flexible, allowing TEA, for example, the possibility of selecting school districts for research without competition, if this would expedite or make the research more effective. In addition to flexibility, the process would incorporate well-established research procedures. Finally, it would also allow TEA to provide incentives or create sanctions for such activities as data collection.

Recommendation 2:

Implement additional pilots that examine the feasibility of providing substantial content via technology.
Even with the limited time for this study, areas of great promise began to emerge from the pilot sites. These areas should be investigated further and some of the school districts involved in the Ed Tech PILOTS should be asked to participate in these further investigations. Using a new research process, study of some or all of the areas listed below should yield significant information that will inform policy makers. Changing the delivery of content into the teaching and learning environment is changing one of the most fundamental aspects of education. It deserves special attention. The following are but a few of the areas that could show great promise:

- using technology with at-risk students;
- using technology with special education students;
- exploring strategies for increasing parental involvement through technology-oriented programs;
- partnering with one or more publishers to determine what it would take to create and deliver digital content to through a variety of technologies to an entire campus or district;
- assessing the potential for using handheld devices in the classroom; and
- studying the implications of infusing large amounts of technology on the infrastructure of the school.

Recommendation 3:

Encourage more curriculum content to be delivered electronically.
It is clear from the pilot study—and interviews with teachers in particular—that having substantial electronic content available is extremely valuable to teachers when a number of criteria are met. Those criteria include:

- the content matches the TEKS;
- the hardware and infrastructure are readily available to teachers and equitably accessible to students;
- the teachers have had training on how to access and use the content in their classrooms as part of the teaching and learning process;
- the teachers have confidence that the hardware, infrastructure, and content will consistently work well; and
- the teachers are supported by their principals in using on-line content.

Teachers want substantial electronic curriculum content when they know how to access and use technology effectively and typically publishers will develop more electronic curriculum content when they know teachers have access and know how to use technology effectively. Efforts to encourage more curriculum content to be delivered electronically will promote teacher use of that content in their classrooms as a part of the teaching and learning process.

Recommendation 4:

Develop strategies for helping districts supply an adequate level of technical support to their schools.
In the Ed Tech PILOTS, as in most other pilots, technical support proved to be extremely critical to success. For a variety of reasons, most school districts do not provide the level of technical support that teachers need in order to integrate technology into their curriculum successfully. This is an area where education is significantly behind business in the application of technology. Such strategies might include some combination of the following:

- incentives to districts to increase the allocation of local funds to support this function;
- funding assistance from the state through allotment funds or other means;
- contractual support from private vendors; and
- increased support from the regional education service centers.

20.2 *Existing Strategies*

The state has several strategies in place to assist districts in **planning** for and implementing technology programs. **The Long-Range Plan for Technology 1996-2010** is organized around the key areas of Teaching and Learning, Educator Preparation and Development, Administration and Support, and Infrastructure for Technology. The **Technology Allotment**, which provides $30 per student per year, assists districts in meeting the goals of this plan. This dedicated funding allows districts to plan for long-term goals and objectives. The Educational Technology Advisory Committee (ETAC) has developed the **Texas STaR Chart**, a tool for planning and assessing school technology and readiness aligned with the Long Range Plan for Technology. The statewide Educational Technology Coordinating Council's (ETCC) **State of Texas Master Plan for Educational Technology 2000-2003** recommends that the Texas STaR Chart serve as the standard for assessing technology preparedness in K-12 schools.

The **adoption process** for **instructional materials** has defined textbooks to include electronic curriculum content and provide a wider array of choices for school districts. **Technology proficiencies for students and teachers** have been established. A wealth of resources correlated to these proficiencies are available on the TEA web site. To best use these resources **professional development** opportunities are available from a variety of sources. Districts are encouraged to use the tools and resources available to effectively plan and implement educational technology programs. The ETAC is currently developing a campus based STaR Chart with a planned release during the 2002-2003 school year. The Texas StaR Chart is available online at http://www.tea.state.tx.us/technology/etac/txstar and provides charts and graphs to assist districts in assessing their technology readiness. A variety of technology planning resources are available at http://www.tcet.unt.edu/tek-plan.htm to assist districts.

The world of technology is changing every day and many of the tools and resources now available were still on the drawing board when these pilots were launched. With this rapid pace of technological innovation, it is essential to continue to explore the potential of technologies and digital content to improve teaching and learning. Additional pilot projects based on the lessons learned in this and other studies should help determine how **educational technologies can provide increased learning opportunities for Texas students.**

Appendices

Appendix A - Principal Survey

Appendix B - Teacher Survey

Appendix C - Teacher Self-Assessment

Appendix D – Student Assessment of Teachers

APPENDIX A

Ed Tech PILOTS

Principal Survey Results

Baseline Data vs. End of Study Data[1,2]

BACKGROUND INFORMATION

Gender:

5 (5)	Male	4 (4)	Female

Ethnicity:

African-American		White, non-Hispanic	7 (7)
Asian-American		Multi-ethnic	
Hispanic	2 (2)		
Native-American			

What is the highest degree you have received?

Bachelor's + Teaching Credential		Master's + units beyond	8 (8)
Bachelor's + units beyond		Doctorate	
Master's	1 (1)		

Do you have a computer at home?

3 (2)	No	6 (7)	Yes
		5	CD ROM
		1	Internet
			Both

[1] All results are indicated as the frequency of responses.

[2] Results from the baseline survey are in parenthesis and the responses from the end of the implementation are shown to the left of the baseline data.

SECTION I: STUDENT INFORMATION

Please describe how frequently each occurs. Most of the students at my school:

	Never	Rarely	Sometimes	Often	Extensively	Don't Know
1. Use technology to become more competent in basic skills		(1)	1 (2)	5 (4)	3 (2)	
2. Are able to communicate electronically with others	(1)		2 (3)	2 (1)	5 (4)	
3. Can independently conduct electronic information searches		(1)	(1)	3 (5)	6 (2)	
4. Use technology to better understand the relationship between real life situations and academic concepts		(2)	3 (3)	4 (4)	2	
5. Use traditional data sources (paper-based encyclopedias, dictionaries) to gather information)		1 (1)	2 (3)	3 (3)	3 (2)	
6. Use technology to gather information from data sources that emulate traditional data sources (e.g., electronic encyclopedias)		(1)	3 (1)	1 (7)	5	
7. Use technology to access data sources previously unavailable without technology (e.g. demographic data from the U.S. Census website)		1 (3)	1 (4)	2 (2)	5	
8. Use technology to solve simple, exercise style problems (e.g., list the population of several African nations over the last five years)		(5)	3 (3)	5 (1)	1	
9. Use technology to solve complex, real life problems		(3)	5 (5)	2 (1)	2	
10. Work in groups as a result of using technology (sharing electronic files, emails, etc.)		1 (1)	2 (5)	1 (3)	5 (2)	
11. Are motivated by the use of technology			(7)	3 (2)	6	
12. Are actively engaged in learning through the use of technology			(3)	4 (5)	5 (1)	
13. Use technology to create complex integrated products, for instance stock market portfolios using Internet investment resources	1 (1)	1 (3)	3 (3)	2 (2)	2	

	Never	Rarely	Sometimes	Often	Extensively	Don't Know
14. Strategies for grouping students for instruction are determined by technology	(2)	2 (2)	4 (4)	1 (1)	2	
15. Students and teachers use a variety of technologies, such as scanners, digital cameras, computers, graphing calculators, video microscopes, to enhance instruction			(5)	3 (3)	6 (1)	

Please indicate whether a particular use of technology is part of common instructional practice in the school.

	Commonly Used	Not Commonly Used	Don't Know
16. Use of electronic search systems	9 (6)	(3)	
17. Use of electronic bulletin boards	2 (1)	4 (8)	3
18. Development of Web pages	5 (5)	4 (4)	
19. Use of word processing programs	9 (9)		
20. Use of spreadsheet programs	7 (6)	2 (3)	
21. Use of presentation programs (e.g., Hyperstudio, Powerpoint)	9 (5)	(4)	
22. Use of email	9 (6)	(2)	(1)
23. Searches on the Web for class assignment related material	8 (6)	1 (3)	
24. Searches for professional/personal use	8 (5)	1 (3)	(1)
25. Use of commercial content specific software	5 (4)	3 (4)	1 (1)
26. Development of multimedia class projects	8 (3)	1 (6)	
27. Use of drill and practice software	8 (5)	1 (4)	

SECTION II: CLASSROOM INFORMATION

For each item below, please select the statement that best completes the following sentence:
In most of the classrooms at my school, ...

28.	The educational software available is not matched to the learning content.	(3)
	Educational software available is matched to the learning content but supports primarily "drill and practice."	2 (3)
	Educational software available supports learning content using a variety of strategies to support student learning.	7 (3)
	Don't Know	
29.	The teacher directs most of the activities	1 (3)
	Students share some, though not a large portion, of the control for their learning	5 (3)
	Students direct most of their own learning with the teacher assuming a guiding role	3 (3)
	Don't Know	
30.	Students work almost exclusively as individuals rather than in teams	(2)
	Students are experimenting with collaborations, though this is not yet the norm	3 (3)
	Working in teams is the norm students	6 (4)
	Don't Know	
31.	Teachers work almost exclusively as individuals rather than in teams	1 (2)
	Teachers are experimenting with collaborations, though this is not yet the norm	3 (4)
	Working in teams is the norm for teachers	5 (3)
	Don't Know	
32.	No computers are connected to a network	
	Only one computer is connected to a network	
	Multiple computers are connected to a network	9 (9)
	Don't Know	
33.	Few if any measures are in place to determine student success with technology	1 (4)
	Traditional measures such as standardized achievement tests are the primary means for determining students' success with technology	3 (1)
	A variety of measures and indicators are used for determining student success with technology	5 (4)
	Don't Know	
34.	Students and educators have no access to the Internet	(1)
	Students and educators have access to the Internet, but it is slow and unreliable	2 (3)
	Students and educators have fast, reliable access to the Internet	7 (5)
	Don't Know	

SECTION III: SCHOOL INFORMATION

Please describe how often the following occur in your school:

	Never	Rarely	Sometimes	Often	Extensively	Don't Know
35. Technology is used to expand classroom strategies and practices		1 (1)	5 (3)	3 (2)	(3)	
36. Students use technology to communicate with the outside world		1 (2)	1 (3)	5 (4)	2	
37. Content supported by technology is aligned with state and national standards		(1)	(2)	2 (3)	6 (2)	1 (1)
38. Technology is used as an assessment tool		(2)	2 (2)	3 (3)	4 (2)	
39. Technology is used to communicate with parents	(2)	2 (4)	3 (2)	3	1 (1)	
40. Individuals from the school initiate communications with experts via technology	(2)	3 (2)	4 (3)	1 (1)	1 (1)	
41. Technology is used to support professional development		(1)	3 (4)	4 (2)	2 (2)	
42. Teachers are recognized for using technology successfully			2 (1)	4 (6)	3 (2)	
43. Technology encourages teachers to assume the role of facilitators			2 (3)	5 (3)	2 (3)	
44. Technology resources are upgraded or replaced		(1)	1 (1)	5 (4)	3 (3)	
45. Technology is used to help collect and analyze student assessment data			1 (3)	2 (4)	6 (2)	
46. Parents, business partners or community members are informed about student learning related to technology		(2)	5 (5)	2 (1)	2 (1)	

	Never	Rarely	Sometimes	Often	Extensively	Don't Know
47. Community-based partnerships provide ongoing opportunities for many students to learn real-life applications of technology in community settings.	(1)	1 (4)	4 (2)	3 (2)	1	
48. School-based community/business partnerships provide ongoing opportunities for many students to learn real-life application of technology within the school setting.	(1)	2 (2)	2 (3)	4 (3)	1	
49. There is access to school technology resources for community members.	1 (3)		1 (4)	5 (1)	2 (1)	
50. Based on successful track records with partnerships, community representatives, school officials, and students go beyond the minimum required, seeking ways to extend, enrich, and renew partnerships	(3)	1 (2)	2 (2)	4 (2)	1	1
51. The school and community have a specific process for periodic and final reviews/reports on community-school partnerships.	1 (2)	1	1 (5)	5 (1)	1	1

For each of the following items, please select the statement that best completes the following sentence:
In my school, …

52.	Teachers view themselves as the primary expert for information	1
	Teachers, while remaining the primary expert in the classroom, accept the expertise of students in limited areas and under limited conditions	4 (6)
	Teachers are comfortable with and encourage student expertise in the classroom	4 (3)
	Don't Know	
53.	Teachers rely on tried and true strategies, rarely using technologies	(1)
	Teachers tend to experiment with technology when they consider technology to be safe and low stakes	6 (6)
	Teachers constantly experiment with technology	3 (2)
	Don't Know	

54.	No staff are aware of the school/district vision for the use of technology	1
	Only those staff involved in writing the technology plan are aware of the school/district vision for the use of technology	(3)
	All staff are familiar with the school/district vision for the use of technology	8 (6)
	Don't Know	
55.	The most important focus of the technology plan is on basic equipment and software purchases	
	The most important focus of the technology plan is on automating existing classroom practice	
	The most important focus of the technology plan is on the use of technology to maximize student learning	9 (9)
	Don't Know	
56.	The technology plan puts the onus of change on classroom teachers with no recognition of the system changes that must take place in order for teachers to take full advantage of the technologies	
	The technology plan identifies policies, procedures and operations at some levels of the system in order to improve efficiency through automation of current practices	3 (2)
	The technology plan identifies policies, procedures and operations across all levels of the education system that must change if the effective use of technology integration is to be realized and sustained across the system	6 (7)
	Don't Know	
57.	The technology plan includes few if any activities for collecting data	2 (1)
	The technology plan includes activities for collecting data for the primary purpose of reporting progress against the plan	1 (5)
	The technology plan includes activities for collecting data for reporting progress and informing decision-making and plan adjustments	6 (3)
	Don't Know	
58.	Staff members are rarely or never trained to serve as technology resources for the training or support of other staff	
	Staff members are occasionally trained to serve as technology resources for the training or support of other staff	2 (5)
	Staff members are frequently trained to serve as technology resources for the training or support of other staff	7 (4)
	Don't Know	
59.	The district/school provides no networked resources to support learning	2 (1)
	The district/school provides limited resources on the network to support learning	3 (5)
	The district/school provides a rich library of network-based resources to support learning	4 (3)
	Don't Know	
60.	The technology support system is inadequate	1
	The technology support system is adequate, but not exceptional	4 (7)
	The technology support system is exceptional	4 (2)
	Don't Know	

61.	Network failures are usually rectified in a period greater than 4 hours.	3 (4)
	Network problems are usually rectified within 4 hours	4 (3)
	Network problems are solved usually within one hour	2 (1)
	Don't Know	(1)
62.	There are no problems that effect teachers' use of technology due to limitations of the school building. My classrooms are "technology ready"	3 (1)
	There are minor problems that effect teachers' use of technology due to limitations of the school building, such as lack of electrical outlets, temperature control problems, or poor placement of electrical /network outlets	6 (4)
	There are major problems that effect teachers' use of technology due to limitations of the school building, such as lack of electrical outlets, or poor placement of electrical /network outlets	(4)
	Don't Know	
63.	No data is collected to measure student performance with regard to technology	2 (3)
	The measures used to gauge the impact of technology on student learning are primarily gains on standardized tests, that are not necessarily aligned with content standards	1 (3)
	Technology performance is assessed through measurement of applications and products in content areas	5 (3)
	Don't Know	1
64.	Beneficial school-community partnerships involving technology do not exist	1 (2)
	School-community partnerships involving technology exist that primarily benefit the school	1 (4)
	School- community partnerships involving technology exist and are mutually beneficial to both the school and partner	7 (3)
	Don't Know	
65.	No formal structure is in place for approving or denying the formation of a community-school partnership.	2 (4)
	The approval or denial for the formation of a community-school partnership falls under the general policies and procedures of the school.	4 (2)
	The school has a specific process for reviewing and approving or denying potential community-school partnerships.	2 (3)
	Don't Know	1

Please indicate the extent to which you agree or disagree with the following statements :

	Strongly Disagree	Disagree	Agree	Strongly Agree	Don't Know
66. In my school, technology is present in sufficient quantity to impact and change the learning the process		2 (2)	1 (4)	6 (3)	
67. In my school, most educators have significantly changed their professional practice through the use of technology		1 (2)	5 (5)	3 (2)	
68. In my school, educators have limited or no opportunities for professional development related to the integration of technology	7 (3)	2 (4)	(2)		

	Strongly Disagree	Disagree	Agree	Strongly Agree	Don't Know
69. My school has received benefits as the result of school/community partnerships related to technology	(2)	(1)	6 (4)	3 (2)	
70. My school has contributed to the community as the result of school/community partnerships related to technology	(2)	1 (3)	4 (2)	3 (2)	1
71. At my school, the available technology resources are sufficient to support learning		1 (2)	4 (6)	4 (1)	
72. At my school, technology resources are conveniently located close to classrooms		(2)	4 (6)	5 (1)	
73. At my school, peripheral devices, such as scanners, digital cameras, and plotters are readily available for use		1 (2)	3 (6)	5 (1)	
74. At my school, technology resources are regularly upgraded or replaced		(1)	6 (5)	3 (3)	
75. At my school, there is ample assistance available when we have problems or questions about software that we use		(2)	2 (6)	7 (1)	
76. Technology is used in new ways to capture evidence of student performances as well as to collect and analyze data and report results		(3)	5 (5)	4 (1)	
77. At my school, careful plans have been made for the replacement of obsolete technology on a regular basis.		(1)	7 (6)	2 (2)	
78. At my school, classroom successes with technology are communicated on a regular basis to the school community	(1)	3 (4)	5 (3)	1 (1)	
79. At my school, technology failures result in long periods of time waiting for repairs	1	5 (6)	3 (2)	(1)	
80. Network failures occur on a regular basis		6 (5)	2 (4)	1	
81. At my school, both informal and formal communications concerning student performance are customized using technology for different stakeholders.		(3)	4 (4)	3	2 (2)

	Strongly Disagree	Disagree	Agree	Strongly Agree	Don't Know
82. Parents, business partners, or community members are represented within the development process of the school's technology plan		1 (4)	7 (5)	1	
83. Key community leaders have been instrumental in shaping the way in which technology is used in the learning process	(1)	4 (4)	3 (4)	2	
84. The technology plan calls for significant change at the classroom and building levels, establishing long-term support systems to sustain these changes.		1 (1)	6 (7)	2 (1)	

SECTION IV: TEACHER INFORMATION

Please indicate how well the teachers in your school can currently do each of the following tasks:

	Currently not able to perform this task	Can perform this task with detailed assistance	Can perform this task with minimal assistance	Can perform this task without assistance	Don't Know
85. Use technology to more efficiently accomplish their professional tasks.	(1)	(1)	7 (5)	2 (1)	(1)
86. Use electronic search systems (reference books on CD-ROM, Internet Search Engines)	(1)	(1)	2 (3)	7 (3)	(1)
87. Use peripheral devices attached to their computer, such as printers, scanners, mouse, etc.	(1)		3 (2)	6 (5)	(1)
88. Use the basic functions of a word processor such as creating and saving documents, changing fonts and styles, and printing documents			1 (2)	8 (6)	(1)
89. Use advanced features of a word processor (e.g., footnoting, creating and using tables, etc)		(2)	6 (4)	3 (2)	(1)
90. Use the basic features of email such as creating, sending and reading messages	(2)	(1)	(1)	9 (4)	(1)

	Currently not able to perform this task	Can perform this task with detailed assistance	Can perform this task with minimal assistance	Can perform this task without assistance	Don't Know
91. Use advanced features of email packages such as creating and managing address books, filing messages, creating rules for automatic filing, etc	(2)	(2)	6 (4)	3	(1)
92. Use the basic features of a browser (e.g., Netscape or Internet Explorer) to access the World Wide Web	(2)		1 (2)	8 (4)	(1)
93. Use advanced features of a Web browser (e.g. managing bookmark files, changing helper applications, installing plug-ins, etc)	(2)	2 (3)	5 (3)	2	(1)
94. Use basic network resources (e.g., file servers, networked programs, collaborative network software that allows users to work together over a network)	1 (3)	2 (1)	3 (4)	3	(1)
95. Use technology in their professional work			2 (5)	7 (3)	(1)
96. Use technology occasionally to facilitate professional collaboration e.g., using email to follow up on meetings, conducting web searches for professional events, etc.	(2)	(2)	2 (1)	7 (3)	(1)

For each item below, please select the statement that best completes this sentence:
In my school, teachers …

97.	Recognize the need to modify the physical environment of their classrooms to accommodate technology resources, but lack strategies for accomplishing this	2 (2)
	Strategically reorganize the physical environment of their classrooms to maximize the use of technology resources and facilitate new forms of learning	2 (3)
	Successfully incorporate technology into the physical environment of their classrooms to support the kinds of learning activities that were present in the classroom before technology was available	5 (3)
	Don't Know	(1)

98.	Recognize the value that technology might bring to instruction, but they do not develop lessons using technology	(3)
	Develop lessons using technology that only automate existing practice	2 (4)
	Develop lessons that carefully integrate technology, allowing students to approach content in ways that were previously not possible	8 (1)
	Don't Know	(1)
99.	Design lessons almost exclusively in a fashion that involves direct instruction, i.e., the teacher as expert providing information to the students	(2)
	Sometimes design lessons that allow students to use a variety of information resources to build their own understanding of content	7 (4)
	Almost always design lessons that allow students to use a variety of information resources to build their own understanding of content	2 (2)
	Don't Know	(1)
100.	Create a classroom environment where teacher-directed learning is the norm	(2)
	Create a classroom environment where teacher-directed learning is the norm but occasionally students are provided with opportunities to direct their own learning	6 (5)
	Create a classroom environment where student self-direction is the norm	3 (1)
	Don't Know	(1)
101.	Communicate with parents and other stakeholders in the school community through traditional means only, e.g., typed newsletter, written notes home, or phone calls	1 (4)
	Automate the communications that were in place before technology became available, e.g., using desktop publishing or word processing software to produce parent newsletters	1 (3)
	Use technology to communicate in ways that were previously not possible, e.g. emailing with parents or posting student work on the school web page	7 (1)
	Don't Know	(1)
102.	Recognize the possibilities for new opportunities for professional development through technology, but lack the training and/or access to participate	1 (3)
	Sometimes use technology for professional development (i.e.; research, communication with experts, online collaborations)	5 (3)
	Use technology as a central component for their continuing professional development	3 (2)
	Don't Know	(1)
103.	Recognize the issues related to the ethical use of technology, but do not have a depth of understanding to deal effectively with those issues on a day to day basis	2 (2)
	Ensure that their daily practice is based on a clear understanding of the ethical use of technology, but do not involve students in self-regulation related to the ethical use of technology	3 (2)
	Involve students in processes of self-regulation related to the ethical use of technology	4 (3)
	Don't Know	(2)
104.	Recognize the value of technology related professional associations , publications and conferences, but do not take advantage of these resources	4 (3)
	Regularly access technological resources to improve both their skill levels and integration of practices related to instructional technology. However, teachers do not typically contribute to or create resources	1 (2)
	Use technology to access professional resources on instructional technology, drawing from, contributing to, and creating these resources	4 (2)
	Don't Know	(2)

MGT of America expresses appreciation to the Florida Educational Technology Corporation and the Milken Family Foundation for their contributions toward the development of this survey instrument.

APPENDIX B

Ed Tech PILOTS

Teacher Survey Results
Baseline Data vs. End of Study Data[1,2]

Background Information

Are you participating in the pilot?

14 (16)	No	56 (85)	Yes

Gender?

16 (20)	Male	54 (80)	Female

Ethnicity?

African-American	1 (7)	White, non-Hispanic	50 (2)
Asian-American	1	Multi-ethnic	1 (70)
Hispanic	15 (20)		
Native-American	2		

What is the highest degree you have received?

Bachelor's + Teaching Credential	35 (41)	Master's + units beyond	6 (12)
Bachelor's + units beyond	15 (23)	Doctorate	2
Master's	13 (22)		

Do you have a computer at home?

6 (15)	No	64 (83)	Yes
		2	CD ROM
		0	Internet
		62	Both

[1] All results are indicated as the frequency of responses.
[2] Results from the baseline survey are in parenthesis and the responses from the end of the implementation are shown to the left of the baseline data.

SECTION I: STUDENT INFORMATION

Please describe how frequently each of the following occurs.
Most of the students in my classroom:

	Never	Rarely	Sometimes	Often	Extensively
1. Use technology to become more competent in basic skills	(3)	4 (13)	28 (33)	30 (37)	7 (14)
2. Select appropriate technologies for specific classroom tasks	13	5 (17)	28 (41)	30 (22)	7 (8)
3. Have difficulty making sense of electronic information in the form of text, numbers, and graphs	3 (4)	28 (27)	27 (46)	11 (19)	1 (3)
4. Are able to communicate electronically with others	3 (20)	11 (14)	14 (28)	23 (32)	17 (6)
5. Understand which technology, software and online services to select in order to solve particular problems	1 (12)	11 (19)	24 (42)	27 (25)	7 (3)
6. Can independently conduct electronic information searches	1 (12)	1 (8)	18 (33)	36 (37)	14 (10)
7. Use technology in ways that add more learning opportunities	(3)	5 (18)	17 (42)	31 (30)	17 (7)
8. Require assistance when using technology	1	12 (13)	37 (50)	19 (27)	1 (10)
9. Use technology related pictures, graphs, or illustrations to better understand concepts	(3)	6 (21)	31 (35)	23 (32)	9 (8)
10. Use technology to better understand the relationship between real life situations and academic concepts	(7)	13 (29)	24 (38)	24 (22)	8 (3)
11. Use traditional data sources (paper-based encyclopedias, dictionaries) to gather information	1 (3)	15 (14)	32 (33)	16 (39)	5 (10)
12. Use technology to gather information from data sources that emulate traditional data sources (e.g., electronic encyclopedias)	3 (10)	3 (14)	34 (43)	23 (25)	6 (7)
13. Use technology to access data sources previously unavailable without technology (e.g., demographic data from the U.S. Census website)	5 (18)	12 (27)	29 (41)	21 (12)	3 (3)
14. Use technology to solve simple, exercise style problems (e.g., list the population of several African nations over the last five years)	7 (20)	12 (32)	39 (34)	9 (13)	3 (1)

	Never	Rarely	Sometimes	Often	Extensively
15. Use technology to solve complex, real life problems	6 (21)	24 (34)	29 (34)	7 (10)	3
16. Work in groups as a result of using technology (sharing electronic files, emails, etc.)	13 (24)	14 (27)	20 (31)	16 (14)	6 (4)
17. Use technology resources and processes (e.g., spreadsheets, simulations, or modeling programs) to predict results	10 (33)	26 (21)	16 (30)	14 (15)	4 (1)
18. Are motivated by the use of technology	(1)	1 (5)	10 (26)	26 (39)	32 (29)
19. Are actively engaged in learning through the use of technology	(3)	1 (12)	14 (37)	27 (31)	28 (16)
20. Are engaged in real-world problems that are tied to personal experiences and needs	2 (6)	12 (19)	30 (41)	18 (23)	8 (10)

Please describe the extent to which <u>most of your students</u> can do each of the following:

	Cannot do this task	Can do this task with detailed assistance	Can do this task with limited assistance	Can do this task without assistance
21. Use electronic search systems	(15)	9 (18)	33 (41)	26 (24)
22. Use electronic bulletin boards	29 (44)	15 (26)	13 (15)	9 (7)
23. Develop Web pages	33 (59)	15 (23)	15 (9)	4 (4)
24. Use word processing programs	(10)	4 (16)	23 (31)	41 (37)
25. Use spreadsheet programs	9 (27)	22 (29)	20 (25)	17 (13)
26. Use presentation programs (e.g., HyperStudio, PowerPoint)	6 (35)	15 (26)	22 (21)	24 (10)
27. Use email	9 (17)	10 (20)	21 (23)	27 (31)
28. Search the Web for class assignment related material	2 (16)	7 (14)	27 (33)	31 (29)
29. Search for personal use	1 (14)	4 (10)	17 (28)	45 (40)
30. Use commercial content specific software	4 (14)	7 (15)	28 (43)	29 (21)
31. Play computer games	2 (4)	(8)	8 (16)	58 (64)
32. Develop multimedia class projects	4 (28)	22 (31)	32 (22)	9 (13)
33. Use drill and practice software	1 (5)	7 (14)	27 (43)	33 (29)

For each item below, please select the statement that best completes this sentence:

Most of the students in my classroom.....

34.	Develop projects, without technology that may or may not model real-world applications for the specific intent of getting a good grade	10 (33)
	Develop projects through technology that may or may not model real-world situations with the specific intent of getting a good grade	41 (49)
	Develop high quality projects through technology that model real-world situations, grades are secondary because students are intrinsically motivated	18 (12)
35.	Do not typically use technology to create student products	4 (35)
	Use technology to create student products that are reflective of traditional learning products, e.g., reports, presentations, etc.	53 (58)
	Use technology to create complex products, for instance stock market portfolios using Internet investment resources	11 (4)
36.	Do not typically use technology to present/communicate information to others	13 (52)
	Use technology to present/communicate in simple ways such as using presentation software to support a classroom report	39 (35)
	Use technology to create complex communications, (e.g., Web pages utilizing graphics, animation, and interactivity)	15 (8)
37.	Rarely or never use technology to exchange ideas/gather information, improving the quality of their questions	16 (46)
	Use technology to improve their questions primarily by gathering existing information	42 (38)
	Use technology to improve their questions, primarily by exchanging ideas with others	9 (13)
38.	Have little or no understanding of how technology has shaped aspects of society	17 (33)
	Have a moderate understanding of how technology has shaped aspects of society	33 (53)
	Have a sophisticated understanding of how technology has shaped aspects of society	19 (10)

SECTION II: CLASSROOM INFORMATION

For each item below, please select the statement that best completes the following sentence:

In my classroom, ...

39.	The teacher directs most of the learning activities	11 (25)
	Students share some, though not a large portion, of the control for their learning	33 (45)
	Students direct most of their own learning with the teacher assuming a guiding role	25 (28)
40.	Strategies for grouping students for instruction do not consider the use of technology	11 (39)
	Strategies for grouping students for instruction are occasionally determined by technology	32 (44)
	Strategies for grouping students for instruction are frequently determined by technology	27 (15)

41.	Assessment is designed exclusively by the teacher	24 (47)
	Assessment is designed with some input from students	37 (41)
	Assessment is designed with extensive input from students	5 (9)
42.	Students work almost exclusively as individuals rather than in teams	9 (19)
	Students are experimenting with collaborations, though this is not yet the norm	32 (41)
	Working in teams is the norm for students	28 (37)
43.	Teachers work almost exclusively as individuals rather than in teams	11 (21)
	Teachers are experimenting with collaborations, though this is not yet the norm	25 (34)
	Working in teams is the norm for teachers	33 (41)
44.	No computers are connected to a network	(20)
	Only one computer is connected to a network	11 (24)
	Multiple computers are connected to a network	57 (53)
45.	My students and I have no access to the Internet	1 (20)
	My students and I have access to the Internet, but it is slow and unreliable	28 (39)
	My students and I have fast, reliable access to the Internet	38 (35)

SECTION III: SCHOOL INFORMATION

Please describe how often the following occur.
In my school:

	Never	Rarely	Sometimes	Often	Extensively
46. Technology is used to expand classroom strategies and practices	(8)	(5)	23 (37)	28 (37)	19 (14)
47. Students use technology to communicate with the outside world	5 (22)	19 (26)	19 (30)	18 (16)	7 (5)
48. Content supported by technology is aligned with state and national standards	(6)	3 (6)	16 (21)	28 (34)	22 (29)
49. Learning is organized around real-world tasks	(1)	7 (4)	23 (44)	31 (43)	9 (7)
50. Technology is used as an assessment tool	1 (9)	6 (16)	29 (43)	27 (24)	7 (7)
51. Technology is used to communicate with parents	8 (17)	16 (28)	22 (38)	20 (15)	3 (2)
52. Individuals from the school initiate communications with experts via technology	3 (10)	17 (29)	30 (40)	17 (17)	3 (1)
53. Teachers are recognized for using technology successfully	3 (13)	11 (27)	28 (24)	20 (29)	7 (4)
54. Technology encourages teachers to assume the role of facilitator	2 (2)	2 (23)	26 (29)	28 (31)	11 (3)
55. Technology resources are upgraded or replaced	(3)	9 (21)	29 (48)	25 (18)	6 (9)
56. Technology is used to help collect and analyze student assessment data	(5)	5 (9)	7 (45)	33 (29)	15 (10)

	Never	Rarely	Sometimes	Often	Extensively
57. Parents, business partners or community members are informed about student learning related to technology	3 (7)	8 (25)	24 (37)	25 (23)	10 (4

For each of the following items, please select the statement that best completes the following sentence:

In my school, …

58.	Teachers view themselves as the primary expert for information	5 (16
	Teachers, while remaining the primary expert in the classroom, accept the expertise of students in limited areas and under limited conditions	31 (34)
	Teachers are comfortable with and encourage student expertise in the classroom	33 (47)
59.	Teachers rely on tried and true strategies, rarely using technologies	1 (12)
	Teachers tend to experiment with technology when they consider technology to be safe and low stakes	35 (49)
	Teachers constantly experiment with technology, valuing both successes and failures as learning experiences	33 (37)
60.	Few or no educators have significantly changed their professional practice through the use of technology	2 (14)
	Some educators have significantly changed their professional practice through the use of technology	48 (63)
	Most educators have significantly changed their professional practice through the use of technology	20 (22)
61.	The most important focus of the vision for the use of technology is on existing methods of instruction	8 (16)
	The most important focus of the vision for the use of technology is on school access to equipment and Internet connections	28 (39)
	The most important focus of the vision for the use of technology is on new roles for teachers and learners in a digital age	33 (42)
62.	No staff are aware of the school/district vision for the use of technology	(3)
	Only those staff involved in writing the technology plan are aware of the school/district vision for the use of technology	25 (35)
	All staff are familiar with the school/district vision for the use of technology	43 (57)
63.	There is no technology plan with which I am familiar	7 (3)
	The technology plan is integrated within the school improvement plan	59 (80)
	The technology plan and school improvement plan are separate	7 (10)
64.	The most important focus of the technology plan is on basic equipment and software purchases	5 (18)
	The most important focus of the technology plan is on automating existing classroom practice	1 (6)
	The most important focus of the technology plan is on the use of technology to maximize student learning	59 (69)

65.	I do not have access to examples of classrooms where technology is used	14 (28)
	I have access primarily to examples of classrooms where technology is used to support traditional classroom practice	21 (30)
	I have access primarily to examples of classrooms where technology is used to support new strategies of teaching and learning	34 (37)
66.	Staff members are rarely or never trained to serve as technology resources for the training or support of other staff	3 (23)
	Staff members are occasionally trained to serve as technology resources for the training or support of other staff	30 (38)
	Staff members are frequently trained to serve as technology resources for the training or support of other staff	34 (38)
67.	The district provides no networked resources to support learning	4 (14)
	The district provides limited resources on the network to support learning	33 (47)
	The district provides a rich library of network-based resources to support learning	28 (28)
68.	The technology support system is inadequate	12 (28)
	The technology support system is adequate, but not exceptional	38 (44)
	The technology support system is exceptional	20 (22)
69.	There are no problems that effect my use of technology due to limitations of the school building. My classroom is "technology ready"	22 (27)
	There are minor problems that effect my use of technology due to limitations of the school building, such as lack of electrical outlets, temperature control problems, or poor placement of electrical /network outlets	35 (39)
	There are major problems that effect my use of technology due to limitations of the school building, such as lack of electrical outlets, or poor placement of electrical /network outlets	13 (31)
70.	Technology is not mentioned in the content standards to which I teach	1 (12)
	Technology is mentioned in the content standards to which I teach, but only superficially	17 (30)
	Technology is clearly integrated where appropriate in the content standards to which I teach	51 (54)
71.	Technology performance standards have not been established	8 (26)
	Technology performance standards have been established but are not included in the assessment process	15 (19)
	Technology performance standards have been established and are included in the assessment process	45 (46)
72.	No data is collected to measure student performance with regard to technology	15 (33)
	Student performance with technology is assessed primarily by gains on standardized tests, that are not necessarily aligned with content standards	25 (25)
	Student performance with technology is assessed in a variety of ways such as measuring their ability to apply technology to content areas, developing student products, and measures on standardized exams aligned with content standards	29 (35)

Please indicate the extent to which you agree or disagree with the following statements :

	Strongly Disagree	Disagree	Agree	Strongly Agree
73. In my school, educators have limited or no opportunities for professional development related to the integration of technology	33 (27)	31 (51)	4 (17)	2 (4)
74. My classroom has received benefits as the result of school/community partnerships related to technology	(7)	5 (18)	36 (55)	28 (18)
75. My school has contributed to the community as the result of school/community partnerships related to technology	(3)	9 (29)	48 (57)	13 (6)
76. At my school, the available technology resources are sufficient to support learning	(6)	16 (33)	37 (54)	17(4)
77. At my school, technology resources are conveniently located close to classrooms	(9)	19 (25)	33 (57)	17 (7)
78. At my school, peripheral devices, such as scanners, digital cameras, and plotters are readily available for my use	1 (18)	22 (37)	30 (35)	16 (8)
79. At my school, technology resources are regularly upgraded or replaced	1 (9)	20 (34)	38 (49)	10 (6)
80. At my school, there is ample assistance available when we have problems or questions about software that we use	2 (10)	24 (35)	30 (42)	14 (10)
81. At my school, classroom successes with technology are communicated on a regular basis to the school community.	4 (13)	32 (47)	21 (32)	12 (4)
82. At my school, technology failures result in long periods of time waiting for repairs	5 (6)	31 (43)	30 (40)	4 (8)
83. Parents, business partners, or community members are represented within the development process of the school's technology plan	(6)	22 (27)	42 (52)	4 (8)

SECTION IV: TEACHER INFORMATION

Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Agree	Strongly Agree
84. I can use folders and basic menu commands but do not change settings or use file management capabilities	6 (15)	31 (38)	23 (35)	10 (10)
85. I can use the file management capabilities of my operating system; change basic settings such as colors and mouse speed; and connect simple peripherals such as mouse and keyboard	(3)	5 (22)	31 (44)	34 (28)
86. I accomplish my professional tasks efficiently through the use of technology	(2)	2 (9)	34 (53)	34 (31)
87. I am able to construct and use performance-based assessments	(2)	8 (21)	34 (54)	26 (19)
88. I organize the use of technology resources to support existing classroom practices	(3)	4 (18)	42 (64)	23 (13)
89. I organize technology resources to identify new approaches to learning	(3)	9 (27)	41 (56)	19 (10)
90. I often use electronic search systems (reference books on CD-ROM, Internet Search Engines)	(8)	8 (21)	32 (44)	30 (25)
91. I utilize chat rooms or bulletin boards	18 (22)	40 (58)	9 (15)	3 (3)
92. I am capable of developing Web pages for classroom use	10 (20)	27 (48)	24 (25)	9 (3)

Please indicate how well you can currently do each of the following tasks:

	Currently not able to perform this task	Can perform this task with detailed assistance	Can perform this task with minimal assistance	Can perform this task without assistance
93. Use peripheral devices attached to your computer, such as printers, scanners, mouse, etc.	(3)	3 (5)	19 (32)	48 (58)
94. Use technologies other than computers that might be useful to your teaching assignment (e.g., graphing calculators for a math teacher or MIDI equipment for a music teacher)	10 (21)	12 (18)	24 (34)	24 (25)
95. Use the basic functions of a word processor such as creating and saving documents, changing fonts and styles, and printing documents	1 (2)	(2)	5 (10)	64 (84)
96. Use advanced features of a word processor (e.g., footnoting, creating and using tables, etc)	3 (13)	2 (15)	23 (25)	42 (45)
97. Use the basic features of email such as creating, sending and reading messages	(6)	1 (3)	4 (9)	64 (80)

	Currently not able to perform this task	Can perform this task with detailed assistance	Can perform this task with minimal assistance	Can perform this task without assistance
98. Use advanced features of email packages such as creating and managing address books, filing messages, creating rules for automatic filing, etc	4 (12)	5 (15)	23 (29)	38 (44)
99. Use the basic features of a browser (e.g., Netscape or Internet Explorer) to access the World Wide Web	(7)	1 (6)	7 (13)	62 (73)
100. Use advanced features of a Web browser (e.g. managing bookmark files, changing helper applications, installing plug-ins, etc)	3 (12)	7 (21)	22 (29)	38 (37)
101. Locate resources on the Internet that are appropriate to your teaching assignment	(6)	1 (8)	6 (18)	63 (67)
102. Evaluate the quality and authority of Internet resources	4 (9)	5 (14)	16 (24)	43 (51)
103. Use basic network resources (e.g., file servers, networked programs, collaborative network software that allows users to work together over a network)	8 (22)	8 (25)	32 (27)	21 (24)
104. Create multimedia products for and with students in your classroom	3 (22)	17 (23)	23 (30)	27 (23)
105. Use technology in my professional work	(5)	2 (9)	15 (23)	52 (62)
106. Use technology occasionally to facilitate professional collaboration e.g., using email to follow up on meetings, conducting web searches for professional events, etc.	1 (13)	3 (8)	20 (18)	45 (58)

For each item below, please select the statement that best completes this sentence:

In my classroom,

107.	I conduct classroom activities where students work almost exclusively as individuals when using technology	12 (25)
	I involve students with collaborative activities using technology, however most work in the classroom still involves students working as individuals	26 (46)
	I structure a learning environment where student collaboration is the norm when using technology	32 (24)

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108.	I strategically reorganize the physical environment of my classroom to maximize the use of technology resources and facilitate new forms of learning	29 (38)
	I recognize the need to modify the physical environment of my classroom to accommodate technology resources, but lack strategies for accomplishing this	24 (35)
	I successfully incorporate technology into the physical environment of my classroom to support the kinds of learning activities that were present in the classroom before technology was available	16 (21)
109.	I recognize the value that technology might bring to instruction, but do not develop lessons using technology	5 (32)
	I currently develop lessons using technology. These lessons are similar to the lessons that I have taught in the past and I only use the technology to automate existing practice	43 (33)
	I develop lessons that carefully integrate technology allowing students to approach content in ways that were previously not possible	21 (32)
110.	I provide students with work that is almost exclusively "exercise" type, i.e., problems and exercises that provide practice in skills but do not provide that practice within the context of a complex, real world problem	4 (4)
	I sometimes provide students with opportunities to work on problems that develop and exercise skills within complex, real-world problems	48 (56)
	I almost always provide students with opportunities to work on problems that develop and exercise skills within complex, real-world problems	18 (35)
111.	I design lessons almost exclusively in a fashion that involves direct instruction, i.e., the teacher as expert providing information to the students	4 (12)
	I sometimes design lessons that allow students to use a variety of information resources to build their own understanding of content	47 (65)
	I almost always design lessons that allow students to use a variety of information resources to build their own understanding of content	18 (23)
112.	I serve in the role of expert in the classroom	5 (6)
	I occasionally allow students to serve in the role of expert in the classroom	28 (49)
	I frequently allow students to serve as experts within the classroom	36 (43)
113.	I create a classroom environment where teacher-directed learning is the norm	6 (12)
	I create a classroom environment where teacher-directed learning is the norm but occasionally students are provided with opportunities to direct their own learning	45 (62)
	I create a classroom environment where student directed learning is the norm	19 (25)
114.	I create and administer assessments that are almost exclusively multiple choice, short answer and/or essay.	11 (24)
	I create and administer performance assessments occasionally	30 (31)
	I create and administer performance assessments on a regular basis	29 (45)

115.	I communicate with parents and other stakeholders in the school community through traditional means only, e.g., typed newsletter, written notes home, or phone calls	30 (64)
	I automate the communications that were in place before technology became available, e.g., using desktop publishing or word processing software to produce parent newsletters	13 (20)
	I use technology to communicate in ways that were previously not possible. For example, emailing with parents or posting student work on the school web page	26 (15)
116.	I recognize the possibilities for new opportunities for professional development through technology, but lack the training and/or access to participate	11 (35)
	I sometimes use technology for professional development (i.e.; research, communication with experts, online collaborations)	25 (30)
	Technology is central to my continuing professional development	33 (32)
117.	I understand the value that technology-based community partnerships and projects might bring to my students, but I lack the training or access to be able to establish these	35 (50)
	I facilitate my students' participation in technology-based community partnerships and projects, but do not initiate these projects	11 (16)
	I facilitate my students' participation in technology-based community partnerships and projects and often initiate projects related to my curriculum	22 (26)
118.	I recognize the issues related to the ethical use of technology, but do not have a depth of understanding to deal effectively with those issues on a day to day basis	16 (24)
	I ensure that my daily practice is based on a clear understanding of the ethical use of technology, but do not involve students in self-regulation related to the ethical use of technology	14 (28)
	I involve students in processes of self-regulation related to the ethical use of technology	40 (40)
119.	I regularly access technological resources to improve both my skill levels and integration of practices related to instructional technology. However, I do not typically contribute to or create resources	26 (29)
	I recognize the value of technology related professional associations , publications and conferences, but do not take advantage of these resources	20 (41)
	I use technology to access professional resources on instructional technology, drawing from, contributing to, and creating these resources	24 (26)
120.	I recognize the procedures through which technology resources are assigned but play a passive role in the acquisition of resources	21 (41)
	I understand the processes in the school and district for acquisition of technology resources and participate in those processes on a limited basis	31 (37)
	I play a major role in the identification and acquisition of technology resources in the classroom and school	16 (20)

MGT of America expresses appreciation to the Florida Educational Technology Corporation and the Milken Family Foundation for their contributions toward the development of this survey instrument.

APPENDIX C
RESULTS OF TEACHER SELF ASSESSMENT

ED TECH PILOTS TEACHER'S SELF-ASSESSMENT OF USING TECHNOLOGY TO IMPROVE STUDENTS' ACADEMIC ACHIEVEMENT

1. I believe that students like mine would be ideally served by teachers who incorporate appropriate electronic technology into approximately _____% of most students' instructional time.

49%	(47%)	Mean
15	(0)	Minimum
90	(100)	Maximum

2. Presently, I incorporate appropriate electronic technology into approximately ____% of most of my students' instructional time.

33%	(28%)	Mean
5	(0)	Minimum
90	(100)	Maximum

3. Compared to last year, my current use of technology in the classroom is contributing to: *(Check only one)*

23	(44)	substantial improvements in academic achievement by most of my students.
28	(39)	minor improvements in academic achievement by most of my students.
3	(13)	no improvements in academic achievement by most of my students.
2	(0)	No response

4. On a scale of zero to 10 (with 10 being maximum effectiveness), I believe my current use of technology in the classroom should be rated a ____ in terms of its effectiveness in improving the academic achievement of most of my students.

5.6	(5.4)	Mean
0	(0)	Minimum
10	(10)	Maximum

5. The main thing that is hindering me from being more effective in my use of electronic technology to improve my students' academic achievement is:

26	(50)	Lack of equal access to technology resources and equipment
4	(2)	Teachers' lack of classroom management skill using technology
1	(3)	Incorporating relationship between real world application and curriculum
12	(28)	Lack of time for teacher training
4	(0)	Lack of time to create new technology integrated lessons
3	(2)	Technical support is not adequate
3	(8)	Constant problems with hardware or software
3	(3)	Nothing

6. The main thing that seems to be <u>hindering most of my students</u> from making better use of electronic technology to improve their academic achievement is:

17	(34)	Lack of equal access to technology resources and equipment
7	(16)	Different learning levels of students
5	(0)	Long periods of time students spend waiting to use computers
8	(2)	Computer repair time
6	(12)	Lack of teacher initiative and training
2	(2)	Resistance to change
11	(4)	Nothing

7. One thing that seems to be <u>hindering a few of my students</u> from making better use of electronic technology to improve their achievement is:

9	(25)	Lack of equal access to technology resources and equipment
6	(4)	Teachers' lack of "technology knowledge"
13	(10)	Lack of student motivation
2	(0)	Students sometimes get frustrated because the computers are slow
1	(0)	Lack of parental support at home
8	(12)	Differing learning levels of students
5	(3)	Slow repair time
2	(1)	Students are distracted by email and the Internet
10	(11)	Nothing

APPENDIX D
RESULTS OF STUDENT ASSESSMENT OF THEIR TEACHER

STUDENT ASSESSMENT OF TEACHERS INVOLVED IN THE ED TECH PILOTS

(For administration to middle and high school students only)

1. I believe that students like me should be spending approximately _____% of their time using computers or other electronic technology during their class time with *(teacher's name will be inserted here).*

59%	(58%)	Mean
0	(0)	Minimum
100	(100)	Maximum

2. Presently, I use computers or other electronic technology for approximately ____% of the time I spend during my class time with *(teacher's name will be inserted here).*

39%	(28%)	Mean
0	(0)	Minimum
100	(100)	Maximum

3. Compared to most other teachers I've had in the past, *(teacher's name will be inserted here)*:

748	(397)	is a better teacher because I learn more in his/her class.
728	(276)	is about the same as other teachers in terms of how much I learn in their classes.
101	(22)	is not as good a teacher because I learn less in his/her class.
62	(1)	no response

4. On a scale of zero to 10 (with 10 being maximum effectiveness), I believe *(teacher's name will be inserted here)* use of computers and other technology in the classroom should be rated a ____ for the way it helps me to learn.

6.4	(6.7)	Mean
0	(0)	Minimum
10	(10)	Maximum

5. The main thing that I like about the computers and other technology that *(teacher's name will be inserted here)*, uses in this class is:

Nothing	258	(12)
Playing games	92	(20)
Helps learning and you learn more	285	(48)
Keyboarding and computer skills	142	(1)
Internet	250	(114)
Digital text books	26	(0)
Working is easier and faster	233	(123)
Project and programs are fun	246	(72)
Work is neater	15	(0)
We can work in groups	4	(0)

Designing Web pages	14	(0)
All of it	30	(0)
The computer replaces the teacher	6	(0)
Individualized learning	38	(0)

6. The main thing that I don't like about the computers and other technology that (*teacher's name will be inserted here*), uses in this class is:

Nothing	572	(36)
Keyboarding	50	(20)
Eyes get tired	9	(7)
Can't play games	43	(0)
My teacher tells me when I can use the computer	67	(0)
We don't get to use them very much	164	(64)
Software and Internet	92	(30)
The computers break often or freeze up	219	(48)
Computers are confusing	79	(50)
Lots of extra work	84	(0)
Computers are too slow	159	(64)
Computers are boring	32	(13)
I forget to bring it to class	2	(0)
Program is too easy	13	(5)
There are not enough computers	54	(0)

7. Do you have access to a computer at your home that you could use for doing homework or special school assignments?

555	(268)	No
262	(89)	Yes, but I do not use it for school assignments.
438	(209)	Yes, but I only use it occasionally for school assignments.
359	(134)	Yes, and I use it often for school assignments.
25	(9)	no response

8. About how many hours do you spend using computers in school during a typical week?
_____ Hours per week.

4.99	(4.73)	Mean
0	(0)	Minimum
19	(30)	Maximum

COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a nonsegregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

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If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964 AS AMENDED BY THE EQUAL EMPLOYMENT OPPORTUNITY ACT OF 1972; EXECUTIVE ORDERS 11246 AND 11375; EQUAL PAY ACT OF 1964; TITLE IX, EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED; IMMIGRATION REFORM AND CONTROL ACT OF 1986; AMERICANS WITH DISABILITIES ACT OF 1990; AND THE CIVIL RIGHTS ACT OF 1991.

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