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For additional information on data used for this report contact Virgene Hanna at ISER (907-786-7710).
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EXECUTIVE SUMMARY

This report presents the final assessment of the Elementary School Class Size Reduction Pilot Project at four participating elementary schools: one in the Juneau School District and three in the Kenai Peninsula School District. The project was designed to assess the effectiveness of reduced class size—combined with other teaching interventions—on student achievement and attitude, school discipline, and parental involvement in education. Participating schools explored strategies to reduce class size and improve education without significantly adding to the cost of education.

This document includes a description of participating schools’ progress toward achieving their goals and comparative data on students’ academic achievement from Fall 1993 to Spring 1996. It also answers a series of research questions pertaining to the effectiveness of the Elementary School Class Size Reduction Pilot Project and includes a summary of the cost per classroom for reducing the pupil-teacher ratio and implementing the instructional changes. To make the evaluation, we used classroom observations; staff interviews; project coordinators’ reports; teachers’ portfolios and logs (daily and weekly records and schedules of instruction for reading, language arts, and math); and end-of-the-year surveys of parents, students, and teachers. To assess academic achievement, based on standardized assessments, we include a comparison of mathematics, reading, and language arts test results from Fall 1993 to Spring 1996.

While the focus of each participating school varied, all used multiple strategies to reduce the pupil-teacher ratio, including half-time co-teachers, parallel block scheduling, increased use of computer-assisted instruction, parent and community volunteers, flexible staff allocation, and collaborators who worked with the classroom teacher during reading, language arts, and mathematics instruction. Parents and teachers at all participating sites overwhelmingly agreed that periods of reduced pupil-teacher ratio during core instruction time increased academic achievement and improved the overall quality of education.

Significant findings about the effects of the Elementary School Class Size Reduction Pilot Project include:

- Parallel block scheduling was the most cost-effective approach to reducing class size and provided the most consistent small-group time.
- Student attitude toward learning and school was reported as positive over 90 percent of the time at all schools during the three years of the project.
- Classroom climate and behavior improved at all participating schools during periods of lower pupil-teacher ratio.
- Technology as a strategy to reduce class size and improve instruction was effective when the implementation process was supported by an on-site specialist and ongoing staff development.
- Academic achievement, as reported in teachers’ weekly logs and parent surveys, improved as a result of reduced class size and instructional innovations.
- Teachers overwhelmingly reported that small group instruction and challenging learning experiences improved students’ self-esteem and attitudes toward school.
- Parental involvement in their children’s education improved at all schools. However, the lack of consistency limited the effectiveness of parent volunteers as a long-term strategy to reduce the pupil-teacher ratio and improve instruction.
INTRODUCTION

This document presents the third and final assessment of the Elementary School Class Size Reduction Pilot Project at four participating elementary schools. The purpose of this project was to explore strategies to reduce the pupil-teacher ratio and to improve instruction without significantly adding to the cost of education. The project, authorized by the legislature (GCS CSSB 435 (HES)), required that participating districts maintain a pupil-teacher ratio (PTR) not exceeding 15:1 in grades K-4 and endeavor to maintain a ratio not exceeding 20:1 in grades 5-6. It was funded by the State of Alaska, as a four-year demonstration project. The Institute of Social and Economic Research, University of Alaska Anchorage (ISER, UAA) was responsible for documenting project implementation and project effects for the Alaska Department of Education.

The first year of the project involved setting expectations and organizing a request-for-proposal process; soliciting specific project proposals; selecting participating schools, and negotiating with schools on individual site plans. The second year included implementing the strategies to reduce class size and initiating the data collection process to evaluate the project. The third and fourth years included a continuation, with some modifications, of the strategies to reduce class size and improve instruction. This final evaluation provides an overview of strategies used at each school and answers the following research questions:

1) Did each program meet its class-size goals?
2) What instructional innovations in reading and mathematics did schools use along with class size reduction?
3) What training in support of instructional innovation for the class size reduction program did schools provide to teachers, other school staff members, and parents?
4) What roles did parents, volunteers, tutors, and technology play in instruction?
5) How did the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?
6) How are parental involvement, teacher satisfaction, and student attendance and behavior affected by the class size reduction and associated instructional innovations?
7) How can this project be replicated at other elementary sites?

This report also contains an overview of the project's impact on students identified as at-risk for increased probability for school failure or learning problems. Where numbers of students are sufficient, at-risk students are analyzed separately on tests of academic achievement. An analysis of the cost per classroom for reducing the pupil-teacher ratio and implementing instructional changes is included for each site.

STRATEGIES TO REDUCE THE PUPIL-TEACHER RATIO

Responding to the legislative mandate to explore creative ways of reducing class size, participating elementary schools proposed a variety of research-based and innovative strategies for grades K-6, to be monitored and documented over three years. While each school in the Elementary School Class Size Reduction Pilot Project proposed innovations and strategies to accommodate specific site needs, they all included substantial similarities. Among these were:

- Staff development
- Changes in instructional practices
- Reduced pupil-teacher ratio during periods of instruction in reading, language arts, and mathematics
- Increased community and parent involvement
- Documentation of project implementation and effectiveness
While there were considerable similarities in the proposals, there were also some notable differences. The four schools targeted different grades for class reduction: Sites A and B, K-2; Site C, 3-5; and Site D, K-6. The methods of reducing class size also differed somewhat. Site A used half-time co-teachers in targeted classrooms. Site B used block scheduling, computer-assisted instruction, volunteers, and collaborators who worked with the classroom teachers to reduce PTR during core instruction time. Site C used parallel block scheduling, computer-assisted instruction, volunteers, and noncertified special program staff. Site D used parallel block scheduling, computer-assisted instruction, and volunteers.

There were also substantial differences in the emphasized instructional strategies and related staff development programs. Site A emphasized the development of thematic units and team-building skills. Site B focused on collaboration, team teaching, peer coaching, cooperative learning, and integrated instructional technology. Site C concentrated on effective small-group instructional techniques and the integration of technology. Site D stressed the development of instruction in reading and mathematics problem-solving skills and the integration of technology into the instructional program.

This study provides insight into the effectiveness of the site-specific strategies and innovations to reduce class size on student achievement, school discipline, teacher innovation, and parents’ participation. Therefore, we will present the evaluation as case studies, one for each participating school.

**EVALUATION**

The focus of this evaluation is on an assessment of the *Elementary School Class Size Reduction Pilot Project* from a multi-participant perspective. Evaluation activities used to compile the data for the report include standardized, diagnostic, and norm-referenced achievement tests; classroom observations; staff interviews; project coordinators' reports; teachers' portfolios and logs (daily and weekly records and schedules of instruction for reading, language arts, and math as well as project impact on academic achievement, class behavior and climate, and teacher satisfaction); and end-of-the-year surveys from parents, students, and teachers. Evaluation activities completed during the duration of the project include:

- KeyMath (Fall 1994, Spring 1995, Fall 1995 [new students], Spring 1996)
- Peabody Picture Vocabulary Test (Fall 1994, Spring 1995, Fall 1995 [new students], Spring 1996)
- Reports from principals and project coordinators
- Classroom observations
- Daily logs documenting the number of minutes of reduced pupil-teacher ratio time and accompanying instructional strategies
- Weekly classroom logs documenting the type of instruction used; level of parent participation; and a subjective assessment of classroom climate, student achievement and behavior, and teacher satisfaction
- Weekly teachers' observation of project impact on at-risk students

The goal of the project was to examine class size as a general treatment to improve instruction and learning, not as a comparative study; therefore we will present the participating schools as Sites A, B, C, and D.
BACKGROUND DESCRIPTION

Site A has approximately 522 students, 23 regular classroom teachers, and 13 special service and support teachers. Five classroom teachers and four part-time co-teachers participated in the project to reduce the pupil-teacher ratio and implement the instructional changes during the 1993-95 school years. Four classroom teachers and four co-teachers participated in the project during the 1995-96 year. This evaluation includes interviews, reports, and surveys from parents, students, and classroom teachers directly benefiting from the Elementary School Class Size Reduction Pilot Project.

The ethnic makeup of the student population is Caucasian, 73.5 percent; Native-American (Alaska Native and American Indian), 14.7 percent; Asian-American, 6.3 percent; African-American, 3.3 percent; and Hispanic-American, 2.2 percent. Approximately 25 percent of the students enrolled in the project were identified as “at risk” using the following criteria: socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a Second Language qualification.

At the start of the project, the school maintained a reputation for encouraging innovative teaching and learning practices and supporting the individual classroom teachers’ efforts to obtain grants to supplement and support their innovative practices.

General project goals at Site A included:

- Increasing student achievement as reflected in norm-referenced, criterion-referenced, and other forms of authentic assessment
- Increasing time engaged in learning
- Increasing the frequency of interaction between the student and teacher
- Increasing students’ positive attitudes and motivation to learn
- Increasing parental involvement and improving the home-school communication loop
- Implementing a thematic curriculum (an instructional approach that organizes curricula contents around a specific theme and integrates two or more subject areas) designed to develop students’ complete thinking skills
- Providing extensive staff development and training to achieve the implementation and curriculum changes

STRATEGIES TO ACHIEVE GOALS

The strategies used by Site A staff members to achieve these goals included reducing the pupil-teacher ratio, changing the organization and delivery of lessons, and creating highly trained co-teacher teams with broadened expertise and perspectives. Participating staff members expected student academic achievement, attitude, and behavior to be significantly improved and sustained throughout the project.
Reducing the Pupil-Teacher Ratio

Five full-time classroom teachers and four part-time co-teachers (1993-95) and four classrooms with four co-teacher teams (1995-96) shared all educational responsibilities, including organization of the class; evaluation of student achievement; development and design of instructional activities; and assessment of the overall effects of the project on student achievement, attitude and behavior, and parent participation. This co-teaching strategy changed the one-class, one-room, one-teacher model into a collaborative teaching arrangement with two professionals accountable for all aspects of the educational environment.

Parental Involvement

Participating teachers at Site A emphasized the importance of involving parents in their children’s education and increasing home-school communication beyond volunteering in the classroom during instruction time. Parents were informed of classroom and grant activities and their children’s progress through newspaper articles, weekly newsletters, personal notes, phone calls, and in-class presentations. Parent activity nights and in-school activities, facilitated by project participants, were held to encourage in-school interaction between parents and children, and provide information for helping students with literacy, mathematics, science, technology, and writing.

Changing the Organization and Delivery of Curricular Objectives

Next to the co-teacher teams, changing the organization and delivery of instruction was the most significant feature of the project at Site A. Participating staff worked on implementing thematic units across the curriculum. This curriculum strategy represents an instructional approach that organizes curricula contents around a specific theme and integrates two or more subjects, with all themes linked throughout the school year to district curricular units. The project staff held monthly meetings to review overall project goals, examine progress, and share expertise about implementing and integrating the theory of multiple intelligences into the daily curriculum. Project participants made use of different techniques for assessing and evaluating what students learned, particularly by using authentic assessment techniques such as observation of students’ daily work.

PROJECT MODIFICATIONS

At Site A, changes were made in personnel, staff development, and technology in the second and third years of implementation of the Elementary School Class Size Reduction Pilot Project.

Changes 1994-95

Turnover in Personnel

- Three part-time co-teachers and one full-time second-grade teacher joined the project during the second year of the grant.
- A new project coordinator—a full-time classroom teacher involved with the original planning of the grant proposal—supervised all phases of the grant.
- A new principal was hired.
Staff Development
- There was increased reliance on in-district and in-school personnel to provide staff development training.

Technology
- Computers, printers, software, and related equipment for the project were ordered during the 1993-94 school year and were available for classroom use during the 1994-95 school year. The new equipment was used for student assessment and evaluation, data collection, and curriculum enrichment.

Changes 1995-96

Turnover in Personnel
- The grant coordinator accepted a principal's position at another school; a co-teacher, a grant participant since the first year of the project, assumed the principal's responsibilities.
- Following the original intent of the proposal, the kindergarten component was dropped to include two second-grade classrooms. This change allowed as many students as possible to continue in project classrooms for a second or even a third year. The new second-grade co-teacher team included two classroom teachers participating in job-sharing.
- A first-grade classroom teacher who had worked with the grant during part of the 1993-94 school year was re-hired to work with the new project coordinator.
- One half-time co-teacher in a second-grade class left to accept a full-time teaching position at another district school. Her replacement had been a co-teacher during the 1993-94 school year and a substitute teacher during the 1994-95 school year.

Staff Development
- Staff development for the 1995-96 school year included increasing project teachers' understanding and use of thematic curriculum in all subjects, based on Gardener's Theory of Intelligences. The project supported workshops, conferences, and contracts, with specialists working with the staff.

Budget/Technology
- New hardware and software products were added to the project for the 1995-96 school year. In-class computer centers, used for supplemental and enrichment activities, were expanded and overall technology was upgraded, including connecting classroom computers to the network in the computer lab.
**PROJECT OUTCOMES**

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the *Elementary School Class Size Reduction Pilot Project*. In preparing this section, we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; those examined effects of the project on student academic achievement and attitude, school climate and discipline, teacher innovation, and parental involvement.

1. Did the program at Site A meet its class size goals?

**Goal 1: Increasing student achievement as reflected in norm-referenced, criterion-referenced, and other forms of authentic assessment**

*We are seeing children who did not know how to tackle a story problem or know how to begin to think mathematically now go through the grids of cognitive guided problem solving. I attribute this to being able to meet with them at least three times per week in small groups and getting them talking. Some kids who were confused at first are leaping ahead and I do not think they could have made that progress had they not been tutored individually or divided into interest groups.*

(First-grade co-teachers)

Refer to Research Question 5 for comparative data on norm-referenced and diagnostic achievement tests (Peabody Picture Vocabulary Test and KeyMath).

Student achievement as defined here means weekly assessments of students’ academic performance using measures other than standardized tests. Individualized, informal, and frequent assessment strategies were carried out in classrooms with two teachers. These assessments allowed for immediate response and assistance to children learning the basic skills in reading, writing, and mathematics.

District portfolios—which include reading attitude surveys, self-reflection surveys, teacher narratives, reading continuum, writing continuum, reading samples, and writing samples—were used extensively for student assessment. Besides these district-wide assessments, participating classroom teachers used math homework results, math take-home records, home reading records, and science take-home checklists.

Classroom teachers’ general assessments of the effects on academic achievement of reduced pupil-teacher ratio for the 1995-96 school year were 88 percent excellent and 12 percent good. For the 1994-95 school year these assessments were 60 percent excellent and 40 percent good. Teachers reported that the students enrolled in the project for at least one full school year approached learning more confidently, exhibited high expectations for their academic performance, and were more independent and self-directed learners.

Parent surveys conducted at the end of the 1995-96 school year substantiated classroom teachers’ reports of increases in academic achievement. Parents reported “strongly agreeing” 89 percent of the time that the reduced pupil-teacher ratio had a positive impact on their children’s academic achievement. In a similar survey conducted at the end of the 1994-95 school year, 100 percent of parents “strongly agreed” that the reduced pupil-teacher ratio had a positive effect on learning.

All project teachers agreed that academic achievement had increased among the students in the project classes. They attributed this increase to consistent small group instruction made available by having two teachers in the classroom during core instruction time.
Goal 2: Increasing time engaged in learning as indicated by an engagement time summary

Data collected from the teachers' daily records show an average of 14.7 hours of available instruction time with a pupil-teacher ratio of 15:1 or less. Along with the co-teacher team, teachers used computers in the classroom, resource personnel, and volunteers to support and enhance the learning environment for the students. Two co-teacher teams used call-back time—a strategy where a few (3-5) students remained in the classroom after the normal school day and received additional assistance (see Figure 1).

![Figure 1. Site A Average First and Second Grade Teacher Weekly Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less](image)

Note: Sometimes several strategies were used at the same time—so the sum of the strategies is greater than the total time shown with reduced PTR.

The average time with reduced PTR remained relatively consistent throughout the project. During the 1993-94 school year, teachers reported a total of 14 hours of reduced pupil-teacher ratio time (15:1 or less), and 14.7 hours during the 1994-95 school year.

Goal 3: Increasing the frequency of interaction between the student and teacher

Students are excited to learn something new because they know they will get the help they need to understand so they can approach the new task with a can-do type of attitude. One of us is always available to talk to kids about a problem they may have with a specific task. (First-grade teacher)

It [co-teachers] is a wonderful idea! It allows the teachers to really get to know the children as individuals—their strengths and weaknesses—and at a very important time in their lives. What a better way to have a positive attitude toward school! I am sorry to see the grant end. (Parent)

The most significant and worthwhile feature of the co-teacher team was having time to work with individual students or very small groups on a consistent daily basis. Time on task—sustained, uninterrupted time students spent in productive learning activities—was often observed by the project evaluator. The co-teacher team encouraged the quality and frequency of this student-teacher interaction. Technology available in the classroom allowed the teachers the increased opportunity to individualize and enhance their instructional strategies to meet the needs of a broader range of learning styles.
Goal 4: Increasing students' positive attitudes and motivation to learn

This is the most important thing. If kids do not have a positive attitude about learning and thinking they can learn, they are not going to learn. The most important thing about the grant is that we are able to help with the children's attitude. (First-grade teacher)

At the end of each school year, all students attending classes participating in the project completed a survey asking for information on attitudes toward learning and school in general. The surveys were designed to show students' attitudes for the year under study, not to provide comparison from year to year; comparisons were made with students enrolled in non-grant classes. Student survey results consistently showed positive and favorable attitudes toward learning and school.

Table 1 shows students' responses to questions about their attitudes toward school and learning in 1995-96. The survey also asked students to assess their progress and to say whether they felt school was a safe place. Overall, as found in the 1993-94 and 1994-95 student surveys, favorable attitudes toward learning, school, and safety were the norm. In response to the question, “Do you like school?”, 63 percent said always, 36 percent said sometimes, and 1 percent said never. To the question, “Do you like learning to do math at school?”, 73 percent responded always, 21 percent sometimes, and 5 percent never. Students were also asked their favorite school activities. Twenty-seven percent cited mathematics and 14 percent reading. The one activity preferred above all others was sports and physical education, at 36 percent. Other preferred school activities included computer lab; arts and crafts; games; and music, drama, and dance.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>Don't Know</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like school?</td>
<td>63%</td>
<td>36%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like reading at your school?</td>
<td>67%</td>
<td>28%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like doing math at your school?</td>
<td>73%</td>
<td>21%</td>
<td>5%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel your school is a safe place?</td>
<td>70%</td>
<td>2%</td>
<td>0%</td>
<td>28%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel good about how you are doing at school?</td>
<td>64%</td>
<td>28%</td>
<td>6%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Do most of the kids in your class follow the rules?</td>
<td>23%</td>
<td>72%</td>
<td>1%</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Number of students responding = 90

Goal 5: Increasing parental involvement and improving the home-school communication loop

Parent participation and involvement in their children's education are valued and important components of academic success and achievement. Elementary School Class Size Reduction Pilot Project participants worked to involve parents in the everyday educational activities that assist a child's learning and build a positive perception of self and school. Staff engaged parents in their children's learning by encouraging them to assist with school-related activities and programs; read aloud to their children; listen to their children talk about the school day; volunteer for special events; and send their children to school fed and properly attired and with appropriate school materials. Teachers also involved parents in project-related objectives and kept them updated on the progress of the grant.

During the first year of the Elementary School Class Size Reduction Pilot Project, considerable attention was given to informing parents about the philosophy and goals of the grant. During year two, teachers worked on evening classes to share various educational methods and lessons for parents to use with their children at home. Throughout the final grant year, the teachers held monthly parent-child activity sessions during the noon hour. This in-school activity met with greater success than the evening sessions, because more working parents were able to take extended lunch hours to attend the sessions.
Table 2 shows the percentage of parents in 1995-96 who were aware of the project components and who felt the project had a positive impact on their children’s education. A total of 89 percent reported the co-teacher as having a positive impact on their children’s education. This response had remained fairly consistent throughout the three years of the project. However, parents’ awareness about the effectiveness of staff development and changes in the way the curriculum was presented declined over the duration of the project. In the 1993-94 school year, 78 percent felt staff development had a positive impact and 86 percent felt the curriculum presentation had a positive impact. These ratings changed to 41 percent and 45 percent, respectively, for the 1994-95 school year, and 38 percent and 49 percent for the 1995-96 school year.

### Table 2. Site A Parents’ Awareness of and Involvement in the Project

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Percent Aware of Project Component</th>
<th>Percent of Those Aware of Project Who Feel Project Has Had a Positive Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two teachers in the classroom</td>
<td>95%</td>
<td>89%</td>
</tr>
<tr>
<td>Staff development</td>
<td>49%</td>
<td>38%</td>
</tr>
<tr>
<td>Curriculum presentation</td>
<td>57%</td>
<td>49%</td>
</tr>
</tbody>
</table>

**Parent Involvement**
- Participated in educational activities such as assisting child with homework, reading to child at home, listening to child read, helping with school-related assignments, and reading newsletters about class events and educational activities. 98%
- Volunteered by assisting during field trips, working in the classroom, attending parent orientations and conferences, attending special events during the school day, or contributing to supplementary classroom supplies and materials. 92%

**Number of parents responding = 63**

Fifty-four percent of the parents responding to the survey had children in project classes before the start of the 1993-94 school year. Of that group, 84 percent felt the program offered to their children was better because of the Elementary School Class Size Reduction Pilot Project and 14 percent were undecided (see Table 3). This rating had increased 9 percent from the 1993-94 school year and decreased 4 percent from the 1994-95 school year.

### Table 3. Site A Percentage of Parents with Children in the School Before the Start of the 1993-94 School Year Who Felt the Program was Better Because of the Grant

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>84%</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>14%</td>
</tr>
</tbody>
</table>

**Number of parents responding = 34**

Parents’ perceptions about the project at Site A were overwhelmingly positive. Ninety-eight percent of respondents said their children enjoyed coming to school, 97 percent knew how their children were doing at school, and 98 percent were pleased with the school’s effort to communicate with them. A total of 73 percent felt that changes in the school program as a result of the grant improved their children’s attitude toward school (see Table 4). These overall ratings remained consistent during the three years of project implementation.
Table 4. Site A Parents' Perceptions About the School

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child enjoys coming to school.</td>
<td>71%</td>
<td>27%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>The project has provided opportunities for me to get involved in my child's education.</td>
<td>51%</td>
<td>35%</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Changes to the school program, as a result of the project, have improved my child's attitude toward school.</td>
<td>52%</td>
<td>21%</td>
<td>22%</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>I feel I know how my child is doing at school.</td>
<td>62%</td>
<td>35%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I am pleased with the school's communication efforts.</td>
<td>60%</td>
<td>38%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Number of parents responding = 63

Parent Comments About the Project

Throughout the three years of the project, positive comments of parents far exceeded negative comments. Negative comments generally referred to teachers' absences from the classroom for staff development and other project-related meetings.

The following statements are representative of parent comments about the Elementary School Class Size Reduction Pilot Project.

Positive

- We are so pleased with the class size pilot project and regret the thought that it may, or most likely will, end. We strongly believe that it has greatly influenced our child's attitude toward school. He has both a very positive feeling and attitude toward school. I cannot even remember when I had to talk him into going to school. He not only looks forward to going but is excited about learning. He was very fortunate to have been involved in this pilot program. It would be great if the program continued and expanded to include K-6th-grade. This would benefit so many, especially if overcrowding were a problem. As taxpayers we would be happy to support the extension of this program.

- We feel this has contributed greatly to our child's development.

- I felt the student-teacher ratio is important in that it determines the amount of direct attention each student gets in the classroom. My daughter seems to have thrived in the class size reduction project because of the additional attention she has received. She is a quiet student who otherwise may not have received much attention in a one-teacher environment.

- The 15:1 program was outstanding. Our child thrived in an environment enriched with two adults to nurture and care about her.

Negative

- The only complaint I have is the amount of substitutes used while teachers attend meetings. This is hard on the children.

Mixed

- My child has a very difficult time with transition and change, and has been negative about school since before kindergarten. I believe this program could be effective and probably is, but my child is still negative through no fault of the program.
Goal 6: Implementing a thematic curriculum designed to develop students’ complete thinking skills

Our recommendation is to expect it [curriculum changes] all to take time. One cannot change overnight. Start trying new strategies, one year try to write out the lessons, then revamp them.
(Second-grade co-teachers)

The process of implementing a thematic curriculum—an instructional approach that organizes the curriculum around a specific theme and integrates two or more subjects—requires long-term and consistent staff development and training. The co-teacher teams in the project at the close of the 1995-96 school year represented three distinctive phases of this process. Two sets of teaming partners had worked on thematic curriculum models since the 1993-94 school year. One teaming pair was involved with the curriculum changes since the 1994-95 school year and the fourth teaming pair, new to the project in 1995-96, was in the introductory phase of the changes. All participants acknowledged the importance of adequate training and time (at least three years) to understand and feel comfortable making the transition.

The co-teachers working on the first phase of implementing a thematic curriculum credited frequent interactions with other grant teachers, opportunities for observation, and staff development sessions for supporting their progress in using this approach to teaching.

The co-teachers working in the second phase of implementing the thematic curriculum reported that they still needed training and practice to sharpen their skills to successfully adjust to this type of teaching. They stressed the importance of commitment from administration, adequate planning time, and staff development to support this new approach. They were confident in this method of learning, and the recent special education endorsement of the thematic curriculum as a way to integrate special needs’ students into the regular class program strengthened their commitment to this innovative approach to learning.

The co-teachers who worked on this model for three years reported being comfortable with the changes and adjusting all lessons to fit this curriculum model. They credited time for planning curriculum changes, support from administration, staff development, constant peer coaching, and interaction for their success. These co-teachers held staff development sessions on thematic curriculum for in-school and in-district staff and provided opportunities for non-project teachers to observe in their classrooms.

Goal 7: Providing extensive staff development and training to achieve the implementation and curriculum changes

I have learned so much from the people I work with. This has been the ultimate in-service. As teachers we are so isolated. Other than student teaching I have not spent any time watching others teach. Now, for the past three years, I had the opportunity to watch others teach. (Second-grade teacher)

I came in as a special education teacher. I have been exposed to so many wonderful opportunities and ideas I know I will never be the same teacher. The training, both formal and informal, has been such a gift to me these last two years. (First-grade teacher)

Staff Development

Research on the effectiveness of reduced class size indicates that smaller class size is ineffective if teachers continue to teach using strategies geared to whole-class instruction. A major grant objective for the Site A project included extensive staff development to achieve organizational and curriculum changes. Along with increasing their repertoire of effective teaching and learning strategies for small-group instruction, teachers were faced with the challenge of developing new skills for successfully changing from a traditional one-classroom, one-teacher model to a cooperative team approach to education. This new role required the teachers to develop a common philosophy of education, knowledge of teamwork, and effective communication skills.
During the 1994-95 school year, the co-teacher teams received training in the integration and implementation of a thematic curriculum model designed to develop students’ critical thinking skills and different ways of learning techniques for assessing, validating, and evaluating what students learned; team-building skills and applied communication techniques; and ongoing training opportunities in relevant areas.

The focus of staff development for the final grant year included increasing project teachers’ understanding and use of thematic curriculum in all subject areas following Gardner’s Theory of Intelligences. The project supported workshops, conferences, and contracts with specialists to work with the staff development component.

A sample of seminars and workshops held to support project goals at Site A include the following:

**Workshops/Seminars**
- Team Building
- Goal Setting
- Grant Documentation
- Communication Building
- Student-led Conferences
- Thematic Curriculum Development
- Life Styles Inventory
- Transformation of Elementary Schools into a “Community Environment”
- Multiple Intelligences
- Computing for Educators
- Early Reading and Writing Strategies
- Multi-age Instruction
- In-service on Gardner’s Theory of Intelligences
- District In-service: teachers presented thematic assessment and instruction for beginning readers

**National and State Conferences**
- National Conference for Teachers in Mathematics
- National Conference for Teachers in English
- National Association of Education for Young Children
- 1994 Alaska Staff Development Network Summer Academy
- Alaska State Reading Conference
- Alaska State Math and Science Conference
- District Inservice: teachers presented thematic curriculum and integrating assessment and instruction for beginning readers

**Staff Meetings**
Project team participants met one-half day per month to plan and write topical units based on the selected thematic goals. Additionally, all four teams met one full day per month to discuss and evaluate progress toward grant-related objectives and to revise plans for implementation as needed.

2. What instructional innovation in reading and mathematics is Site A using along with class size reduction?

All classes in the project used a variety of teaching strategies throughout the school week. Teaching strategies documented in weekly logs and observed by the evaluator included guided practice, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, independent work, and cross-age tutoring. The last strategy provided younger students the opportunity to work one-on-one with students from the upper-grades.
Data collected from teachers’ weekly logs show the instructional strategies used in the classroom and the percentage of weeks during the school year when the strategies were used (see Table 5).

Table 5. Site A Teachers’ and Co-teachers’ Report of Instructional Strategies Used in the Classroom

<table>
<thead>
<tr>
<th>Instructional Strategy</th>
<th>Percent of weeks teachers reported the strategy used in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-directed Instruction. An instructional method whereby the teacher provides the information that will enable the students to perform a task or meet an objective.</td>
<td>99%</td>
</tr>
<tr>
<td>Whole-group Instruction. An arrangement whereby a class of students receives instruction by one teacher.</td>
<td>98%</td>
</tr>
<tr>
<td>Guided Practice. An instructional method by which students attempt to perform tasks independently but where the teacher is available for immediate and direct feedback. This strategy is generally used for new tasks.</td>
<td>98%</td>
</tr>
<tr>
<td>Small-group Instruction. An arrangement whereby students receive instruction in groups generally no larger than six.</td>
<td>97%</td>
</tr>
<tr>
<td>Individual Instruction. An arrangement whereby a student receives instruction by a teacher and not as part of a class, e.g., instruction for a single person or a one-on-one teaching situation.</td>
<td>96%</td>
</tr>
<tr>
<td>Independent Work. The process of acquiring new learning or new information on one’s own or under limited guidance of an instructor.</td>
<td>94%</td>
</tr>
<tr>
<td>Cooperative Learning. An instructional method by which students cooperate in small teams to learn material that is initially presented by the teacher. Students take responsibility for their learning, for their teammates’ learning, and for classroom management by checking, monitoring, helping one another with problems, and encouraging one another to achieve.</td>
<td>94%</td>
</tr>
<tr>
<td>Computer-assisted Instruction. Programmed instruction using an electronic computer as the principal medium of instruction.</td>
<td>88%</td>
</tr>
<tr>
<td>Learning Centers. An arrangement where complete lessons are set up in various stations and small groups of children or individual students work at them. Centers can have adult supervision, direction provided by the teacher, or be self-explanatory.</td>
<td>86%</td>
</tr>
<tr>
<td>Peer Tutoring. The practice of having students of the same or similar age assist with the instruction of other students who may need supplemental aid.</td>
<td>85%</td>
</tr>
<tr>
<td>Cross-age Tutoring. The practices of having older students (at least two grade levels higher) assist with the instruction of younger students who may need supplemental aid.</td>
<td>occasional</td>
</tr>
</tbody>
</table>

3. What training in support of instructional innovation for the class size reduction program did schools provide to teachers, other school staff members, and parents?

Training for Teachers and Staff (Refer to Question 1, Goal 7)

Training for Parents
A training program was not initiated at Site A for the parents. However, opportunities were occasionally offered for them to participate in educational activities in the evening during the 1993-94 school year and at noon during the 1995-96 school year. The emphasis of these sessions was on educational activities to support in-class instruction and to use with their children at home.

Other Staff
Nonparticipating staff members at Site A had the opportunity to attended training sessions, and grant teachers provided interested staff members with instruction on thematic curriculum and overall progress of the grant.
4. What roles do parents, volunteers, tutors, and technology play in instruction?

Parent/Volunteer Involvement
While parent volunteers were not given major emphasis at Site A, a significant number of parents did volunteer in the classroom. Depending on teacher preferences and student needs, volunteer activities ranged from clerical duties to working with individual and small groups of students in the classroom.

Data collected from the teachers’ weekly records show an average of 3.4 parents spending approximately 70 minutes volunteering in the classroom. This does not take into account special events where large numbers of parents were available for assistance for longer periods—but it does include reading to students; listening to students read; working with individuals and small groups; helping with special projects and reading, writing, and mathematics enrichment activities; participating in an at-home reading program; and other academic and general classroom support. During the 1994-95 school year, there was an increase of 4 parents spending the same amount of time in classrooms per week.

During the 10-week data collection period, the majority of volunteers received a rating of good to excellent for the quality of their work in the classroom.

Tutors
No title programs are available at this school site. Special service personnel were available to assist select children with Individual Educational Plans (IEPs). In some classrooms, the special service personnel worked with the assigned child in small groups. During this time, they focused most of their attention on the special needs child and indirectly assisted the other students in the group. In other classes, special service personnel remained relatively isolated from the class and provided assistance to the special needs child on a one-on-one basis.

Technology
New hardware and software were added to the project for the 1994-95 and 1995-96 school years. Although not a primary component of the project, and one that did not have an effect on the pupil-teacher ratio, technology use increased in these classrooms. Computer centers were used as instructional learning centers and provided skill and drill work and enrichment activities. Teachers report some at-risk students as being very responsive to learning with computers, and the teachers appreciate technology as an additional instructional aid.

5. How did the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement
One of the principal goals of the Elementary School Class Size Reduction Pilot Project was to improve student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school’s project was higher than it would have been had the project changes not been made.

We cannot know how much students in the Elementary School Class Size Reduction Pilot Project would have learned if they had not been in a project classroom. Our best sources of comparison are students in other classrooms or other schools. Yet these students may also have benefited from other, unmeasured instructional innovations. Other students might also differ from project students in ways that cause them to learn at different rates, or they might begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best
comparison group to use is other students in the United States. We wanted to see if students in the Elementary School Class Size Reduction Pilot Project improved their level of academic achievement over time, relative to other students in the United States.

To compare the academic achievement of project students with U.S. students, we used individually administered norm-referenced and diagnostic tests for students in kindergarten, first, and second grade. The two tests used to determine academic achievement are:

**Peabody Picture Vocabulary Test (PPVT)**
These individually administered norm-referenced tests are designed primarily to measure a subject’s receptive (hearing) vocabulary for Standard American English. The test provides an estimate of a student’s verbal ability, and in this sense it is an achievement test since it shows the extent of English vocabulary acquisition.

**KeyMath**
These are individually administered diagnostic inventories of essential mathematics designed to provide a comprehensive assessment of a student’s understanding of basic concepts and application of mathematics. Basic concepts assesses the foundation of knowledge upon which all of elementary mathematics is based. Applications assesses the use of knowledge and computational skills.

The Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments were selected by consensus of the project coordinators, the project evaluator, and the Department of Education. Both tests are regarded as appropriate for providing a general overview of primary students’ academic achievement in language and mathematics. The Iowa Test of Basic Skills (ITBS) was considered inappropriate for Site A, since the project did not go beyond the second grade.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the KeyMath results of project students relative to all U.S. students. We used percentile rank as a measure of academic achievement for students taking the PPVT. We tracked the math and language arts achievement of individual students in each project school. An analysis of academic growth as measured by these tests for all students and for at-risk students, where numbers of students are sufficient, are analyzed separately. At-risk students are identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language.

A description of these methods of reporting test results follows.

**National Percentile Rank**
Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.

**Grade Equivalent**
Indicating the year and month of schooling of students nationally that corresponds with the student’s test performance. By comparing the student’s actual grade level (e.g. 4.2 years) with the grade equivalent (e.g. 4.6 years) it is possible to tell if the student is learning at a faster, or slower, or similar rate as students in the U.S. as a whole.

Five classroom teachers and four part-time co-teachers with approximately 125 students participated in the project to reduce the pupil-teacher ratio and implement the instructional changes during the 1993-95 school years. Four classroom teachers and four co-teachers with approximately 100 students
participated in the project during the 1995-96 school year. Students in kindergarten, first, and second grades were given individually administered norm-referenced and diagnostic tests in the Fall of 1994 and Spring of 1995 and 1996. Classroom teachers administered and scored the tests and ISER performed the analysis of these test results. Grade cohort represents the year of school the student was in during the 1993-94 school year. Thus, in the 1995-96 school year, the kindergarten cohort students were in the second grade.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the Key Math and PPVT is 18 months, a relatively short period to draw conclusions about the impact of the project.

National percentile rank, an average for students taking the test nationally, increased for kindergarten, first, and second graders at Site A in Spring 1995. The national percentile rank for the kindergarten cohort increased 31 percent for basic concepts and 34 percent for applications from Fall 1994 to Spring 1996. (See Table 6.)

<table>
<thead>
<tr>
<th>Site A KeyMath National Percentile</th>
<th>All Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATIONAL PERCENTILE</strong></td>
<td>Basic Concepts</td>
</tr>
<tr>
<td>Fall 94</td>
<td>Spring 95</td>
</tr>
<tr>
<td>Site A</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>46</td>
</tr>
<tr>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 7 shows the National Percentile Rank for at-risk students in kindergarten, first, and second grade at Site A. Results show an increase in the percentile rank for all three grades from Fall 1994 to Spring 1995. The number of students remaining in the at-risk cohort for the 1995-96 school year was insufficient to include in the final analysis of academic achievement.

<table>
<thead>
<tr>
<th>Site A KeyMath National Percentile</th>
<th>At-Risk Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATIONAL PERCENTILE</strong></td>
<td>Basic Concepts</td>
</tr>
<tr>
<td>Fall 94</td>
<td>Spring 95</td>
</tr>
<tr>
<td>Site A</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

All students at Site A demonstrated an increase in grade equivalent. The mean change for the kindergarten cohort from Fall 1994 to Spring 1996 in basic concepts was two years, four months; the mean change from Fall 1994 to Spring 1995 for the first grade cohort, one year, seven months; and for the second grade cohort, one year, six months. In applications the mean change for the kindergarten cohort from Fall 1994 to Spring 1996 was two years, seven months. The mean change from Fall 1994 to Spring 1995 for the first grade cohort was, one year, seven months; and for the second grade cohort, two years, one month. (See Table 8.)
Table 8. Site A KeyMath Grade Equivalent All Students

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>No. Students Tested</th>
<th>Fall 94</th>
<th>Spring 95</th>
<th>Spring 96</th>
<th>Mean Change</th>
<th>Fall 94</th>
<th>Spring 95</th>
<th>Spring 96</th>
<th>Mean Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site A</td>
<td>K</td>
<td>43</td>
<td>.3</td>
<td>2.8</td>
<td>2.4</td>
<td>.3</td>
<td>2.9</td>
<td>2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>45</td>
<td>1.2</td>
<td>2.9</td>
<td>1.7</td>
<td>1.3</td>
<td>1.0</td>
<td>3.0</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>2.1</td>
<td>3.8</td>
<td>1.6</td>
<td>2.5</td>
<td>2.1</td>
<td>4.6</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At-risk students in all participating grades at Site A increased an average of one year, one month in grade level on basic concepts and one year, four months on applications from Fall 1994 to Spring 1995. The number of students remaining in the at-risk cohort for the 1995-96 school year was insufficient to include in the final analysis of academic achievement. (See Table 9.)

Table 9. Change in Grade Equivalent, Site A KeyMath At-Risk Students, Fall 1994-Spring 1995

<table>
<thead>
<tr>
<th>Key Math</th>
<th>GRADE EQUIVALENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>No. Students Tested</td>
</tr>
<tr>
<td>Site A</td>
<td>43</td>
</tr>
</tbody>
</table>

Table 10 shows the National Percentile Rank of KeyMath test results for kindergarten, first, and second grade cohorts. Results show the percentile rank has increased for all three grades. For the kindergarten cohort the percentile rank increased 32 points from Fall 1994 to Spring 1996.

Table 10. Site A PPVT Percentile Rank All Students

<table>
<thead>
<tr>
<th>PPVT</th>
<th>PERCENTILE RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Grade Cohort</td>
</tr>
<tr>
<td>Site A</td>
<td>K</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

All at-risk students at Site A demonstrated an increase in national percentile rank from Fall 1994 to Spring 1995. The number of students remaining in the at-risk cohort for the 1995-96 school year was insufficient to include in the final analysis of academic achievement. (See Table 11.)

Table 11. Site A PPVT Percentile Rank At-Risk Students

<table>
<thead>
<tr>
<th>PPVT</th>
<th>PERCENTILE RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Grade Cohort</td>
</tr>
<tr>
<td>Site A</td>
<td>K</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
6. How are parent involvement, teacher satisfaction, and student attendance and behavior affected by the class size reduction and associated instructional innovations?

Parent Involvement
Parents’ in-school and at-home involvement increased over the duration of the project. Weekly assignments for parents to complete with their children, at-home reading programs, and sessions where parents were given ideas for working with their children and supplementing classroom learning were available to all parents of students in the project. All cooperating teachers had substantial interaction with the students’ homes through letters, notes, phone calls, and in-school activity days where parents worked with the children on school projects.

Student Attendance
Teachers agree in general that students enjoy coming to school and are excited about learning when challenging and interesting activities are available. Because of the project, not only were there more activities but students enjoyed the attention and increased success they experienced with two teachers in the room. Attendance as an indicator of project success is considered inappropriate for primary-aged students, because it is more a function of parental responsibility than child preference. Teachers reported an average of 5 absences per week. While they felt this attendance rate was good, it could not be directly attributed to project-related changes.

All teachers have telephones in their classrooms and believe that the increased informal access to parents improved the home-school communication link. Also, with a second teacher in the classroom to assume managerial responsibilities, one teacher was free to call parent to make inquiries about children’s whereabouts.

School Climate, Discipline, and Teacher Satisfaction
Teachers’ weekly logs since the 1993-94 school year report class climate and behavior, academic achievement, and teacher satisfaction as mainly excellent during periods of reduced PTR. End-of-the-year analysis of teachers’ weekly logs found class climate rated as excellent 85 percent of the time and class behavior as excellent 72 percent of the time during periods of reduced PTR. Academic achievement as a result of reduced PTR was reported as excellent 88 percent of the time and good 12 percent of the time. All teachers and co-teachers reported a 100 percent satisfaction rate with reduced PTR (see Table 12).

| Table 12. Site A Teacher and Co-Teacher Rating of Class Climate and Class Behavior During Whole Class and Reduced PTR time; Overall Rating of Academic Achievement as a Result of Lowered PTR; and Teacher Satisfaction with Lower PTR |
|---------------------------------|--------|-------|-------|-------|
| Weekly Class Description        | Poor   | Fair  | Good  | Excellent |
| Class Climate with Reduced PTR  | 0%     | 0%    | 15%   | 85%     |
| Class Climate Whole Class       | 0%     | 13%   | 20%   | 67%     |
| Class Behavior with Reduced PTR | 0%     | 0%    | 28%   | 72%     |
| Class Behavior Whole Class      | 3%     | 17%   | 28%   | 52%     |
| Academic Achievement as a result of Reduced PTR | 0%     | 0%    | 12%   | 88%     |
| Teacher Satisfaction with Reduced PTR | Very Satisfied 100% | Somewhat Satisfied 0% | Not Satisfied 0% |
Climate
The overall class climate refers to the atmosphere in the classroom during instruction and takes into account students’ behavior and involvement in the assigned tasks. All participating teachers described an improved class environment while the co-teacher was present, with more positive and productive use of class time, increased opportunities for challenging and developmentally appropriate instruction, and increased positive student-teacher interactions.

Behavior
Teachers described students’ behavior as less argumentative and, in general, more pleasant when all students were able to get substantive attention for academic and social needs. The ability of teachers to deal with behavioral and academic concerns on an immediate and individual level is the key component to establishing the supportive environment necessary for children to experience academic success and develop appropriate social skills. This proactive approach to behavior has a direct influence on the increased frequency of positive student-teacher interactions and time on task—uninterrupted time that a student spends on productive learning activities.

7. How can this project be replicated at other elementary sites?

The following statements are recommendations of the co-teacher teams for elementary schools considering implementing strategies to reduce the pupil-teacher ratio and improve instruction.

- The goals of reducing class size and improving instruction need to be team decisions with enough flexibility to make changes as implementation occurs.
- Teachers must be able to select a cooperative teaching model. While it never hurts to move teachers out of their comfort zone, it could be counterproductive for some people.
- Teaching teams must have similar expectations for student performance and share similar values for education.
- Student teachers should be recruited to help reduce PTR. By increasing the amount of time required in a classroom, the student teachers would have greater opportunities for modeling and developing professional relationships with experienced teachers.
- The role of special service personnel in the classroom should be expanded to include working with special needs children in a heterogeneous small group setting.
- Adequate planning time is essential for teachers to work through new educational practices and curriculum changes.
- Provide on-going focused staff development and at least three years for teachers to make significant changes in their educational practices.

AT-RISK STUDENTS

An average of five at-risk students were enrolled in each participating grant class. Teachers recorded the benefits of the Elementary School Class Size Reduction Pilot Project for those students either academically or behaviorally at-risk of experiencing problems in school. Two themes emerged in these records: time and attention. Students benefited from increased time for teachers to help children develop social skills and change inappropriate behaviors and from time for teachers to attend to students in need of extra attention or individual guidance and support for learning.

The rewards of enhanced self-esteem that come with the security of having needs met and the pride that accompanies accomplishments were some of the major benefits for these children. Additionally,
teachers were able to discreetly and quickly respond to these students without undue disruption to others in the class that, in turn, allowed for a more efficient use of instruction time.

The following are some samples of teachers' observations of at-risk students:

- Two at-risk students, reluctant to participate in large group activities, received help to set up independent projects. One teacher was able to monitor and meet with them daily as they began to feel comfortable and ready to join larger groups.
- An at-risk student who received language support from the speech therapist learned to read. The student celebrated her new achievement by carrying her book everywhere and reading to the principal, other teachers, and a kindergarten class. She was proud of herself and her self-esteem went up five notches.
- We were able to handle disruptive behavior immediately before it escalated to others.
- We were able to concentrate on individual students who needed extra help. Small-group work enabled these students to get more one-on-one instruction. Behaviors were more positive and on-task behavior was excellent. Again, we were able to zero in on these students before they showed behaviors associated with frustration.
- By having two teachers in the room we were able to attend to the at-risk students almost immediately when they were having problems. We were able to help them in small groups and individually. They were more focused and had less time to be off task with two teachers available.
- Two teachers in the room provided an extended opportunity to discuss a child's status with a parent during the school day.

COST ANALYSIS

Introduction

The purpose of the Elementary School Class Size Reduction Pilot Project was to assess the effectiveness of reduced class size, combined with other teaching interventions, on student achievement and attitude, school discipline, and parent involvement. Each participating school was granted $197,600 per school year to develop and implement strategies towards accomplishing these goals. A simple cost analysis provides information on the following: 1) the project's overall costs per classroom; 2) the approximate cost of implementing each strategy; and 3) a description of how project funds were spent.

Project Cost

Site A extended the project to five classrooms, affecting 125 students annually in fiscal years 1994 and 1995. In FY1996, the project encompassed four classrooms, affecting 100 students annually. The cost of the project over the three years was as follows:

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Cost</th>
<th>Number of Classrooms</th>
<th>Cost per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$185,579</td>
<td>5</td>
<td>$37,116</td>
</tr>
<tr>
<td>1995</td>
<td>$179,810</td>
<td>5</td>
<td>$35,962</td>
</tr>
<tr>
<td>1996</td>
<td>$199,640</td>
<td>4</td>
<td>$49,910</td>
</tr>
</tbody>
</table>
Note that for FY1994 and FY1995, Site A's budget was substantially less than the $197,600 the state provided each school. This occurred because Site A believed an indirect charge had to be paid out of project funds. Prior to FY1996, school administrators discovered that this was not the case and the indirect charge was dropped from the FY1996 budget. Consequently, in order to maintain consistency across all fiscal years and across the different school sites, this indirect charge was excluded from the cost analysis.

**Strategy Costs**

Site A employed three strategies—Reduce Pupil-Teacher Ratio, Change Lesson Organization and Delivery, and Create Co-Teacher Teams—to reduce class size and improve education. These strategies were described in detail in previous sections of this report and are summarized below:

- **Reduce Pupil-Teacher Ratio:** Site A hired four part-time co-teachers to assist full-time teachers with student instruction.

- **Change Lesson Organization and Delivery:** Site A implemented an instructional approach based on a thematic curriculum model designed to develop students' critical thinking skills.

- **Create Co-Teacher Teams:** Site A replaced single classroom teachers with co-teacher teams, changing the one-class, one-room, one-teacher model into a collaborative teaching effort.

Figure 2 displays the annual cost per classroom of implementing these strategies.

It should be noted that strategy implementation costs may vary from school to school, as teacher and other personnel salary and benefit costs may vary depending on the experience of the individuals on staff.
Cost Analysis Description

Project and strategy costs were approximated using Site A's fiscal year project budgets. The cost analysis was conducted in two phases. Phase 1 determined the purpose behind each budget expenditure. Phase 2 matched the purpose with the strategy in order to determine the approximate cost of implementing each strategy.

Phase One
First, each budget line item was classified as to the type of expenditure it represented. In pursuing its strategies to reduce class size and improve education, Site A spent its project funds in three ways: 1) hiring more staff, referred to as "additional personnel;" 2) training staff, referred to as "staff development;" 3) purchasing computer equipment, referred to as "technology." An approximate breakdown of the amount of project funds spent for each of these purposes is provided in Figure 3.

In calculating this breakdown, we assumed that since hiring more staff, providing additional staff training, or purchasing technology all have administrative costs in addition to the actual budget item cost, budget items representing general overhead or administrative costs, such as "supplies, materials, and media" were apportioned among additional personnel, staff development, and technology according to their percent share of the total budget. For example, in FY1994 Site A spent 70% of its project funds on adding personnel, 18% on staff development, and 12% on purchasing technological equipment. Consequently, 70% of the line item "support staff" was charged to additional personnel, 18% to staff development, and 12% to technology. The following lists other assumptions we made in the course of conducting the cost analysis:

- Teacher salary and benefit expenditures were apportioned between additional personnel and staff development on the basis of time expended. For example, out of a possible 180 annual work days, teachers spent 7 days, or 4% of their work days, receiving additional training rather than instructing students. Therefore, 4% of teacher salary and benefit expenditures were allocated to staff development.
- Site A indicated that substitutes received employee benefits. A benefit rate for substitutes was calculated based on FY1994's budget expenditures and used in all subsequent fiscal years.
• “Other purchased services” were treated as additional general overhead or administrative costs and apportioned in the same manner as “supplies, materials, and media”—according to percent share of the total budget.

• Since FY1996’s budget was turned in before the end of FY1996, it was assumed that all planned expenditures were completed.

**Phase Two**

Once the purpose of each expenditure was determined it was then possible to match an expenditure to a particular strategy. Site A was unique in that each of the school’s strategies included all expenditures. In other words, the reducing pupil-teacher ratio strategy included all expenditures under additional personnel, staff development, and technology. This was true for the remaining other two strategies as well.

**Cost-Benefit Summary**

The study looked at the mean change in grade equivalent for cohorts of students who participated in the pilot program all three years. Grade equivalence indicates the amount of learning achieved by students as compared to the national average, given in year and month increments. For example, a grade equivalent change of 1.8 means a scholastic achievement equal to one year and eight months of schooling on a national average. This grade equivalent is then compared to the actual length of schooling undergone by each student. For example, if a grade equivalent change of 1.8 (one year and eight months) occurred over a time period of 1.6 (one year and six months), this indicates achieved student learning above the national average. If the change in grade equivalent occurred over a time period of 1.9 (one year and nine months), this would indicate achieved student learning below the national average. Finally, if a 1.8 change in grade equivalent occurred over a time period of 1.8, this indicates achieved student learning equal to the national average.

The study then compared the mean change in grade equivalent using KeyMath Test Results to the project’s estimated mean program cost per classroom. The following table displays the mean change in grade equivalent in mathematics for a kindergarten cohort that participated in Site A’s Elementary School Class Size Reduction Pilot Project from Fall 1994 to Spring 1996.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Mathematics Grade Equivalent</th>
<th>Number of Classrooms in Project</th>
<th>Mean Program Cost Per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6</td>
<td>2.7</td>
<td>4.5</td>
<td>$32,673</td>
</tr>
</tbody>
</table>

**Estimated Mean Program Cost per Classroom**

Site A’s mean program cost per classroom was estimated by: 1) differentiating program costs from project costs, and 2) allocating capital expenditure costs over the use-life of the investment. The purpose for differentiating between program and project costs was to identify ongoing costs—costs that will continue to be present as the program continues—from startup or project-imposed costs. Program costs were defined as those costs necessary to the ongoing operation of Site A’s Class Size Reduction Project. Under this definition, items such as administrative costs imposed by the grant or startup costs associated with designing the program were not included in calculating the annual program cost. Second, capital expenditures, such as purchasing computers, were spread out over the use-life of the investment in order to avoid overestimating annual program costs.
We made the following assumptions in calculating the mean program cost per classroom for Site A:

- The cost of hiring a part-time grant administrator was considered a project and not a program cost.
- Once the program was established, staff development would occur only as new staff was hired. The project had a 40% turnover rate during its three years of operation. Therefore, those expenditures providing for staff development—substitutes/temporaries, professional/technical services, and travel—were calculated at a 40% rate.
- Capital equipment or computer purchases were assumed to have a use-life of eight years.

**SUMMARY**

Teachers’ weekly records reporting on students’ academic achievement and behavior, classroom climate, and teacher satisfaction with the project since the start of the 1993-94 school year describe the positive benefits of having an additional teacher in the classroom during core instruction time and the accompanying curriculum changes.

All participating teachers reported being very satisfied with the support provided by the grant and encouraged by the behavior and academic outcomes observed in the students. Class behavior during periods of instruction with one teacher and with two teachers was rated as good to excellent, and class climate was rated as excellent during periods of both one-teacher and two-teacher sessions. Academic achievement was reported as excellent during periods of reduced class size. Parents reported being pleased with the project, believing their children are receiving a quality education, and seeing the changes as benefiting their children’s reading, language arts, and mathematics skills.

Two of the strategies used to achieve the *Elementary School Class Size Reduction Pilot Project*—lowering the pupil teacher ratio and changing the organization and delivery of instruction—were successful at this site. The third strategy—creating highly trained co-teacher teams with broadened expertise and perspective—proved to be problematic due to frequent staffing changes.

Teachers feel that teaming partners cannot be appointed but instead must be teachers interested in making a commitment to changing their approach to teaching. Teachers assigned to a teaming partner without subsequent consideration could be problematic, and contract requirements, personnel issues, and personal issues need to be considered in designing a formal selection process.

Major benefits of the project over the past three years were opportunities for professional development; increased parent support and involvement in their children’s education; accelerated attention to potentially disruptive behaviors; increased student-teacher contact time and time on task; and more in-depth instruction, assessment, and evaluation for education practices and student needs. Negative consequences of the project included the amount of teacher time away from the class for professional development, extra planning time associated with the change, the potential for mismatch of teaming partners, and internal personnel problems associated with unequal distribution of resources.

The original goal of the project—to change the one-class, one-room, one-teacher model into a collaborative teaching arrangement with two professionals sharing the responsibilities of the classroom—proved to be an effective and rewarding approach to educational innovation.
**SITE B**

**BACKGROUND DESCRIPTION**

Site B is a primary school for 415 students, including pre-school through second-grade. The students feed into Site C for grades 3 through 5. The certified staff consists of 18 classroom teachers, 5 special service teachers, and a collaborator who assists in the classroom and coordinates the staff development component of the *Elementary School Class Size Reduction Project*. All kindergarten, first, and second-grade teachers were involved in implementing the project. The ethnic make-up of the student body is Caucasian, 87 percent; Native-American (Alaska Native and American Indian), 8 percent; Hispanic-American, 3.3 percent; and African-American, 1.7 percent.

In the 1995-96 school year, over 40 percent of the student body—an increase of 10 percent since the 1993-94 school year—were identified as "at risk" under the following criteria: socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a second language.

In 1989, the Alaska Department of Education chose this school to do a three-year study on the effects of using developmentally appropriate teaching practices for primary students. The project was based on a report of the National Association of School Boards of Education (NASBE) task force on Early Childhood Education called "Right from the Start." The staff selected three areas to focus on for restructuring: (1) developmentally appropriate activities and cultural integration into the curriculum; (2) parent and community involvement; and (3) advocacy for children. At the end of the three years, the staff members felt they had made great gains, but they still had large classes and very little ability to make further changes without lowering the pupil-to-teacher ratio. The class size reduction project provided the opportunity to continue with the lessons learned during the earlier program and to improve the delivery of instruction in smaller classes.

The project goals of the *Elementary School Class Size Reduction Pilot Project* at Site B included:

- Increasing the use of teachers working in teams to facilitate classroom grouping and facility sharing
- Using collaborators and special service personnel to work with teachers or teams of teachers to directly reduce the PTR during critical instruction periods
- Implementing parallel block scheduling to reduce PTR during reading, writing, and mathematics periods
- Increasing the use of parent volunteers in the classroom
- Using computers to individualize learning and reduce the PTR
- Improving communication between home and school
- Providing training in the arts for students, staff, and parents
STRATEGIES TO ACHIEVE GOALS

The dominant strategy used to increase student achievement and improve attitude and behavior at Site B was providing students with opportunities for small-group instruction using collaborators, special service teachers, Chapter One tutors, and trained volunteers. The classroom teacher worked with the additional personnel on planning, implementing, and evaluating the individual and small-group teaching and learning experiences of the students. Other methods used for achieving the goals of the project include staff development, volunteer training, team teaching, parallel block scheduling, and technology.

Collaborators/Project Coordinators and Special Service Teachers

The initial proposal called for 3 full-time collaborators to work in the classroom during language arts, reading, and mathematics instruction time. This number was reduced to 2.5 teachers the first year and to 2 teachers the second year due to increased personnel costs and a drop in student enrollment. Each collaborator spent four hours of the instruction day, four days a week, working with teams of teachers in direct pupil instruction to reduce the PTR during language arts, mathematics, and reading. They spent their remaining time planning with classroom teachers and designing the staff development and volunteer training components of the grant. During the 1995-96 school year the volunteer coordinator/collaborator was replaced by a technology specialist who worked with students in a new computer lab, trained staff, and developed a technology curriculum for the primary-grades.

Additional Personnel

The special education assistants, including special service teachers and Chapter One aides, assisted the special needs children either in the classroom or in “pull out” situations, where children are removed from the classroom and taught in small groups with other special needs students. They joined in the collaborative process by increasingly being accountable to the regular classroom teachers, becoming actively involved in team teaching, and working with regular as well as special education students. While they were able to assist with small-group instruction in the classroom, their primary purpose was to attend to the students qualifying for special services.

Staff Development

The staff development coordinator assessed staff development needs, provided the necessary materials to meet these needs, worked on establishing stronger communication with others in the district and the central office regarding staff development at Site B, and acted as a resource for up-to-date research or current articles on innovative educational practices. She also developed a professional library that includes current research on effective teaching and learning practices, teachers’ guides, videos demonstrating classroom teaching techniques, and updated educational material.

Volunteer Training

The parent and volunteer training coordinator’s position was developed and designed following a parent involvement project that the staff felt matched the needs of this early-childhood school. The basic components of the parent program included attention to parenting skills; communication between home and school; parents as school volunteers; parental involvement in school decision-making; collaboration; and exchanges between schools, community organizations, agencies, and businesses.

The major focus throughout the grant was on developing a volunteer training program for parents and community members and making the necessary connections to recruit individuals from the education and business communities.
A classroom tutoring manual, *Classroom Tutor Training*, was developed by the volunteer coordinator and parent liaison. The manual is designed to use in a college class and is a general guideline for policies, practices, and procedures for schools interested in initiating a coordinated and comprehensive volunteer training program. The training manual covers topics on tutor guidelines; understanding the K-2 child; working with small groups; positive talk (K-2 discipline); strategies for working with students in reading, mathematics, and writing; and tips for increasing self-esteem in young children.

**Arts and Humanities Coordinator**

The arts and humanities coordinator worked on developing a holistic—integrating art into all subjects—discipline-based art curriculum and provided direct instruction in the arts and humanities to small groups of students. She reduced the PTR and provided additional collaboration time for the classroom teachers. Along with working with students, she provided staff and parents with in-service training on how to incorporate humanities and arts into the classroom. A drop in student enrollment caused this half-time position to be eliminated at the beginning of the 1994-95 school year.

An increase in kindergarten student enrollment in the 1995-96 school year opened a half-time kindergarten position, and this former coordinator was hired as the teacher. Along with her role in the classroom, she supported and advised teachers, providing ideas and strategies about how to integrate arts and humanities into the curriculum.

**Team Teaching**

Classroom teachers had the option of team teaching or using parallel block class time to provide for periods of reduced PTR during reading, mathematics, and language arts instruction. Those teachers electing to team teach sent their whole class to the specials (gym and music) while they went to another classroom and worked with half of a class for either mathematics, reading, or language arts instruction. In the majority of classrooms, a minimum of four groups worked simultaneously with teachers, parents, community volunteers, and special service personnel.

**Parallel Block Scheduling (Split Specials)**

Parallel block scheduling (PBS)—used to allow teachers to work with half their students while the other half receives instruction from specialists in music, physical education, library, or computers—was an effective strategy for lowering the PTR. The strategy requires two regular classroom teachers to share special classes scheduled back to back. The teachers remain in their classrooms with half the class. At the end of the period, the students in the regular classrooms change places with those returning from special classes. In the majority of classes, the ratio of students to instructors (12:1) was reduced (6:1) by using collaborators, volunteers, and special service personnel who were available on a regular basis to assist teachers during this instruction time.

**Technology**

Technology was a secondary component of the project at Site B during the 1993-94 school year, with only seven new computers available to the first- and second-grade classrooms on a rotating basis. Due to the limited numbers and time open for use, teachers were unable to fully integrate their use into the daily class curriculum. Besides a restricted number of computers, updated software to accompany them was lacking.

The 1994-95 school year was more promising, with every teacher having at least one new computer, software appropriate for the primary grades, and a computer lab coordinator. Students used computers to write stories with word processing programs; do research using multimedia CD-ROM encyclopedia; explore other CD-ROMs such as Word Atlas, The Blue Plant, Space, Foreign Language, Art, and Science and Social Studies programs; and create Hyperstudio portfolios. The computer lab, open during recess, became a favored special event for many students.
During the 1995-96 school year, Site B increased the use of technology across the curriculum. Using the parallel block scheduling model with two computer labs (one run by the technology specialist and one run by an aide), an additional 2 hours per week was available for teachers to work with a PTR of 15:1 or less. Kindergarten and second-grade students went to the Macintosh lab for two hours per week and all first-grade classes went to the GS (skill and drill) lab for 2 hours per week. A scheduling change took place during the second half of the year to allow all students to have equal time in the GS and the new Macintosh lab.

Installation of E-mail on all classroom teachers' computers increased computer use and ease of communication between staff and other district schools. The school district provided funding for the networking of the building.

PROJECT MODIFICATIONS

Changes in the second and third years of implementation of the Elementary School Class Size Reduction Pilot Project at Site B were made in the areas of scheduling, personnel, technology, and volunteer training.

Changes 1994-95

Scheduling
- Classroom teachers had the choice of sending their whole class to a special teacher and working with a portion of other teachers' classes or using parallel block scheduling.
- All library classes were held as whole-group classes instead of split to allow a block of time for teachers to plan and coordinate lessons with their collaborator.
- The lunch schedule expanded to include three periods instead of two, allowing for smaller groups in the gym.

Personnel
- Because of a drop in student enrollment, the collaborator/arts and humanities coordinator position was eliminated. To maintain some aspect of the arts and humanities strand of the grant, the teachers started an art committee which was assigned the task of planning activities and developing ideas to maintain an art and humanities focus in the curriculum.
- A playground aide was hired to help cover lunch duty as well as to take classes into the computer lab to lower PTR further.

Technology
- New 21 LCs provided every teacher with at least one new computer.
- Software, appropriate for the primary-grades, was available.
- A computer lab coordinator was hired.

Volunteer Training
- Volunteers, second in importance and effectiveness only to the collaborators, started at the beginning of the school year with four basic training sessions. On-going training sessions included:
  a. basic training of large groups
  b. basic training of individual people to fit their schedules
  c. specialized training to fit the interests of volunteers
• To eliminate the problem of parent volunteers arriving in the classroom at unscheduled times, a basic one-hour, small-group time for parents to supervise was scheduled into the class day.
• A larger parent/volunteer room was more fully equipped with a copy machine, electric stapler, computer, die cut, laminators, and other supplies.
• No volunteers were allowed in the computer lab; instead a lab aide was hired.
• Training video tapes were available for parents to check out and view at home.
• Weekly newsletters were produced for volunteers.
• Monthly meetings were scheduled so all volunteers could get together.

Changes 1995-96

Personnel
• A technology specialist, who was a former classroom teacher, was added to the staff in lieu of replacing the volunteer coordinator/collaborator.
• One full-time staff development coordinator and five other staff members worked as “in class” collaborators for one hour a day in first- and second-grade classrooms. The staff members included two Title 1 tutors, the speech therapist, the resource teacher, and the music teacher.
• Due to an increase in kindergarten students enrolled at the beginning of the year, a first-grade teacher transferred to the kindergarten. The grade configuration for Site B is seven kindergarten classes, five first-grade classes, and six second-grade classes.
• The volunteer coordinator/collaborator resigned from teaching, and a parent volunteer coordinator assumed all responsibilities for this component of the grant. This coordinator had worked closely with the volunteer coordinator since the 1993-94 school year and was familiar with strategies to recruit, train, and support the volunteers.
• The arts and humanities specialist during the 1993-94 school year returned to the staff as a kindergarten teacher. During the first year of the grant she worked with students and teachers on integrating arts and humanities throughout the curriculum. When her position was eliminated, due to a decline in enrollment, the classroom teachers continued to use her curriculum. As a part-time classroom teacher she resumed her role as a model teacher for staff in the area of arts and humanities.

Technology
• Half the staff development funds were allocated to purchasing new computers.
• A classroom teacher took on the role of technology specialist, converted her classroom into a Macintosh computer lab, and developed a technology curriculum for primary students and teachers.
• A part-time aide worked in the Apple II GS computer lab where students practiced working with computers, using Speedway Math (a math practice program) and Magic Slate (a word processing program).

Volunteer Training
• Volunteer training was made available to meet the needs of new community members and parents wanting to work with students.
• The parent volunteer coordinator organized room representatives for all classroom teachers. These parents assisted with planning classroom events and scheduling volunteers.
• All volunteers were required to attend a training session before working in the school.
Additional responsibilities of the volunteer coordinator included:

- Working with the community, assisting with short-term family needs
- Establishing a child-care sharing network among parents
- Setting up a Parent Room so parents, not working in the classroom, could take younger siblings to the school
- Providing weekly reports of school news to the local newspaper

PROJECT OUTCOMES

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the Elementary School Class Size Reduction Pilot Project. In preparing this section we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; they show outcomes of the project on student academic achievement and attitude, school climate and discipline, teacher innovation, and parent involvement.

1. Did the program at Site B meet its class size goals?

Goal 1: Increase the use of teachers working in teams to facilitate classroom grouping and facility sharing

For sure, this has worked at this school. Teachers work together with class grouping, sharing material, lessons, and much professional expertise. This has been a positive aspect of the grant for this school. While this has been present before, the grant has encouraged a lot more of it. (Second-grade teacher)

It has been invaluable for me as a teacher to watch someone teach and have someone watch me teach and give me feedback. (Second-grade teacher)

The team approach to education was evident in sharing of facilities and instructional resources and in meetings at grade levels to plan and coordinate school and district curriculum criteria and effectively use available materials to support the classroom activities. Classroom teachers had the option of team teaching or using parallel block scheduling (split specials) to provide for periods of reduced PTR during reading, mathematics, and language arts instruction. The teachers electing the teaming approach sent their whole class to the specials (gym, library, and music) while they went to another classroom to reduce PTR during core instruction time.

At the kindergarten level, the classes were either self-contained, using a team-teaching approach to reduced PTR, or split, using the block scheduling model. Both teaching situations also used call-back time (where each student remains more than one hour per week after regular dismissal time for additional assistance and enrichment on reading and math), special service personnel, and volunteers to support conditions for small-group instruction. The team approach to education carried over in the relationship classroom teachers developed with the special service and support personnel. The attention to planning and sharing resources so that the special needs students received services in the classroom helped to avoid labeling and enabled the teacher to have another professional in the class during core instruction time. However, in some cases the pull-out approach to special needs students was applied, especially if the child required a more restricted learning environment.

The collaborators and special service personnel worked well together but were often overwhelmed with the additional planning time necessary to coordinate lessons with the classroom teacher. To maintain this highly effective use of staff expertise after the grant and to reduce the planning time, a cluster of
special needs students will be placed in a few rooms, thereby enabling the teachers to coordinate lessons more effectively.

**Goal 2: Using collaborators to work with teachers or teams of teachers to directly reduce the pupil-teacher ratio (PTR) during critical instruction periods**

_I taught kindergarten two of the three years of the grant, so I had only one year of collaborators. It was a dynamic time. While the collaborator was in the room we also had parents helping with the centers. During this time we did small reading groups 4 days per week for 1 hour per day. It was a highly effective use of class time._ (Kindergarten teacher)

_The collaborator model, floating teachers, is great. They are there every day, they develop that important relationship with the children, and they are able to assess the students' progress and make necessary changes as needed._ (Second-grade teacher)

Classroom teachers in the first and second grades unanimously agreed that the collaborator/teacher model was an effective way to reduce the pupil-teacher ratio. The benefit of having the same teacher in the room on a regularly scheduled basis, with coordinated lesson plans, was invaluable for the regular classroom teacher, who was able to share instruction strategies and assessments of children's progress. The teachers appreciated the second perspective, especially coming from experienced, familiar, and highly respected colleagues.

Planning time was the most significant disadvantage of the strategy. To be truly effective, the collaborator felt she had to cooperatively plan with the classroom teacher on a weekly basis. For the collaborator, this was a scheduling nightmare, and more often than not planning took place long after the normal school day and on weekends. If the planning time did not happen and the collaborator used pre-planned lessons from the teacher, the opportunity for collegial interaction was missing and the integrity of the strategy was compromised.

Some benefits reported by the classroom teachers of having collaborators in the classroom include:

- Mixing the groups (ability, random, mixed) throughout the year allowed students to help and learn from each other
- Using more developmentally appropriate, hands-on activities with students
- Increasing student integration of arts in the curriculum by having a collaborator, the music teacher, work with students on literature, drama, writing, and reading in small groups to develop language and writing skills
- Increasing the interaction of teachers in and across-grade levels

**Goal 3: Implementing parallel block scheduling to reduce pupil-teacher ratio during reading, writing, and mathematics**

_PTRS has been a lifesaver. It will be the one thing I will miss most after the grant. I have six children with ADHD in this class and there is no way I can handle difficult situations unless I separate these students. I do not know if this is a unique class but the number of children with high needs seem to be increasing. Out of 25 students in the class, 17 are on free or reduced-price lunch._ (Second-grade teacher)

_The most effective thing we did in the whole grant. This was a tried and true strategy: day in and day out it gave us a consistent period of small group time. This has been particularly important this year because so many of the kindergarten students have special needs and are very low in language skills._ (Kindergarten teacher)
Parallel Block Scheduling (PBS) allowed teachers to work with half of their students while the other half received instruction from specialists in music, physical education, library, or computers. The ratio of students to instructors (12:1) was further reduced (6:1) by using collaborators, volunteers, and special service personnel, who were available on a regular basis to assist teachers during this instruction time. The music, physical education, and library teachers did not directly benefit from the project. However, while they were essential in creating opportunities to schedule the split sessions, they expressed concerns over teaching the combined classes—including adjusting to different groups of children, classes not arriving at the same time, and difficulty in maintaining continuity in more structured lessons. Those who teach special subjects agreed that split classes were very helpful to the classroom teachers and to the overall academic achievement of the students. They said they planned to continue with such classes and to explore alternate schedules.

The teachers felt the time with one-half the class or teaming with a second teacher was invaluable for the academic and social needs of these primary students. While they considered PBS the best strategy of the project, they saw the remaining problem as the extra time commitment and accompanying scheduling problems necessary to make it work effectively.

PBS is the one strategy teachers felt could be implemented at any school—but it would require staff commitment and a coordinated class schedule. At this site, extra lunch-duty aides allowed teachers the planning time required under contract. While this time was not sufficient, it did alleviate major scheduling problems.

Goal 4: Increasing the use of parents volunteers in the classroom

They are very important. To have gotten the kids in my class to where they are now academically could not have happened without the parents. The students’ self-esteem is great when they see their parents working in the classroom. I see the volunteer component benefiting both parents and children. (Kindergarten teacher)

The volunteer program will be successful as long as someone is around to coordinate it, someone with the personality to get people involved. (First-grade teacher)

The major focus of the volunteer program was developing a training program for parents and community members and making connections to assist with recruiting individuals from the education and business community. Some early, unanticipated successes were connections made with the local college and high school. Tapping these two community resources benefited the school and students alike. Their attendance was more consistent since they were required to attend the volunteer session, and the classroom experience broadened their understanding of careers in education.

The volunteer program at Site B demonstrated what a well-coordinated program can accomplish. Their results showed that if a school wants to increase parent participation, it must be willing to welcome parents and community members and prepare them for their new role in education. Also, the school must be cognizant of the fact that parent-teacher conflicts will surface from time to time.

Data collected from the teachers’ weekly logs showed an average of 4 parent or community volunteers spending 70 minutes per week working in the classroom. This does not take into account special events or general and clerical classroom support but includes small group instruction in language arts, mathematics, reading and writing; supervising whole-class and small-group work; tutoring; assisting in the computer centers; publishing student work and assisting with weekly newsletters; cooking; and supervising learning centers. During the 1994-95 school year, an average of 6 parent and community volunteers per week spent an average of 60 minutes volunteering in the classroom.

During the data collection period, volunteers overwhelmingly received a rating of excellent for the quality of their work in the classroom.
Goal 5: Using computers to individualize learning and reduce the pupil-teacher ratio

The first year was not effective. We are just now getting started. I do not know enough about computers myself and initially questioned whether we should be using them in the primary-grades, but the kids love them and the technology specialist has done a magnificent job. (Kindergarten teacher)

Technology was a secondary component of the project at Site B during the 1993-94 school year. Seven new computers were available for classroom use on a rotating basis. Due to the limited numbers, scheduling concerns, and many teachers' unfamiliarity with computer use, success was constrained. At the start of the 1994-95 school year each teacher received one new computer for his or her classroom, additional age-appropriate software was available for use, and a computer lab aide was hired. Still, this component of the grant was not a preference among the majority of teachers. Progress was slow and many teachers did not hold increased use of technology as a high priority for the primary-grades.

In the final grant year, the staff decided to attend to this component of the grant. A classroom teacher took on the role of technology specialist, set up a new computer lab, and provided additional parallel block time for the classroom teachers. Once a month the technology specialist required the classroom teachers to accompany their classes to the lab so they would have the opportunity to see what the students were learning and to observe first hand how to use technology with young students. The component was very successful in the 1995-96 year. The technology specialist designed a curriculum for the school and provided many formal and informal in-service training sessions for teachers on the use of technology. While still in the early stages of increasing technology across the curriculum, the staff at Site B made tremendous progress with technology in the final grant year.

Reducing the Pupil-Teacher Ratio

Data collected from the teachers' daily records show an average of 11.4 hours of available instruction time with a pupil-teacher ratio of 15:1 or less during the 1995-96 school year. This represents an increase of 2.3 hours from the 1994-95 school year. Besides the extra teachers in the classroom (collaborators and special service personnel), teachers at Site B used call-back time (kindergarten only), computers in the classroom, computer lab, and volunteers to support and enhance the learning environment for the students (see Figure 4).

Figure 4. Site B Average Teacher Weekly Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less

<table>
<thead>
<tr>
<th>Type of Strategy</th>
<th>Time (hrs)</th>
<th>Total Time (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBS/Team Teaching</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Additional Teachers</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Volunteers</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Resource Personnel</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Call Back</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Computer Lab</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Computers in Class</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11.4</td>
<td></td>
</tr>
</tbody>
</table>

Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR.
The teachers' daily records allow us to make an estimate of time the average student spent in reduced size classes in 1995-96. As Figure 5 shows, an average student at Site B had approximately 8 hours per week of small-group instruction time.

Figure 5. Site C Average Student Instruction Time with a Pupil-Teacher Ratio of 15:1 or Less

Note: There are times when multiple strategies are taking place. As a result, the sum of the strategies is greater than the total time shown with reduced PTR.

Goal 6: Improving home-school communication

The home-school link has been a strong part of [this school’s] grant. More parents are in the building, and they [appear to be] more comfortable working and visiting in the school. We have in-service training on parent meetings to help create and build that relationship. (First-grade teacher)

If letters do not get home parents now call to find out what happened. The parents feel much freer to walk into the building and start helping the teacher. It appears so many know what is going on in the school. While I always sent home a newsletter, I never had parents calling to ask if their child did not bring it home or if something in the letter was not clear. I know they are interested in what is going on in their child’s classroom. (Second-grade teacher)

The parent volunteer coordinator credits the openness and receptive nature of the teaching staff and the training component as most significant factors in improving home-school communication. The benefits were far-reaching as parents who participated in the school became its advocates in the community and students’ self-esteem increased as they watched their parents working with their teachers. Teachers and administrators must recognize that parents can initially be reluctant or even fearful about coming into a school and will appreciate the offer of training and a welcoming reception.

Table 15 shows the percentage of parents who were aware of the project components and who felt the project had a positive impact on their children’s education. A total of 87 percent reported the computer-assisted instruction as having a positive impact on their children’s education, followed by 70 percent for the volunteers and 63 percent for team teaching. Fifty percent reported assisting their children’s teacher with school activities. These figures remained relatively consistent throughout the grant. The major change was in the area of computer use where, for the 1994-95 school year, only 55 percent were aware of computer use at school and 58 percent felt computers had a positive impact on the school. The increase in student use this final grant year was a major reason for this change.
Thirty-six percent of the parents responding to the survey had children attend Site B before the start of the Elementary School Class Size Reduction Pilot Project. Of this group, 59 percent felt that the program offered to their child was better in 1995-96 because of the project; 35 percent were undecided (see Table 16).

**Table 15. Site B Parents’ Awareness of and Involvement in the Project**

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Percent Aware of Project Component</th>
<th>Percent of Those Aware of Project Who Feel Project Has Had Positive Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team teaching</td>
<td>73%</td>
<td>63%</td>
</tr>
<tr>
<td>Collaborators with teachers</td>
<td>57%</td>
<td>46%</td>
</tr>
<tr>
<td>Split specials</td>
<td>59%</td>
<td>58%</td>
</tr>
<tr>
<td>Volunteers</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Computer-assisted instruction</td>
<td>92%</td>
<td>87%</td>
</tr>
</tbody>
</table>

**Parent Involvement**

<table>
<thead>
<tr>
<th>Project</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteered to work with students in the classroom</td>
<td>42%</td>
</tr>
<tr>
<td>Assisted child’s teachers and/or participated in PTA-related activities</td>
<td>50%</td>
</tr>
<tr>
<td>Received Volunteer Training</td>
<td>22%</td>
</tr>
<tr>
<td>Feel comfortable in role as volunteer</td>
<td>94%</td>
</tr>
</tbody>
</table>

Number of parents responding = 143

**Table 16. Site B Percent of Parents with Child in a Non-Grant Class During the 1993-94 School Year Who Feel the Program is Better Because of the Grant**

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>59%</td>
</tr>
<tr>
<td>No</td>
<td>1%</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>35%</td>
</tr>
</tbody>
</table>

Number of parents responding = 52

**Parent Comments**

The following is a representative list of parents’ comments on the Elementary School Class Size Reduction Pilot Project:

**Positive**

- Anything that brings the teacher/pupil ratio closer to one is a benefit to the kids.
- It is my opinion that smaller class size benefits both the teacher and student academically, psychologically, and emotionally.
- I have been very pleased with the project impact. My child is able to read at his own speed and can progress as quickly or slowly as he is able. This is due solely to having an adult listen to him individually every day. That would not be possible without the project.
- My child is very excited about school and I feel this is due to the programs [Site B] has with the grant. I feel the volunteer coordinator is extremely effective and important. She has made it possible to get parent volunteers to come in and become involved at their child’s school. I feel this is a very important part of a child’s academic career. To have their parents involved and knowing what is going on at school is a huge advantage. I am impressed with [Site B]!
• I feel it is a good program. The children are less easily distracted and respond positively to the special attention time provided them. I am sorry this is the last year of the project.

• Splitting the classes into smaller groups whenever possible is very beneficial to the kids. I love being able to assist in the classroom. The computer time and Internet for the kids are great! This school needs an art class all year long!

• As a former teacher, I have been in quite a few elementary schools. Site B definitely stands out as the best I have ever seen. The use of collaborators, volunteers, and split specials really benefits the children. Smaller class size as well as more adults per child assures all children will receive the attention and instruction they need. Site B is #1 in my book!

• I have enjoyed the opportunity to help in my child’s class. The training set me at ease and the teachers are very encouraging to the parents.

Negative

• I do not get this class size project? Class sizes have not decreased at all! I see an increase. As for all this class size project all I see is a greater need for volunteers. The way classrooms are working it seems too much is going on for one teacher to teach.

Parent Survey Results

Parents described their perceptions about Site B as positive. Ninety-six percent of respondents said their children enjoy school; 98 percent knew how their children were doing at school; 94 percent were pleased with the school's effort to communicate with them; 75 percent felt the project provided opportunities for them to be involved in their children's education; and 60 percent said the changes made in the school program as a result of the grant improved their children's attitude toward school (Table 17). For all three years of the project, more than 90 percent of parents agreed with the statements, "My child enjoys coming to school," "I know how my child is doing at school," and "I am pleased with the school's communication efforts."

<table>
<thead>
<tr>
<th>Table 17. Site B Parents' Perceptions About the School</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child enjoys coming to school.</td>
</tr>
<tr>
<td>62%</td>
</tr>
<tr>
<td>The project has provided opportunities for me to get involved in my child's education.</td>
</tr>
<tr>
<td>Changes to the school program, as a result of the project, have improved my child's attitude toward school.</td>
</tr>
<tr>
<td>I feel I know how my child is doing at school.</td>
</tr>
<tr>
<td>I am pleased with the school's communication efforts.</td>
</tr>
</tbody>
</table>

Number of parents responding = 143

Goal 7: Provide training in the arts for students, staff, and parents.

The initial plan called for a collaborator/arts and humanities coordinator. This coordinator would have been scheduled 4 days per week to work with all kindergarten teachers during language arts, reading, and mathematics instruction time and one day per week planning the arts/humanities curriculum. This goal was dropped after the first year due to budgetary restrictions. However, the commitment to the arts and humanities remained strong with this group of teachers, and they continued to promote this component of the grant.
During the 1994-95 and 1995-96 school years, staff development opportunities were available to assist teachers with integrating arts and humanities into the everyday curriculum. Teachers who attended conferences, often at their own expense, shared the training and ideas informally and during staff development days. Two examples of training sessions they attended include celebration of culture (a week-long multicultural event) and an Orff music institute promoting an instructional methodology emphasizing the integration of music, language arts, mathematics, and movement for primary students. The music teacher at this site was the primary force behind this methodology and served as a formal and informal resource for staff.

The humanities’ coordinator joined the staff as a part-time kindergarten teacher in 1995-96 and, like the music teacher, served as an informal resource person promoting the integration of the arts throughout the curriculum.

2. What instructional innovations in reading and mathematics are schools using along with class size reduction?

Instructional innovation at Site B emphasized increased use of developmentally appropriate experiences for small groups and one-on-one instruction when needed. Learning centers increased and were most frequently staffed by volunteers in the classroom. Teachers reported that without additional adult assistance, the centers were not as effective. With adult assistance they were able to integrate the subject areas and include more complex lessons requiring critical thinking skills.

Many teachers improved their approaches to reading—for example, the book immersion program, in which students were divided into three groups and the teacher rotated around the groups and listened to each child read one book. The children then took turns reading to the other students in their group. By the end of the week, they had all read aloud a minimum of six to seven books, and teachers reported they understand what they read. The teachers could not have effectively accomplished this strategy with the whole class.

All classes in the project used a variety of teaching strategies throughout the day. Teaching strategies documented in weekly logs and observed by the evaluator included guided practice, team-teaching, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, and independent work (see Table 18).

All participants emphasized small group instruction, often with a PTR of 6:1 or less. Data from teachers’ weekly logs show the strategies used and the number of weeks they were used (Table 18).
Table 18. Site B Teachers’ Report of Instructional Strategies Used in the Classroom

<table>
<thead>
<tr>
<th>Instructional Strategy</th>
<th>Percent of weeks teachers reported the strategy used in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-Directed Instruction. An instructional method whereby the teacher provides the information that will enable the students to perform a task or meet an objective.</td>
<td>100%</td>
</tr>
<tr>
<td>Whole-Group Instruction. An arrangement whereby a class of students receives instruction by one teacher.</td>
<td>100%</td>
</tr>
<tr>
<td>Guided Practice. An instructional method by which students attempt to perform tasks independently but where the teacher is available for immediate and direct feedback. This strategy is generally used for new tasks.</td>
<td>99%</td>
</tr>
<tr>
<td>Small-Group Instruction. An arrangement whereby students receive instruction in groups generally no larger than six.</td>
<td>100%</td>
</tr>
<tr>
<td>Individual Instruction. An arrangement whereby a student receives instruction by a teacher and not as part of a class, e.g., instruction for a single person or a one-on-one teaching situation.</td>
<td>97%</td>
</tr>
<tr>
<td>Independent Work. The process of acquiring new learning or new information on one’s own or under limited guidance of an instructor.</td>
<td>97%</td>
</tr>
<tr>
<td>Cooperative Learning. An instructional method by which students cooperate in small teams to learn material that is initially presented by the teacher. Students take responsibility for their learning, their teammate’s learning, and for classroom management by checking, monitoring, helping one another with problems, and encouraging one another to achieve.</td>
<td>95%</td>
</tr>
<tr>
<td>Computer-Assisted Instruction. Programmed instruction using an electronic computer as the principal medium of instruction.</td>
<td>99%</td>
</tr>
<tr>
<td>Learning Centers, An arrangement where complete lessons are set up in various stations and small groups of children or individual students work at them. Centers can have adult supervision, direction provided by the teacher, or be self-explanatory</td>
<td>96%</td>
</tr>
<tr>
<td>Peer Tutoring. The practice of having students of the same or similar age assist with the instruction of other students who may need supplemental aid.</td>
<td>84%</td>
</tr>
</tbody>
</table>

3. What training in support of instructional innovation for the class size reduction program did schools provide to teachers, other school staff members, and parents?

Teachers and Other Staff Members

Staff development training sessions began in the 1993-94 school year with:

- A teacher self-assessment survey used to determine where teachers were in relation to the instructional innovations proposed in the grant
- A review committee to oversee training requests and determine if they were within the parameters of the grant proposal
- A workshop/seminar evaluation instrument
- A process for sharing what teachers learned in their workshops with other school staff
- A strategy to keep staff updated about training available in the community and new research on issues dealing with teaching and learning strategies implemented at Site B

Teachers also met on a weekly basis during the 1993-94 year to adapt, clarify, review, and schedule the implementation process to better meet the needs of students. They also participated in a seminar, Professional Book Talk, where they reviewed educational-related discussions from journals, research papers, books, and videos.
A sample of staff development activities available to teachers, school staff, and parents during the 1993-96 school years includes workshops and seminars, parent training, and volunteer training.

**Workshops/Seminars**
- Activities Integrating Math and Science (AIMS)
- Cooperative Learning
- Developing Critical Incident Response Teams
- Running a Democratic Classroom
- Spencer-Kagen Cooperative Learning
- School-Wide Discipline
- Integration of Music and Literature in the Language Arts
- Working with Computers
- Developing Pro-social Skills in Children
- Working Effectively with Volunteers
- Restructuring Primary Curriculum and Assessment
- Portfolio Assessment
- Effective Use of an Intervention Team
- Innovative Teaching Practices in Language Arts and Math
- Classroom management
- **The Wright Group**—a whole-language process and an integrated approach to learning, emphasizing literature to enrich reading
- Multi-age, multi-grade classroom workshop
- Technology and computer class
- Weekly round table discussions on a variety of education-related topics. Attendance at these sessions ranged from 9 to 15 staff members

Staff development for the 1995-96 school year included increasing the use of on-site expertise in language arts, writing, technology, and mathematics. By consensus of the staff, part of the funding for staff development was used to buy computer equipment instead of hiring outside specialists. Along with the on-going training available in technology, five teachers attended an Orff conference—an instructional method integrating music, language arts, math, and movement for primary students. The music teacher with experience in this method frequently shared her expertise during staff development sessions, in peer modeling situations, and at national presentations.

**Parent Training**
A parent training manual was developed and refined over the three years of the grant. The manual provides the syllabus for a college course in volunteering in the schools.

The components of this parent program included:
- Basic parenting skills
- Communication between home and school
- Parents as school volunteers, supporters, and spectators at school events
- Parental involvement in school decision-making
- Collaboration and exchanges between schools, community organizations, agencies, and businesses

**Volunteer Training**
To eliminate the problem of parent volunteers arriving at unscheduled times, a basic one-hour small-group time for volunteers to supervise was scheduled into the class day. A larger parent/volunteer room was equipped with a copy machine, electric stapler, computer, die cut, laminators, and other supplies. No volunteers were allowed in the computer lab; instead a lab aide was hired.
Training video tapes were made available for parents to check out and view at home. Weekly newsletters were also produced for volunteers. Monthly meetings were scheduled so all volunteers could get together.

During the final grant year, volunteer training was available for new community members and parents wanting to work with students. The parent volunteer coordinator organized room representatives for all classroom teachers. These parents assisted with planning classroom events and scheduling volunteers. All volunteers attended a training session before they worked in the school. Administrators and teachers felt this requirement improved the overall performance of volunteers and helped acquaint parents with the rules and culture of the school.

4. What roles do parents, volunteers, tutors, and technology play in instruction?

Parents and Community Volunteers: (Refer to Question 1, Goal 4)
Tutors: (Refer to Question 1, Goal 1)
Technology: (Refer to Question 1, Goal 5)

5. How do the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement

One of the principal goals of the Elementary School Class Size Reduction Pilot Project was improving student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school’s project is higher than it would have been, had the project changes not been made.

We cannot know how much students in the Elementary School Class Size Reduction Pilot Project would have learned, had they not been in project classrooms. Our best sources of comparison are students in other classrooms or other schools. Yet these students may benefit from other, unmeasured instructional innovations. Other students might also differ from project students in ways that cause them to learn at different rates, or they might begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best comparison group to use is other students in the United States. We wanted to see if students in the Elementary School Class Size Reduction Pilot Project improved their level of academic achievement over time, relative to other students in the United States.

To compare the academic achievement of project students with all U.S. students, we used tests of achievement that are applied nationally for students in second grade and individually administered norm-referenced and diagnostic tests for students in kindergarten and first grade. The three tests used to determine academic achievement include:

**Iowa Tests of Basic Skills (ITBS)**

These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.

**Peabody Picture Vocabulary Test (PPVT)**

These individually administered norm-referenced tests are designed primarily to measure a subject’s receptive (hearing) vocabulary for Standard American English. The test provides an estimate of a student’s verbal ability, and in this sense it is an achievement test since it shows the extent of English vocabulary acquisition.
KeyMath

These are individually administered diagnostic inventories of essential mathematics designed to provide a comprehensive assessment of a student's understanding of basic concepts and application of mathematics. Basic concepts assesses the foundation of knowledge on which elementary mathematics is based. Applications assesses the use of knowledge and computational skills.

The Iowa Tests of Basic Skills is a measure of student achievement. The major advantage of the Iowa Test of Basic Skills is that it is the most widely used measure of academic achievement in language arts and mathematics. With these multiple choice tests, it is possible to compare individual student's scores with the distribution of scores nationally. However, the ITBS was administered only to second graders; it was considered inappropriate for kindergartners and first graders.

The Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments were selected by consensus of the project coordinators, the project evaluator, and the Department of Education. Both tests are regarded as appropriate for providing a general overview of primary students' academic achievement in language and mathematics.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in second grade to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. This report provides a comparison of achievement of the students who took the Fall 1993 tests and Winter 1996 tests.

Students in kindergarten and first grade were given individually administered norm-referenced and diagnostic tests in the Fall of 1994 and Spring of 1995 and 1996. Classroom teachers administered and scored the tests and ISER performed the analysis of these test results.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS and KeyMath results of project students relative to all U.S. students. We used percentile rank as a measure of academic achievement for students taking the PPVT. We tracked the math and language arts achievement of individual students in each project school. An analysis of academic growth as measured by these tests for all students—and at-risk students, where numbers of students were sufficient—were analyzed separately. [At-risk students are those identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language.] A description of these methods of reporting test results follows.

**National Percentile Rank**

Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.

**Grade Equivalent**

Indicating the year and month of schooling of students nationally that corresponds with the student's test performance. By comparing the student's actual grade level (e.g., 4.2 years) with the grade equivalent (e.g., 4.6 years) it is possible to tell if the student is learning faster or slower than students in the U.S. as a whole.

All kindergarten, first, and second grade students at Site B participated in the Elementary School Class Size Reduction Pilot Project. Students in kindergarten and first grade were tested using Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments in Fall 1994 and Spring 1995. These same students were given the Iowa Test of Basic Skills (ITBS) in the Spring of 1996, when they reached
Second grade—but we have no additional ITBS scores to allow an analysis of changes over time for those students.

Second grade students were tested using the Iowa Test of Basic Skills (ITBS) in Fall 1993 and Spring 1994, 1995, and 1996. Grade cohort represents the year of school the student was in during the 1993-94 school year. Thus, in the 1995-96 school year, the second grade cohort students were in the fourth grade.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the KeyMath and PPVT is 18 months and for the ITBS 28 months—relatively short periods to use in assessing the impacts of the project.

National percentile rank, an average for students taking the test nationally, increased for kindergarten and first grade students. Students in the kindergarten and first grade cohorts were not given either KeyMath or PPVT in the Spring of 1996; instead they took the ITBS in Spring of 1996—so we have no comparative data (Table 19).

**Table 19. Site B KeyMath National Percentile All Students**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Basic Concepts</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fall 94</td>
<td>Spring 95</td>
</tr>
<tr>
<td>Site B</td>
<td>K</td>
<td>129</td>
<td>45</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>156</td>
<td>43</td>
<td>78</td>
</tr>
</tbody>
</table>

Table 20 shows the national percentile rank for at-risk students in kindergarten and first grade at Site B. Results show an increase in the percentile rank for both grades from Fall 1994 to Spring 1995.

**Table 20. Site B KeyMath National Percentile At-Risk Students**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Basic Concepts</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fall 94</td>
<td>Spring 95</td>
</tr>
<tr>
<td>Site B</td>
<td>K</td>
<td>46</td>
<td>32</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>59</td>
<td>28</td>
<td>64</td>
</tr>
</tbody>
</table>

All students at Site B demonstrated an increase in grade equivalent. The mean change in scores on basic concepts for kindergarten students was eight months and for first grade students the change was one year, six months. On applications the mean change for kindergarten students was six months and for first grade students one year, five months. (See Table 21.)

**Table 21. Site B KeyMath Grade Equivalent All Students**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Basic Concepts</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fall 94</td>
<td>Spring 95</td>
</tr>
<tr>
<td>Site B</td>
<td>K</td>
<td>111</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>126</td>
<td>8</td>
<td>2.4</td>
</tr>
</tbody>
</table>
At-risk students in kindergarten and first grade at Site B increased an average of one year in grade level on basic concepts and one year, one month on applications. (See Table 22.)

Table 22. Site B KeyMath Grade Equivalent At-Risk Students

<table>
<thead>
<tr>
<th>School</th>
<th>No. Students Tested</th>
<th>Basic Concepts Mean Change</th>
<th>Applications Mean Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>111</td>
<td>1.0</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Table 23 shows the national percentile rank of PPVT test results for kindergarten and first grade. The percentile rank increased for both grades.

Table 23. Site B PPVT Percentile Rank All Students

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 94</th>
<th>Spring 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>K</td>
<td>126</td>
<td>29</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>150</td>
<td>56</td>
<td>60</td>
</tr>
</tbody>
</table>

At-risk students in kindergarten demonstrated an increase in national percentile rank, and first grade students maintained the same percentile rank from Fall 1994 to Spring 1995. (See Table 24.)

Table 24. Site B PPVT Percentile Rank At-Risk Students

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 94</th>
<th>Spring 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>K</td>
<td>40</td>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>63</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

On average, national percentile rank for the second grade cohort at Site B increased 6 points in mathematics, 17 points in reading, and 8 points in language arts from Fall 1993 to Winter 1996. (See Table 25.)

Table 25. Site B ITBS National Percentile Rank

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Math Fall '93</th>
<th>Winter '96</th>
<th>Reading Fall '93</th>
<th>Winter '96</th>
<th>Language Arts Fall '93</th>
<th>Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>2</td>
<td>58</td>
<td>41</td>
<td>47</td>
<td>30</td>
<td>47</td>
<td>31</td>
<td>39</td>
</tr>
</tbody>
</table>
Table 26 shows the national percentile rank for at-risk students in second grade at Site B. Scores decreased in percentile rank in mathematics, and increased in percentile rank in reading and language arts, from Fall 1993 to Winter 1996.

<table>
<thead>
<tr>
<th>ITBS</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Winter '96</th>
<th>Reading Fall '93</th>
<th>Winter '96</th>
<th>Language Arts Fall '93</th>
<th>Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>17</td>
<td>40</td>
<td>31</td>
<td>22</td>
<td>32</td>
<td>26</td>
<td>29</td>
</tr>
</tbody>
</table>

The second grade cohort at Site B demonstrated a mean increase in mathematics of two years, six months in grade equivalent from Fall 1993 to Winter 1996. (See Table 27.)

Table 27. Site B ITBS Grade Equivalent Mean Change All Students Math

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Winter '96</th>
<th>Mean Change Fall '93-Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>2</td>
<td>58</td>
<td>2.1</td>
<td>4.6</td>
<td>2.6</td>
</tr>
</tbody>
</table>

The second grade cohort at Site B demonstrated a mean increase in reading of two years, five months in grade equivalent from Fall 1993 to Winter 1996. (See Table 28.)

Table 28. Site B ITBS Grade Equivalent Mean Change All Students Reading

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Winter '96</th>
<th>Mean Change Fall '93-Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>2</td>
<td>58</td>
<td>2.1</td>
<td>4.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

The second grade cohort at Site B demonstrated a mean increase in language arts of two years, four months in grade equivalent from Fall 1993 to Winter 1996. (See Table 29.)

Table 29. Site B ITBS Grade Equivalent Mean Change All Students Language Arts

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Winter '96</th>
<th>Mean Change Fall '93-Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>2</td>
<td>58</td>
<td>1.8</td>
<td>4.1</td>
<td>2.4</td>
</tr>
</tbody>
</table>

The at-risk second grade cohort at Site B showed an average increase in grade equivalent of two years, one month in mathematics, reading, and language arts from Fall 1993 to Winter 1996. (See Table 30.)

Table 30. Site B ITBS Grade Equivalent Mean Change At-Risk Students

<table>
<thead>
<tr>
<th>ITBS</th>
<th>No. Students Tested</th>
<th>Math Mean Change Fall '93-Winter '96</th>
<th>Reading Mean Change Fall '93-Winter '96</th>
<th>Language Arts Mean Change Fall '93-Winter '96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site B</td>
<td>17</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>
6. How are parental involvement, teacher satisfaction, and student attendance and behavior affected by the class size reduction and associated instructional innovations?

Parent involvement: (Refer to Question 1, Goal 6)

Student Survey Results
At the end of the each grant school year, all students attending classes participating in the project completed a survey on their attitudes toward learning and school. While the survey results are not meant to be exact comparisons, since some children were new to the project in 1995-96, the surveys for the final year continued to show students in participating classes as having positive and favorable attitudes toward school.

Table 31 shows students' responses to questions about their attitudes toward school and learning during the 1995-96 year. Asked if they liked school, 63 percent of students responded "always" and 28 percent "sometimes." Their responses about whether they like reading and math were fairly similar, with 58 percent reporting always liking reading and 65 percent reporting always liking math. Only 1 percent reported not feeling good about how they were doing in school. Overall, as in the 1993-94 and 1994-95 survey results, students reported favorable attitudes toward learning, school, and safety.

<table>
<thead>
<tr>
<th>Table 31. Site B Students' Perceptions About School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like school?</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Do you like reading at your school?</td>
</tr>
<tr>
<td>Do you like doing math at your school?</td>
</tr>
<tr>
<td>Do you feel your school is a safe place?</td>
</tr>
<tr>
<td>Do you feel good about how you are doing at school?</td>
</tr>
<tr>
<td>Do most of the kids in your class follow the rules?</td>
</tr>
<tr>
<td>Number of students responding = 278</td>
</tr>
</tbody>
</table>

The survey also asked the students to describe their favorite school activity. Of all students responding, 37 percent reported their favorites as physical education and sports; 12 percent, mathematics; and 12 percent, science. Other activities, in order of preference, included computer lab, reading, and games.

School Climate and Discipline
In this study the following definitions are used to describe classroom climate, behavior, and academic achievement from the teacher's perspective. Classroom climate means the general physical and interpersonal atmosphere in the classroom and takes into account the students' behavior and involvement in the assigned learning tasks. Class behavior means any response made by students to a stimulus—either an internal thought or impulse or an external intrusion. Academic achievement means weekly assessment of students' academic performance using measures other than standardized tests.

Teachers rated classroom climate as excellent 86 percent of the time and class behavior as excellent 78 percent of the time during periods of reduced class size. Academic achievement as a result of reduced PTR was reported as excellent 62 percent of the time and good 35 percent of the time. Eighty-eight percent of the classroom teachers reported being very satisfied with the reduced PTR and 12 percent were somewhat satisfied (see Table 32).
Table 32. Site B Teacher Rating of Class Climate and Class Behavior During Whole Class and Reduced PTR Time; Overall Rating of Academic Achievement as a Result of Lowered PTR; and Teacher Satisfaction with Lower PTR

<table>
<thead>
<tr>
<th>Weekly Class Description</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Climate with Reduced PTR</td>
<td>0%</td>
<td>3%</td>
<td>11%</td>
<td>86%</td>
</tr>
<tr>
<td>Class Climate Whole Class</td>
<td>3%</td>
<td>33%</td>
<td>52%</td>
<td>13%</td>
</tr>
<tr>
<td>Class Behavior with Reduced PTR</td>
<td>0%</td>
<td>3%</td>
<td>19%</td>
<td>78%</td>
</tr>
<tr>
<td>Class Behavior Whole Class</td>
<td>12%</td>
<td>40%</td>
<td>37%</td>
<td>11%</td>
</tr>
<tr>
<td>Academic Achievement as a result of Reduced PTR</td>
<td>0%</td>
<td>3%</td>
<td>35%</td>
<td>62%</td>
</tr>
<tr>
<td>Teacher Satisfaction with Reduced PTR</td>
<td>Very Satisfied 88%</td>
<td>Somewhat Satisfied 12%</td>
<td>Not Satisfied 0%</td>
<td></td>
</tr>
</tbody>
</table>

Attendance

For primary students who need transportation to get to school, attendance is considered a problematic indicator of project success. The absentee rate was reported at an average of 8 students per class per week during 1995-96. While at first glance this appears high, frequent reports of children with the flu or viruses were found to be major determinants of school attendance. The teachers reported that the students’ desire to attend school improved as their attitude toward school improved. However, chronic absentee problems are too often caused by overriding family issues. For these students, the school tried to encourage parents to bring them to school regularly, on time, and ready to learn.

7. How can this project be replicated at other elementary school sites?

We are past the day when we can close the door and be isolated in our classrooms. The system and the profession demand excellence and one way to achieve this excellence is to coach each other. (First-grade teacher)

The following statements are recommendations from parents, teachers, and support personnel at elementary schools to those thinking about implementing strategies that allow for periods of reduced pupil-teacher ratio without significantly adding to the cost of education.

- Go slow and give all staff members and parents opportunity for initial input to any school improvement plan. Work on getting acceptance from all staff.
- Use call-back time for kindergarten students (no cost). During this time each kindergarten student remains in the classroom for approximately one hour per week, after regular kindergarten, for additional assistance and enrichment in reading, language arts, and mathematics.
- Provide more specialists in music, art, and drama. Even if they didn’t collaborate with the classroom teachers, such specialists could provide more opportunities for parallel block time so the classroom teachers could work with smaller groups of students.
- Hire classified staff to run centers.
- Start a volunteer program with a coordinator in charge to organize, recruit, train, and coordinate the volunteers. Make the volunteer training program mandatory for anyone working in the school.
- Use parallel block/split specials. During this time half the students in a class participate in special classes (computer lab, music, library, or physical education), while the other half remain in the classroom for instruction. This requires the cooperation of teachers and can be implemented with little or no money.
- Schedule planning time into the work day for team teachers and coordinators.
• Select a focus and give staff time to work through the changes for staff development. On-going and staff-directed in-service sessions promote professionalism and increase the opportunities for successful change.

AT-RISK STUDENTS

Over 40 percent of the student population at Site B during the 1995-96 school year were identified as at-risk for increased probability of school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a second language. This number represented an increase of 10 percent over the 1993-94 school year. While the teachers were committed to providing a positive learning environment for all students, they were particularly concerned with increasing positive adult interaction with those at risk. They reported a decline in general communication skills among primary students and felt that daily interaction with teachers, staff, and volunteers were crucial components for increasing basic language skills.

The Elementary School Class Size Reduction Pilot Project provided teachers and other personnel working with students the opportunity to provide attention, early identification of learning problems, and early intervention to improve both social and academic skills. One experienced kindergarten teacher found her volunteers to be critical in establishing social and language skills on a daily basis. Increasing opportunities for successful learning experiences and developing self-esteem drives the commitment for improving instruction.

The staff at Site B recognized the importance of early intervention as well as creating a learning environment that supported children’s needs, whether in the classroom or in a pull-out program. The following are examples of ways teachers said the project helped them meet the needs of at-risk students in the regular classroom.

• Using a combination of special service personnel and grant personnel, literature groups of 5:1 for 30 minutes a day. Three particularly high needs’ students (not social service identified) worked in a group of three. Another great grant-related benefit this week was when an at-risk child who has had little home follow-up began to complete homework and his classroom behavior improved. His mother has begun working in the classroom at center time for the past three weeks.

• Reduced class-size allowed me time to do individual assessments of reading and mathematics and small-group assessment of writing and spelling. As a result of reduced PTR time, I re-evaluated my reading method for one group, including two at-risk students, and initiated a new approach for their instruction.

• Having Chapter 1 or Title I personnel as well as parents in the class to give individual attention to specific needs’ children has been a great help. The children are developing a flexible personality that responds to other adults and is not as fearful of change.

• Parent helpers are being used during periods of splits, to reduce the size of groups even more. Working with five to six students for language activities is more successful for high-risk kids. They have to respond and we can take the time to wait for them.

• Language deficit is a big concern in kindergarten this year and I cannot describe the value of the split sessions. It is so important to have small groups so that conversation may happen among students and the teacher. Many of these at-risk students are overshadowed by the other children in large groups and often with so many students, poor behavior results. During the splits I see the at-risk students more on task and smiling.
I was thinking of how much the parent helpers get insight into how to work with their children. One of my helpers is a mom of one at-risk student. The modeling that she receives in the classroom helps her in knowing how to work with her child at home.

At least five of my at-risk students, labeled from the beginning of the school year, who have been able to receive Chapter I assistance are, in my opinion, no longer at-risk.

One student that I consider young, immature, and at-risk got very upset during writing time, and a parent was able to work one-on-one with him while my collaborator and I continued to work with other children.

**PROJECT AND STRATEGY COSTS**

**Introduction**

The purpose of the *Elementary School Class Size Reduction Pilot Project* was to assess the effectiveness of reduced class size, combined with other teaching interventions, on student achievement and attitude, school discipline, and parent involvement. Each participating school was granted $197,600 per school year to develop and implement strategies towards accomplishing these goals. A simple cost analysis provides information on the following: 1) the project’s overall costs per classroom; 2) the approximate cost of implementing each strategy; and 3) a description of how project funds were spent.

**Project Cost**

Site B extended the Class Size Reduction Project to 18 classrooms, affecting 415 students annually. The cost of the project over the three years was as follows:

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Cost</th>
<th>Number of Classrooms</th>
<th>Cost per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$182,290</td>
<td>18</td>
<td>$10,127</td>
</tr>
<tr>
<td>1995</td>
<td>$215,059</td>
<td>18</td>
<td>$11,948</td>
</tr>
<tr>
<td>1996</td>
<td>$204,473</td>
<td>18</td>
<td>$11,360</td>
</tr>
</tbody>
</table>

**Strategy Costs**

Site B employed five strategies—collaborators, staff development, volunteers, parallel block scheduling, and technology—to reduce class size and improve education. These strategies were described in detail in previous sections of this report and are summarized below:

- **Collaborators:** Site B hired additional personnel or "collaborators" to assist classroom teachers and provide students with opportunities for small-group instruction.
- **Staff Development:** Site B also devoted time and resources toward additional professional training for teachers.
- **Volunteers:** Site B recruited and trained volunteers to assist teachers with educational activities.
- **Parallel Block Scheduling:** Site B used this scheduling technique to allow for small group instruction. A single class was divided into two halves. One half of the class would be sent out for specialized instruction in physical education, music, or computer use; the other half remained for
• **Technology**: In FY 1996, Site B added a new strategy; the school integrated the use of technology into the curriculum to enhance learning and reduce pupil-teacher ratio.

Figure 6 displays the annual cost per classroom of implementing these strategies.

It should be noted that strategy implementation costs will vary from school to school, depending on the following variable-cost items:

• Salary and benefit costs of teachers and other personnel may differ, depending on the experience of the individuals on staff.

• Parallel block scheduling is potentially a no-cost strategy if planning time is already available in teachers' schedules. For Site B, however, teachers' schedules were so tight that this planning time could be made available only by hiring a part-time aide.

**Figure 6. Site B Strategy Implementation Costs per Classroom**

<table>
<thead>
<tr>
<th>Year</th>
<th>Collaborators</th>
<th>Staff Development</th>
<th>Volunteers</th>
<th>Parallel Block Scheduling</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY1994</td>
<td>$5,872.41</td>
<td>$5,333.01</td>
<td>$641.98</td>
<td>$58.13</td>
<td>$0.00</td>
</tr>
<tr>
<td>FY1995</td>
<td>$7,161.24</td>
<td>$1,316.89</td>
<td>$961.27</td>
<td>$354.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>FY1996</td>
<td>$4,782.83</td>
<td>$1,583.88</td>
<td>$1,006.42</td>
<td>$436.64</td>
<td>$3,026.48</td>
</tr>
</tbody>
</table>

**Cost Analysis Description**

Project and strategy costs were approximated using Site B's fiscal year project budgets. The cost analysis was conducted in two phases. Phase 1 determined the purpose behind each budget expenditure. Phase 2 matched the purpose with the strategy so we could determine the approximate cost of implementing each strategy.

**Phase One**

First, each budget line item was classified as to the type of expenditure it represented. In pursuing its strategies to reduce class size and improve education, Site B spent its project funds in four ways: (1) hiring more staff, referred to as "additional personnel;" (2) training staff, referred to as "staff development;" (3) recruiting and organizing volunteers, referred to as "volunteers;" or (4) purchasing computer equipment, referred to as "technology." An approximate breakdown of the amount of project funds spent for each of these purposes is provided in Figure 7.
In calculating this breakdown, we assumed that since hiring more staff, providing additional staff training, recruiting volunteers, or purchasing technology all have administrative costs in addition to the actual budget item cost, budget items representing general overhead or administrative costs, such as “maintenance” or “support staff,” were apportioned among additional personnel, staff development, volunteers, and technology according to their percent share of the total budget. For example, in FY1995 Site B spent 62.11 percent of its project funds on adding personnel, 15.85 percent on staff development, 8.37 percent on recruiting and training volunteers, and 13.67 percent on purchasing technological equipment. So we charged 62.11 percent of the line item “support staff” to additional personnel, 15.85 percent to staff development, 8.37 percent to volunteers, and 13.67 percent to technology. The following lists other assumptions we made in the course of conducting the cost analysis:

- Employee benefits were based on the same fixed percentage of salary for all individuals receiving benefits.
- Supplies and equipment not allocated specifically to one of the above purposes were apportioned in the same manner as general overhead or administrative costs—according to percent share of the total budget.
- To avoid double-counting, budget items listed as encumbrances were included in the originating fiscal year only. For example, an encumbrance appearing in FY1994 was included in FY1994’s budget, with the amount subtracted from FY1995’s budget in order to eliminate counting an item twice.
- Since FY1996’s budget was turned in before the end of FY1996, it was assumed that all planned expenditures were completed.
- In FY1996, one classroom teacher was reassigned to work as a “technology specialist.” Therefore, this teacher’s salary was approximated by shifting 25 percent of teacher salary and benefit expenditures from additional personnel to technology.

**Phase Two**

Once the purpose of each expenditure was determined it was then possible to match an expenditure to a particular strategy. The collaborator strategy included all expenditures classified as additional personnel or technology for both FY1994 and FY1995. In FY1996, Site B added the strategy “technology” to the four strategies used FY1994 and FY1995. Therefore, in FY1996 the collaborator strategy included
only additional personnel expenditures, while technological expenditures were allocated to the technology strategy. The staff development strategy included all expenditures under staff development. The volunteer strategy included all expenditures under volunteers. Finally, the strategy of parallel block scheduling included the expenditure of hiring a part-time aide, to free teachers from a small portion of their instruction load and allow them the planning time necessary to implement and maintain parallel block scheduling.

**COST-BENEFIT SUMMARY**

The study looked at the mean change in grade equivalent for cohorts of students who participated in the pilot program all three years. Grade equivalence indicates the amount of learning achieved by students as compared to the national average, given in year and month increments. For example, a grade equivalent change of 1.8 means a scholastic achievement equal to one year and eight months of schooling on a national average. This grade equivalent is then compared to the actual length of schooling undergone by each student. For example, if a grade equivalent change of 1.8 (one year and eight months) occurred over a time period of 1.6 (one year and six months), this indicates student learning above the national average. If the change in grade equivalent occurred over a time period of 1.9 (one year and nine months), this would indicate student learning below the national average. Finally, if a 1.8 change in grade equivalent occurred over a time period of one year, eight months, this indicates student learning equal to the national average.

The study then compared the mean change in grade equivalent on the Iowa Tests of Basic Skills (ITBS) to the project’s estimated mean program cost per classroom. The following table displays the mean change in grade equivalent in mathematics, reading, and language arts for a second grade cohort that participated in the *Elementary School Class Size Reduction Pilot Project* from Fall 1993 to Winter 1996. Note that this second grade cohort participated in Site B’s program the first year and another site’s program in the second and third years. Unfortunately, due to student turnover, this second grade cohort was the only uncompromised cohort available that could indicate Site B program results.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Time Period</th>
<th>Grade Equivalent</th>
<th>Number of Classrooms in Project</th>
<th>Mean Program Cost Per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>2.4</td>
<td>2.6</td>
<td>18</td>
<td>$8,795</td>
</tr>
<tr>
<td>Reading</td>
<td>2.4</td>
<td>2.5</td>
<td>18</td>
<td>$8,795</td>
</tr>
<tr>
<td>Language Arts</td>
<td>2.4</td>
<td>2.4</td>
<td>18</td>
<td>$8,795</td>
</tr>
</tbody>
</table>

**Estimated Mean Program Cost per Classroom**

Site B’s mean program cost per classroom was estimated by: (1) differentiating program costs from project costs, and (2) allocating capital expenditure costs over the use-life of the investment. The purpose of differentiating between program and project costs was to identify ongoing costs—or costs that will continue to be present as the program continues—from start-up or grant-imposed costs. Program costs were defined as those costs necessary to the ongoing operation of Site B’s Class Size Reduction Project. Under this definition, items such as administrative costs imposed by the grant or start-up costs associated with designing the program were not included in calculating the annual program cost. Second, capital expenditures, such as purchasing computers, were spread out over the use-life of the investment in order to avoid overestimating annual program costs.
We made the following assumptions in calculating the mean program cost per classroom for Site B:

- Support staff and extra-duty compensation expenditures were used to perform grant administrative tasks and therefore were considered project and not program costs.
- An estimated 75 percent of staff development was used to develop a vision of the project. Therefore, those expenditures providing for staff development—substitutes, professional/technical services, travel, and other expenses—were calculated at a 25 percent rate.
- Capital supplies and capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

**SUMMARY**

The staff at Site B successfully implemented all their initial project goals. Their commitment to supporting a developmentally appropriate learning environment, assessing teaching strategies and approaches to learning, and providing a quality education for all the students unified this conscientious staff. Dialogue among staff, administration, and parents flourished from the initial planning phase of the grant, when approaches to learning were evaluated and assessed. The opportunity to reflect, critique, and defend existing educational practices contributed to a positive learning environment throughout the three years of the grant.

The staff at Site B valued the educational leadership, support, and vision from their principal. They appreciated her ability to share the leadership necessary to make the project work over the past three years. This administrative support, professional commitment to improving education, and increased community involvement supported the staff’s and parents’ commitment to the overall goals of the grant.

The three years of the grant were not, however, trouble-free. Some drawbacks included the stringent time constraints with tightly established schedules, shortage of space for the small groups, lack of adequate planning time, excessive paperwork required to document progress, and the overall additional time commitment necessary to make the whole process fall together. Compromises to the initial grant proposal were made along the way, resulting from conflicts between priorities and budgets. All modifications were made with considerable debate and involvement of staff.

The positive benefits of the grant outweighed the negative ones. Student gains in academic achievement, improved behavior and attitude, opportunities for improving existing technology, training, and additional teachers/collaborators were all welcome additions to the school. The staff at Site B appreciated the opportunity to demonstrate to the State of Alaska what can be accomplished with additional funds to support a well-planned, research-based, all-inclusive school improvement plan.
SITE C

BACKGROUND DESCRIPTION

Site C has 455 students in-grades three through five, 18 classroom teachers, and 9 special service and support teachers. The ethnic make-up of the student population is Caucasian, 90 percent; Native-American (Alaska Native and American Indian), 5 percent; and other, 5 percent. Approximately 30 percent of the student population is identified as “at risk” under the following criteria: socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a Second Language.

All 18 classroom teachers participated in the project to reduce the pupil-teacher ratio (PTR) during mathematics and reading instruction time. Special service and support staff participated by teaching the music, library, and physical education classes; by accommodating flexible class scheduling; and by working in the classroom with small groups of students.

The mission statement of Site C is to “provide a positive and safe environment for all students and staff. The school, parents, and community are partners who strive to develop enthusiastic life-long learning.” This statement, developed as part of a school-wide strategic plan during the 1991-92 school year, guided the goals of the Elementary School Class Size Reduction Pilot Project.

General project goals at Site C included:

- Lowering the PTR to improve academic achievement in math and language arts by adapting instructional practices, integrating technology with the curriculum, and implementing parallel block scheduling
- Organizing and maintaining a volunteer program
- Improving student performance as measured on Iowa Test of Basic Skills (ITBS) scores, teachers’ evaluations, portfolios, and other measures
- Improving student attitude and behavior
- Increasing and promoting the creative use of technology to enhance existing instructional practices

STRATEGIES TO ACHIEVE GOALS

The Elementary School Class Size Reduction Pilot Project provided the administration and staff with the opportunity to develop and carry out their long-standing goals of improving instruction through five interrelated means: (1) staff development, (2) parallel block scheduling and team teaching, (3) improvements in school climate, (4) enhancement of parent and community participation in volunteering and other school activities, and (5) integration of technology into the curriculum. A description of the actual strategies follows.
Staff Development

Staff development provided the staff with skills and instructional strategies to complement the reduced class size and improve the psychological climate of the school. It trained teachers in integrating technology into the curriculum, in cooperative learning, and in using small-group instructional strategies. Staff development emphasized abandoning traditional techniques and experimenting with new teaching and learning strategies.

Parallel Block Scheduling/Team Teaching

One way of reducing the PTR was scheduling the school day to accommodate parallel block time for all classroom teachers. This setup allowed half the students in a class to participate in special classes (computer lab, music, library, or physical education), while the other half remained in the classroom for instruction. Parallel block time (Figure 8) requires two regular classroom teachers to share special classes scheduled back to back. The teachers remained in their classrooms, with the remaining students being instructed in small groups. At the end of the period, the students in the regular classrooms changed places with those returning from special classes. Classroom teachers preferring not to split their students for special classes had the option of team teaching. Those electing to team teach sent their whole class to the specials while they went to another classroom and worked with half a class for either mathematics or reading instruction.

Figure 8. Parallel Block Scheduling

Using parallel block scheduling with a class of 28 students, the classroom teacher had the opportunity, provided additional strategies were used (computers or volunteers, for example), to interact with students in a PTR of 7:1 or less for up to one hour a day. Samples of teaching arrangements used with PBS included:

- One group of 14 students, led by teacher-directed activities
- Two groups of 7 students each, rotating between independent activity and a teacher-directed activity
- One group of students with a trained volunteer and one group with a teacher
- One group of students with the teacher and another using computers
School Climate
A part-time guidance counselor provided staff and students with a psychological base designed to promote academic achievement using two self-esteem building programs: Here’s Looking At You and Lion’s Quest. The programs revolved around seven skills identified as necessary for children to develop into capable adults. Some of the skills taught include self-discipline, communication, responding to limits, and judging relationships. The counselor also facilitated student assistance groups, helped staff with motivational strategies to improve achievement, counseled students in crisis, and acted as a community service contact and child advocate.

Parent and Community Volunteers
The volunteer component of the grant worked to establish a well-trained and reliable volunteer force to assist the classroom teacher and lower PTR. During the 1993-94 and 1994-95 school years, the project coordinator established and trained a pool of parent and community volunteers. The final project year, this coordinator position was discontinued and the responsibility for volunteer training was shared among staff members. Volunteers supported the overall goal of reducing PTR during mathematics and reading time by working with small groups of students, supervising independent work, and increasing the time students could receive individual attention.

Technology
In addition to an existing computer lab, six computers were placed in each classroom. Students used these computers independently or with assistance from teachers or volunteers. Several classrooms combined the computers to create a shared learning center. While groups of students were at these work stations, teachers were able to work directly with smaller groups of students. Computers in the classroom helped foster independent learning and increase the integration of technology into the everyday curriculum.

The technology component, supported by a part-time technology specialist since the 1994-95 school year, concentrated on seven academic objectives in 1995-96: (1) providing sequential, individual instruction to students, (2) offering reinforcement of newly acquired skills, (3) permitting students to access information from libraries and informational services, (4) encouraging students’ creativity, (5) introducing students to interactive reading, (6) offering students a wide range of subject matter previously unavailable at Site C, and (7) increasing teachers’ productivity.

PROJECT MODIFICATIONS

Changes 1994-95
Changes in the second year of implementation of the Elementary School Class Size Reduction Pilot Project at Site C were made in the areas of school climate, scheduling, personnel, staff development, and volunteers.

School Climate
The role of the counselor changed to include a more school-wide focus and involve classroom instructional activities, with the goal of the counselor being in at least four to six classrooms per week, providing students with as many as four or five assistance groups per week, and intervening in crises.
Parallel Block Scheduling/Team Teaching

Classroom teachers had the option of either splitting their classes during PBS or team teaching with partners. During the first year of the grant, reduced PTR time included only mathematics. During the second year of the grant, with the additional use of support personnel, volunteers, and computer-assisted instruction, reduced PTR time expanded to include reading and language arts. The staff development coordinator worked on a daily basis as a collaborator in classrooms that did not receive any support from special services and provided a half-hour of collaborative planning time for each classroom.

Personnel

A half-time technology coordinator was made available by the district office at no cost to the grant. Responsibilities of the coordinator included promoting integrated use of technology across the curriculum; providing adequate staff development training throughout the school year to staff and students; training a core team of teachers to use appropriate software for the various grade levels; providing workshops and on-site training sessions for staff; and general hardware and software installation, maintenance, and general trouble shooting. A new principal was hired, and three playground aides were also added to help give classroom teachers time during recess to do the planning required when additional personnel work with students.

Staff Development

The focus of staff development for the 1994-95 school year was on technology. Fourteen teachers completed a computer class on HyperStudio and were exposed to all the new programs available at the school, to the CD players, and to other new equipment purchased for the 1994-95 school year. Twice each month, the technology specialist conducted a computer mini-lesson for staff. Several teachers attended a follow-up session on cooperative learning and a “Great Books” workshop.

Changes 1995-96

School Climate

Classroom teachers took responsibility for presenting all phases of the self-esteem programs and the part-time school counselor worked directly with individual students in assistance groups. Student assistance groups provided an avenue for students to discuss problems. These groups ranged from three to six students and, when appropriate, were co-facilitated by the school nurse and the principal. A climate committee, made up of rotating staff members, worked on developing whole-school activities that provide support and recognition to staff members, parents, and students.

Personnel

The half-time volunteer coordinator position was discontinued during the final grant year. The facilitation of monthly volunteer training sessions became the responsibility of various staff members. A substitute teacher was hired to fill in for the teachers when they were facilitating training sessions.

Technology

Increasing the use of technology across the curriculum continued as the major focus of the grant for the 1995-96 school year.

- Every regular classroom had a pod of five computers for student use.
- Twenty-six Macintosh LC 580s, thirteen of which have CD-ROM drives, were purchased.
- All computers were connected to the high-speed ethernet network.
- Ethernet cards were purchased and installed in computers, and all computers were connected to the high-speed ethernet network.
• An additional multimedia station was set up—with three computers, a scanner, a digital video camera, a color printer, and a laser disk player and a video camcorder which students could use to import and export video images to and from the computers.

• *Portfolio Assessment Toolkit*, software for the creation of student electronic portfolios, was available to the students.

• Thirty-two Alpha Smarts (portable word processors) were purchased.

• An additional Apple IIe/GS lab with Apple II computers was set up.

**Staff Development**

The focus of staff development for the 1995-96 school year continued to be technology. The opportunities for staff development provided the teachers with the skills to integrate technology into their daily lessons. The technology coordinator provided on-site and frequent training to teachers and students. A math assessment workshop, language arts assessment, Rubric training, and Glasser’s (Quality Schools Programs) were also part of the staff development sessions.

**PROJECT OUTCOMES**

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the *Elementary School Class Size Reduction Pilot Project*. In preparing this section, we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; those examined student academic achievement and attitude, school climate and discipline, teacher innovation, and parental involvement.

1. **Did the program at Site C meet its class size goals?**

   **Goal 1: Lowering the PTR to improve academic achievement in math and language arts by adapting instructional practices, integrating technology with the curriculum, and implementing parallel block scheduling.**

   Yes, I feel like I did a very good job. I did a better job this year than the first two years. This year I am team teaching and we do computer lab splits during which time we have parents who come in to work in the computer lab or in the room. This increases our lower PTR time. *(Fourth-grade teacher)*

   All teachers at Site C successfully reduced PTR during language arts and mathematics instruction time. In addition to improving instructional strategies to meet the needs of small groups of students and integrating technology into the curriculum, teachers used special service personnel, extra teachers (specialists), and volunteers to help lower the PTR. During the 1993-94 school year the average weekly PTR time was 7.6 hours, and for the 1994-95 school year it increased to 9 hours. During the final grant year teachers reported a weekly average of 9.4 hours with a PTR of 15:1 or less. (See Figure 9.)

   Parallel block scheduling was a method of reducing the PTR during language arts and mathematics instruction time. Teachers preferring to keep their whole class together were able to team teach with a grade-level partner. Advantages of the parallel block scheduling included improved classroom behavior, increased student participation, and frequent assessment of students’ progress. However, many teachers felt the half-hour block of reduced class time was too short and scheduling too restrictive.
The teachers’ daily records allow us to estimate the time the average student spent in reduced size classes. As Figure 10 shows, the average student had approximately 5.6 hours per week of small-group instruction time during the 1995-96 year.

The attention to changing instructional practices to better meet the needs of small groups of students at Site C were impressive. The extensive staff development training and peer interaction improved the instructional strategies of all staff members. Time commitment necessary to effectively plan with partners, accommodate volunteers, and increase small-group instruction was considerable.
Goal 2: Organizing and maintaining a volunteer program

Training is very important for volunteers and without the coordinator the program has had difficulties. There must be someone in charge to make the volunteer group feel cohesive.

(Fifth-grade teacher)

I was involved in an excellent training class last year. I am delighted with the school’s willingness to train and use parent volunteers. The computers give kids a great introduction to modern technology. (Parent volunteer)

The initial goals of establishing a well-trained and reliable volunteer force to assist the classroom teacher and lower the PTR were not met. While volunteering was extensive across the grades and volunteers were well trained, they were not reliable. However, many staff members continued to use volunteers in their classrooms; others preferred to have them assist in non-instructional areas.

The volunteer coordinator position was a critical component of the project at Site C. While the number of volunteers working in classrooms increased the final year, distribution among classes was uneven, a condition attributed to the lack of a coordinator. Some classroom teachers were more successful at recruiting than others. Favorable recruiting sites were the high school, with students participating in “work release” programs, and the college, with students interested in education; getting high school and college volunteers required extensive coordination.

A fifteen-hour volunteer training course was offered through Kenai Peninsula College during the first two years of the grant. While one hundred parents and community members attended sessions, only a few took the class for credit. Mini-training sessions were offered throughout the school year by the teachers and included strategies for working with small groups and using school equipment, as well as an overview of the philosophy and discipline policy of the school. Individual teachers reported training each new set of parents coming to work in their classrooms.

The final grant year the training sessions were dropped due to lack of participation. Staff at Site C found that many volunteers had attended extensive volunteer training at Site B (a kindergarten through second-grade district school) and did not need to repeat the sessions. Teachers appreciated the opportunity to work with volunteers and acknowledged the importance of parent involvement with their children’s classroom. However, they did not recommend volunteers as a reliable and consistent way to reduce the pupil-teacher ratio.

Data collected from the teachers’ weekly logs show an average of 4 parents or community volunteers spending 70 minutes per week volunteering in the classroom. This does not take into account special events where large numbers of parents were available for longer periods of time but does include individual and small group instruction in mathematics, writing, reading, language arts; editing; creative writing; general clerical assistance; reading aloud to students; computer lab assistance; guided practice; and assessment.

During the data collection period, volunteers overwhelmingly received a rating of excellent for the quality of their performance in the classroom.

Goal 3: Improving student performance as measured on ITBS scores, teachers’ evaluations, portfolios, and other measures

I don’t know. From a personal standpoint and looking at the students’ portfolios, I believe the quality has improved. Students get more help, more immediate feedback and are more excited about learning in general. Overall this whole experience has improved their attitude toward school.

(Third-grade teacher)

(Refer to Research Question 5.)
Using authentic assessment (observations, teacher-made tests, portfolios), the majority of teachers reported a significant improvement in academic achievement and quality of student work. Teachers report that attention to individual students needs, small groups, increased technology, and increased opportunities for classroom participation benefited the students' academic achievement. Yet, they were not confident that these gains would show up on the standardized test results. For the 1994-95 school year, teachers reported academic achievement as a result of reduced class size to be good 56 percent of the time and excellent 36 percent of the time and for the 1995-96 school year, good 62 percent of the time and excellent 37 percent of the time.

Goal 4: Improving student attitude and behavior

Attitude and behavior improved 100 percent. The self-esteem program, “Lion’s Quest,” has helped. The kids are receptive about the program and are learning to work well in small groups. I believe the program has improved their attitude toward each other, toward the school, and toward what we are doing regarding the overall school behavior program. (Fifth-grade teacher)

The counselor has been excellent; she has been able to take kids out of the classroom and work with them in small groups. It will be our loss if we lose her. When we have a student in crisis, and they are not able to learn because of the crisis, I cannot help the child and ignore the rest of the class. The counselor provided critical support for these students. (Fourth-grade teacher)

All students attending the third, fourth, and fifth-grade classes at Site C completed a survey on their perception of school and learning at the end of the 1993-94, 1994-95, and 1995-96 school years. The survey asked for information on attitude toward learning and school. While student mobility rates (moving in and out of the school) restrict comparisons, survey results showed students in participating classes having positive and favorable attitudes toward school. Table 35 shows students’ responses to questions about their attitudes toward school and learning.

As asked if they liked school, 36 percent of the students responded “always,” and 57 percent responded “sometimes.” The responses about whether they liked reading and math were positive. Ninety-seven percent of students reported feeling school is a safe place, and only 3 percent reported not feeling good about how they were doing at school.

Table 35. Site C Students’ Perceptions About School

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>Don’t Know</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like school?</td>
<td>36%</td>
<td>57%</td>
<td>7%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like reading at your school?</td>
<td>38%</td>
<td>54%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like doing math at your school?</td>
<td>51%</td>
<td>39%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel your school is a safe place?</td>
<td>61%</td>
<td>36%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel good about how you are doing at school?</td>
<td>54%</td>
<td>43%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do most of the kids in your class follow the rules?</td>
<td>16%</td>
<td>81%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Number of students responding=379

Students were also asked to describe their favorite school activity. Of all students responding, 26 percent said physical education and sports; 20 percent said mathematics; and 13 percent said arts and crafts. Other activities in order of preference included computer lab, reading, music, drama and dance, science, and spelling and writing.

All teachers reported a favorable discipline and classroom climate during periods of reduced class size. Few opportunities for disrupting classes exist when students are actively engaged in learning. Site C adopted a school-based philosophy fostering student accountability for behavior. This philosophy
extended to parents working in the building, the administrator, the teachers, and everyone in the school community. This school-wide approach toward discipline, the principal’s involvement in the daily activities of all students, and the school counselor all made significant contributions to the overall improvement of school climate.

**Goal 5: Increasing and promoting the creative use of technology to enhance existing instructional practices**

As we near the end of the grant, it is clear to this writer that Site C is a vastly different school than it was three years ago. Technology use is ubiquitous and becoming more and more ‘invisible.’ By that I mean that students and teachers are thinking less about how to use different technologies, they are just using them when appropriate. Many teaching styles are evolving toward a more student-centered approach. Site C is a dynamic, exciting place in which to teach and learn, I hope I get to stay next year! (Technology Specialist)

Progress during the last two years of the grant in the area of technology was extensive, and at the close of the final grant year it was a natural part of the students’ and teachers’ workday. Besides the extensive technology available in the classrooms, all students were required to train on keyboard at least 15 to 20 minutes, four days per week.

The technology coordinator—a half time position supported by the district office since the second year of the grant—was a critical component for success. Without this position, the technology would not have been as effective and perhaps would have failed. The on-going support, availability of weekly training sessions, and consistent on-site expertise available to students and teachers kept the project going smoothly. The most important lesson learned regarding technology is that a school must have a specialist on staff to support all the components—training, equipment and programs. Without this constant assistance, technology can be overwhelming.

At the close of the 1995-96 school year, staff and students were proud of their accomplishments. After three years, teachers who initially protested the use of technology in the classroom could not imagine teaching without using technology. By the end of the project, Site C could access the Internet from all classrooms and had begun work on their World Wide Web home page.

**2. What instructional innovation in reading and mathematics did schools use along with class size reduction?**

I do more cooperative teaching instead of using texts and worksheets. I am able to individualize the math program this year and I can easily follow a student’s progress. (Fifth-grade teacher)

This week I attempted to do a math lesson with all 26 students. We are all so used to working in small groups that everyone—parents, students and I—were finding it hard to adjust. Instead of helping 5 students in a small group, I was overwhelmed by all of them. Now that we are in our routine of small group time, it’s very difficult to go back to the large groups. (Fourth-grade teacher)

All classes in the project used a variety of teaching strategies throughout the day. Teaching strategies documented in weekly logs and observed by the evaluator include guided practice, team-teaching, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, and independent work. All participants emphasize small-group instruction, often with a PTR of 6:1 or less. Data collected for teachers’ weekly logs showed strategies used and the number of weeks they were used in the classroom (Table 36).
Table 36. Site C Teachers' Report of Instructional Strategies Used in the Classroom

<table>
<thead>
<tr>
<th>Instructional Strategy</th>
<th>Percent of weeks teachers reported the strategy used in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher-directed Instruction.</strong> An instructional method whereby the teacher provides the information that will enable the students to perform a task or meet an objective.</td>
<td>97%</td>
</tr>
<tr>
<td><strong>Whole-group Instruction.</strong> An arrangement whereby a class of students receives instruction by one teacher.</td>
<td>95%</td>
</tr>
<tr>
<td><strong>Guided Practice.</strong> An instructional method by which students attempt to perform tasks independently but where the teacher is available for immediate and direct feedback. This strategy is generally used for new tasks.</td>
<td>97%</td>
</tr>
<tr>
<td><strong>Small-group Instruction.</strong> An arrangement whereby students receive instruction in groups generally no larger than six.</td>
<td>99%</td>
</tr>
<tr>
<td><strong>Individual Instruction.</strong> An arrangement whereby a student receives instruction by a teacher and not as part of a class, e.g., instruction for a single person or a one-on-one teaching situation.</td>
<td>92%</td>
</tr>
<tr>
<td><strong>Independent Work.</strong> The process of acquiring new learning or new information on one's own or under limited guidance of an instructor.</td>
<td>93%</td>
</tr>
<tr>
<td><strong>Cooperative Learning.</strong> An instructional method by which students cooperate in small teams to learn material that is initially presented by the teacher. Students take responsibility for their learning, for their teammate's learning, and for classroom management by checking, monitoring, helping one another with problems, and encouraging one another to achieve.</td>
<td>92%</td>
</tr>
<tr>
<td><strong>Computer-assisted Instruction.</strong> Programmed instruction using an electronic computer as the principal medium of instruction.</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Learning Centers.</strong> An arrangement where complete lessons are set up in various stations and small groups of children or individual students work at them. Centers can have adult supervision, direction provided by the teacher, or be self-explanatory.</td>
<td>57%</td>
</tr>
<tr>
<td><strong>Peer Tutoring.</strong> The practice of having students of the same or similar age assist with the instruction of other students who may need supplemental aid.</td>
<td>76%</td>
</tr>
</tbody>
</table>

3. **What training in support of instructional innovation for the class size reduction program did schools provide to teachers, other school staff members, and volunteers?**

Staff development emphasized abandoning traditional techniques and experimenting with new teaching and learning strategies. It was planned and designed to provide the staff with skills and instructional strategies to complement the reduced class size, improve the psychological climate, and restructure the scheduling to accommodate the reduced PTR. The major emphasis was on training teachers in integrating technology into the curriculum, cooperative learning, and the use of small group instructional strategies. The staff selected technology as the major focus for staff development for the final grant year and emphasized integrating technology into the everyday curriculum and providing computer training in the classroom for teachers and students.

For the first two years of the grant, the project coordinator worked closely with the staff to provide a combination of in-service training, mentoring, and peer modeling to help them integrate technology into the curriculum and increase innovative learning and teaching practices. She visited classrooms during the parallel block time to help with small-group instruction and provided opportunities for classroom teachers to visit other classrooms to observe instructional techniques. She also worked, on a daily basis, as a collaborator in classrooms that did not receive any support from special services.
The following is a sample of staff development activities available to at Site C from 1993-94 through 1995-96.

- Parallel Block Scheduling
- Technology; the technology specialists offered insights on integrating computer programs into the classroom
- Grant orientation
- Using an updated computer lab
- Spencer-Kagen’s Cooperative Learning—a strategy for small-group learning where students cooperatively work together to complete lessons
- Bookshare class on Glasser’s Quality Schools
- Glasser’s Control Theory, Reality Therapy (CTRT)—a one-week session in Marysville, Washington, attended by six staff members.
- How Difficult It Can Be: Understanding the special-needs children
- Skills for Excellence—a two-day presentation for representatives from the participating school district to begin developing a five-year technology plan
- Standard Achievement Assessment Orientation
- Pro-Grow: A half-hour session every other week, where teachers share their expertise in particular areas with other interested staff members
- Summer training in technology
- Apple Classroom of Tomorrow
- Alaska Society for Technology in Education
- Reading Recovery Inservice
- Strategies for Host Teachers with Student Teachers
- Lion’s Quest Training
- School site visitations
- Intervention Team Training

The technology coordinator provided frequent on-site training to teachers and students. A math assessment workshop, language arts assessment, Rubric training, and Glasser’s (Quality Schools Programs) were also part of the staff development sessions during the final grant year.

The opportunities for staff development provided teachers with the skills to successfully and creatively integrate technology into their daily lessons, support changing instructional strategies, and improve the overall classroom climate. The professional expertise of existing staff was acknowledged and supported by their increased peer interactions and participation in designing training sessions.

Volunteers

The volunteer component of the grant worked to establish a well-trained and reliable volunteer force to assist the classroom teacher and lower PTR. The volunteers supported the overall goal of reducing PTR during mathematics and reading time by working with small groups of students, supervising independent work, and increasing the time students can receive individual attention. Each classroom had a parent representative who worked as a liaison for all PTA and class projects. The PTA volunteer chairperson oversaw volunteers in the school working in and outside the classrooms (lunch room,
office, and library). The volunteers operated a "parents' room" with a lending library that included materials to support and sponsor programs that enhance teaching and parenting practices.

A five-week training course was offered to volunteers through the local college. During the second and third year of the grant, five sessions were spread out among monthly meetings. Parent training sessions covered topics on classroom management, working with computers, questioning techniques, cooperative learning strategies, and small-group strategies on math and reading. Volunteer meetings were coordinated through the PTA volunteer coordinator, and classroom teachers were encouraged to recruit their volunteers to attend the monthly mini-lessons.

4. What roles do parents, volunteers, tutors, and technology play in instruction?

Parent/Volunteers (Refer to Research Question 1, Goal 2)

Tutors
The special education tutors, including special service teachers and Chapter 1 aides, assisted the special needs children either in the classroom or in "pull-out" situations, where they were removed from the classroom and taught in small groups with other special needs students. This extended use of resource personnel served to assist the classroom teacher in lowering the PTR and to assist the special needs child in the classroom with his or her peers. The tutors were accountable to the regular classroom teacher and became involved in team teaching by working with regular as well as special education students. While they were able to assist with small-group instruction in the classroom, their main focus was attending to the students qualifying for special services.

During the 1993-94 school year, the special service personnel provided for an average of 3.6 hours per week of reduced PTR time for the classroom teacher. Reduced PTR time was 2.5 hours for the 1994-95 school year and 3.6 hours in 1995-96.

Technology (Refer to Question 1, Goal 5)

5. How did the class size reduction and the instructional innovations affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement
One of the principal goals of the Elementary School Class Size Reduction Pilot Project was improving student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school's project is higher than it would have been had the project changes not been made.

We cannot know how much students in the Elementary School Class Size Reduction Pilot Project would have learned, had they not been in a project classroom. Our best sources of comparison are students in other classrooms or other schools. Yet these students may benefit from other, unmeasured instructional innovations. Other students might also differ from project students in ways that cause them to learn at different rates, or they may begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best comparison group to use is other students in the United States. We wanted to see if students in the Elementary School Class Size Reduction Pilot Project improved their level of academic achievement over time, relative to other students in the United States.
To compare the academic achievement of project students with all U.S. students, we used the Iowa Tests of Basic Skills (ITBS) for students in grades three through five. These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in grades 3-5 to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. This report provides a comparison of achievement of the students who took the Fall 1993 tests and Winter 1996 tests.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS test results of project students relative to all U.S. students. We tracked the math and language arts achievement of individual students in each project school. We analyzed academic growth as measured by these tests for all students, and—where numbers of students were sufficient—for at-risk students. At-risk students are identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language. A description of these methods of reporting test results follows.

<table>
<thead>
<tr>
<th>National Percentile Rank</th>
<th>Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Equivalent</td>
<td>Indicating the year and month of schooling of students nationally that corresponds with the student’s test performance. By comparing the student’s actual grade level (e.g., 4.2 years) with the grade equivalent (e.g., 4.6 years) it is possible to tell if the student is learning at a faster or slower rate than students in the U.S. as a whole.</td>
</tr>
</tbody>
</table>

All third, fourth, and fifth grade students in Site C participated in the Elementary School Class Size Reduction Pilot Project. Students in grade three took the ITBS in Fall 1993, Spring 1994, Spring 1995, and Winter 1996. Students in grade four took the ITBS test in Fall 1993 and Spring 1995. Students in grade five took the ITBS test in Fall 1993 and Spring 1995. Fourth grade students took state administered tests in Spring 1994. Students who had been in fifth grade at the start of the project were no longer attending school at Site C in Spring 1995. Grade cohort represents the year of school the student was in during the 1993-94 school year. Thus, in the 1995-96 school year, the original third grade cohort students were in the fifth grade.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the ITBS test is 28 months, a relatively short period on which to base conclusions about the impact of the project.

Table 37 shows the national percentile rank of students at Site C. On average, students in the third grade cohort increased their percentile rank in math and language arts and decreased their percentile rank by one percent in reading from Fall 1993 to Winter 1996. Fourth grade students increased the percentile rank in all subjects tested from Fall 1993 to Spring 1995; and fifth grade students increased their percentile rank in math, reading, and language arts from Fall 1993 to Spring 1994.
Table 37. Site C ITBS National Percentile All-Students

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>No. Students Tested</th>
<th>Math Fall 93</th>
<th>Math Spring 94</th>
<th>Math Spring 95</th>
<th>Math Winter 96</th>
<th>Reading Fall 93</th>
<th>Reading Spring 94</th>
<th>Reading Spring 95</th>
<th>Reading Winter 96</th>
<th>Language Arts Fall 93</th>
<th>Language Arts Spring 94</th>
<th>Language Arts Spring 95</th>
<th>Language Arts Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>3</td>
<td>112</td>
<td>47</td>
<td>53</td>
<td>58</td>
<td>57</td>
<td>42</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>121</td>
<td>53</td>
<td>55</td>
<td>54</td>
<td>58</td>
<td>39</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>122</td>
<td>53</td>
<td>61</td>
<td>56</td>
<td>63</td>
<td>45</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 38 shows the national percentile rank for the at-risk student at Site C. Results showed no change in percentile rank for math and language arts and a decrease in percentile rank for reading from Fall 1993 to Winter 1996.

Table 38. Site C ITBS National Percentile At-Risk Students

<table>
<thead>
<tr>
<th>School</th>
<th>No. Students Tested</th>
<th>Math Fall 93</th>
<th>Math Winter 96</th>
<th>Reading Fall 93</th>
<th>Reading Winter 96</th>
<th>Language Arts Fall 93</th>
<th>Language Arts Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>26</td>
<td>34</td>
<td>36</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

On average, students at Site C demonstrated an increase in grade equivalent in math. The third grade cohort increased two years, seven months from Fall 1993 to Winter 1996; fourth grade students increased two years from Fall 1993 to Spring 1995; and the fifth grade cohort increased one year, three months from Fall 1993 to Spring 1994. (See Table 39.)

Table 39. Site C ITBS Grade Equivalent Mean Change All Students Math

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 93</th>
<th>Spring 94</th>
<th>Spring 95</th>
<th>Winter 96</th>
<th>Mean Change Fall 93-Spring 94</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>3</td>
<td>112</td>
<td>3.2</td>
<td>5.9</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>121</td>
<td>4.4</td>
<td>6.4</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>122</td>
<td>5.6</td>
<td>6.8</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On average, students at Site C demonstrated an increase in grade equivalent in reading. The third grade cohort increased two years, six months from Fall 1993 to Winter 1996; and the fourth grade cohort increased two years from Fall 1993 to Spring 1995. (See Table 40.)

Table 40. Site C ITBS Grade Equivalent Mean Change All Students Reading

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 93</th>
<th>Spring 94</th>
<th>Spring 95</th>
<th>Winter 96</th>
<th>Mean Change Fall 93-Spring 94</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>3</td>
<td>112</td>
<td>3.6</td>
<td>6.2</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>121</td>
<td>4.5</td>
<td>6.5</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>122</td>
<td>5.7</td>
<td>6.8</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
On average, students at Site C demonstrated an increase in grade equivalent in language arts. The third grade cohort increased two years, eight months from Fall 1993 to Winter 1996; the fourth grade cohort increased two years, two months from Fall 1993 to Spring 1995; and the fifth grade cohort increased one year, two months from Fall 1993 to Spring 1994. (See Table 41.)

Table 41. Site C ITBS Grade Equivalent Mean Change All Students Language Arts

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 93</th>
<th>Spring 94</th>
<th>Spring 95</th>
<th>Winter 96</th>
<th>Mean Change Fall 93-Spring 94</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>3</td>
<td>112</td>
<td>3.0</td>
<td></td>
<td></td>
<td>5.9</td>
<td>3.0</td>
<td></td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>121</td>
<td>3.9</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>122</td>
<td>6.5</td>
<td>6.5</td>
<td></td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At-risk students at Site C demonstrated an increase in grade equivalent. The mean change from Fall 1993 to Winter 1996 for students in math was two years, four months, and in reading and language arts one year, nine months. (See Table 42.)

Table 42. Site C ITBS Grade Equivalent Mean Change At-Risk Students

<table>
<thead>
<tr>
<th>ITBS School</th>
<th>No. Students Tested</th>
<th>Math Mean Change Fall 93-Winter 96</th>
<th>Reading Mean Change Fall 93-Winter 96</th>
<th>Language Arts Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site C</td>
<td>26</td>
<td>2.4</td>
<td>1.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

6. How are parental involvement, teacher satisfaction, and student attendance and behavior affected by the class size reduction and associated instructional innovations?

Parental Involvement

Parents of students attending Site C have been involved with the grant since the initial planning stage. They were kept informed of grant activities through routine and frequent home-school communication and through the PTA. Surveys were conducted at the end of each grant year to assess parents’ awareness of and involvement in the project, parents’ opinions regarding the grant’s effect on the school program, and parents’ perceptions about the school.

Table 43 shows the percentage of parents who were aware of the project components and who felt the project had a positive impact on their children’s education. Sixty-six percent reported the computer-assisted instruction had a positive impact on their children’s education, followed by 59 percent who felt volunteers had a positive impact and 51 percent who thought parallel block scheduling had. Fifty-two percent reported assisting teachers with school activities, and 29 percent reported working with students in the classroom.
Table 43. Site C Parents' Awareness of and Involvement in the Project

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Percent Aware of Project Component</th>
<th>Percent of Those Aware of Project Who Feel Project Has Had a Positive Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel block scheduling</td>
<td>61%</td>
<td>51%</td>
</tr>
<tr>
<td>Volunteers</td>
<td>80%</td>
<td>59%</td>
</tr>
<tr>
<td>Computer-assisted instruction</td>
<td>73%</td>
<td>66%</td>
</tr>
<tr>
<td>Self-esteem program</td>
<td>48%</td>
<td>41%</td>
</tr>
<tr>
<td>Counselor</td>
<td>50%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Parent Involvement

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteered to work with students in the classroom</td>
<td>29%</td>
</tr>
<tr>
<td>Assisted child's teacher and or participated in PTA related activities</td>
<td>52%</td>
</tr>
<tr>
<td>Received volunteer training</td>
<td>8%</td>
</tr>
<tr>
<td>Feel comfortable in role as volunteer</td>
<td>92%</td>
</tr>
</tbody>
</table>

Number of parents responding = 308

Thirty-nine percent of the parents responding to the survey had children attending Site C before the start of the grant. Of this group, 58 percent felt the program offered to their child was better in 1995-96 because of the Elementary School Class Size Reduction Pilot Project; 36 percent were undecided (see Table 44).

Table 44. Site C Percent of Parents with Child in a Non-Grant Class During the 1993-94 School Year Who Feel the Program is Better Because of the Grant

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>58%</td>
</tr>
<tr>
<td>No</td>
<td>2%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>36%</td>
</tr>
</tbody>
</table>

Number of parents responding = 119

Parents described their perceptions about Site C as positive. Ninety-two percent of respondents said their children enjoyed coming to school in the 1995-96 year; 96 percent knew how their children were doing at school; 93 percent were pleased with the school’s efforts to communicate with them; and 71 percent said the project provided them with opportunities to be involved in their children’s education (see Table 45).

Table 45. Site C Parents' Perceptions About the School

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child enjoys coming to school.</td>
<td>53%</td>
<td>39%</td>
<td>5%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>The project has provided opportunities for me to get involved in my child’s education.</td>
<td>30%</td>
<td>41%</td>
<td>23%</td>
<td>2%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Changes to the school program, as a result of the project, have improved my child’s attitude toward school.</td>
<td>24%</td>
<td>39%</td>
<td>31%</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>I feel I know how my child is doing at school.</td>
<td>55%</td>
<td>40%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>I am pleased with the school's communication efforts.</td>
<td>51%</td>
<td>42%</td>
<td>5%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Number of parents responding = 63
Parents’ Comments

Positive

- My child has become a different person with regards to his academic and social skills since being enrolled in Site C. I think that this is due to the format offered at the school.

- I feel the students and teachers both benefit tremendously when the pupil-teacher ratio is lowered. The children receive more one-on-one instruction and hands on experiences. The teachers get to know each child on a more personal level.

- Parallel block scheduling is fantastic! The student benefits are tremendous—having small group instruction is a valuable use of time and space.

- I feel the self-esteem program and the counselor are necessary in the lower grades now. It has really given our child a time to express not only negative but positive feelings.

- Volunteers in the classroom allow teachers to conduct small centers of 5-10 students in reading, language arts, math, and science, including computer education on a regular basis. Computer assistance allows children to work alone or in small groups on specific projects. I feel the use of volunteers allows children to realize the value of their (and other) parents in education. Through volunteering I feel very connected to my child’s learning and progress and very connected to the programs and practices at Site C.

- The parallel block scheduling has been wonderful. I have seen so much positive growth in my children—which I feel is due to the special time the teachers can spend with the students in the parallel block scheduling.

- Although I’m not as aware of the individual programs, I do know that my child has shown a growth in all areas while at Site C. I feel this must have made the difference along with the positive attitude of the teachers, support personnel, volunteers, and especially the principal. I have children in other systems but none as effective as that at Site C. I look forward to having my other children there.

- ... our granddaughter had a super low self-esteem problem. In Texas she was singled out as being stupid and dumb. She hated school and everything it stood for. Thanks to a loving and caring atmosphere, a wonderful teacher, principal, staff, etc., she has blossomed into a bubbly, happy child who looks forward to school each day. Because of the small classes, she is able to get all the help she needs. She is not separated or singled out from the other students. This would not be possible if it were not for down-sized classes and wonderful volunteers, not to mention teacher and staff well versed in the educating of a dyslexic child... I rate this pilot program A+ and hope each student has a chance to be educated by such a program. The future of our children and our wonderful country can do nothing but benefit from a program like this. I would like to see this in every school throughout the U.S.

Negative

- I do not feel having computers on all day long is healthy. There is a lot of radiation in 10 computers. This greatly concerns me.

- My daughter did not like having her class split for music/gym; she likes being together throughout her day with the same class.

Neutral

- Some wonderful learning opportunities arose from the grant. It all depended on the teachers’ willingness to alter instruction. The use of technology is both exciting and worrisome. Please do not make it a higher priority than other equally important educational experiences such as the visual and performing arts, the library and literature, the importance of books. Some schools have put technology on a golden pedestal. It is no more than one piece of the puzzle. When the educator was committed, the results were positive. When the teachers did not use the opportunity to its potential, there were no benefits.
The parallel block scheduling is very effective as well as the use of volunteers. The computers are great but hinder students' penmanship skills and we could do without the self-esteem program. Teaching the kids the basics will help to build self-esteem in a more important way.

Teacher Satisfaction, School Climate, Discipline, and Attendance

In this study the following definitions are used to describe classroom climate, behavior, and academic achievement from the teacher's perspective. Classroom climate means the general physical and interpersonal atmosphere in the classroom and takes into account the students' behavior and involvement in the assigned learning tasks. Class behavior means any response made by students to a stimulus—whether an internal thought or impulse or an external intrusion. Academic achievement means weekly assessment of students' academic performance using measures other than standardized tests.

Teachers rated class climate as excellent 51 percent of the time in 1995-96 and class behavior as excellent 44 percent of the time during periods of reduced class size. Academic achievement as a result of reduced PTR was reported as excellent 37 percent of the time and good 62 percent of the time. Seventy percent of the classroom teachers reported being very satisfied with reduced PTR (Table 46).

<table>
<thead>
<tr>
<th>Weekly Class Description</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class climate with reduced PTR</td>
<td>0%</td>
<td>0%</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Class climate whole class</td>
<td>0%</td>
<td>15%</td>
<td>78%</td>
<td>7%</td>
</tr>
<tr>
<td>Class behavior with reduced PTR</td>
<td>0%</td>
<td>0%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>Class behavior whole class</td>
<td>0%</td>
<td>19%</td>
<td>78%</td>
<td>3%</td>
</tr>
<tr>
<td>Academic achievement as a result of reduced PTR</td>
<td>0%</td>
<td>1%</td>
<td>62%</td>
<td>37%</td>
</tr>
<tr>
<td>Teacher satisfaction with Reduced PTR</td>
<td>Very Satisfied</td>
<td>Somewhat Satisfied</td>
<td>30%</td>
<td>Not Satisfied</td>
</tr>
</tbody>
</table>

Attendance as an indicator of project impact was a problem at all sites involved in the Elementary School Class Size Reduction Pilot Project. The average weekly absence rate for Site C was 6 students per class. This rate was not considered excessive, considering the general level of illness expected in an elementary school. Classroom teachers reported that as students' attitude toward school improved their desire to attend school improved. However, chronic absentee problems are all too often caused by overriding family issues, not the students interest in or attitude toward the school.

7. How can this project be replicated at other elementary sites?

The following statements are recommendations from parents, teachers, and support personnel for elementary schools considering implementing strategies that allow for periods of reduced teacher ratio without significantly adding to the cost of education.

- Parallel block scheduling is a change any school can make with minimal funding.
- Use the school resource personnel to work with small groups in the classroom instead of working on the pull-out model.
- Use cross-grade groups; for example, have 3rd and 5th graders work together.
- Use the computer lab to provide periods of parallel block time.
• If you are going to have technology, make sure a technology specialist is available to support the program, maintain the equipment, and provide on-site training.

• Get parents, college, and high school students involved in the schools; open doors and stretch boundaries and provide training for anyone working with the students.

• Remember that technology is a learning process; do not feel you have to know it all before you begin. Plan to learn along with your students.

• Distribute resources equally among staff and provide long-term, on-site training to implement changes.

AT-RISK STUDENTS

Nearly one-third of the students attending Site C (an average of 8 students per class) were identified at risk for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a Second Language. Teachers reported the Elementary School Class Size Reduction Pilot Project gave them opportunities for small-group time and one-on-one time for these students, as well as for those students with problems caused by illness or other occasional personal concerns. Benefits of reduced pupil-teacher ratio include increased student participation, assistance with organization, opportunities for at-risk students to be peer-leaders, individual attention, and increased motivation when using computers. However, teachers report that for students with more complex learning and discipline problems, small class size is not the only solution to their needs.

The following statements made by teachers are representative of the benefits of reduced class size they saw for at-risk students.

• [For children with] at-risk characteristics—short attention span and difficulty working independently—small groups allow for frequent assessments and time for re-teaching. At-risk students thrive on attention.

• I am able to give these students my full attention for a full hour every day. One at-risk student has improved in all academic areas because of the reduced pupil-teacher ratio.

• [Student] is emotionally handicapped and finds small groups much more comfortable. He has a tendency to become easily frustrated in large groups and seldom can complete his work. In small groups his concentration is greater. I can provide assistance as needed and he can focus enough to finish his work.

• I cannot begin to tell the vast improvement academically as well as behaviorally using PBS in my classroom for all students. I can readily see who needs help and attend to them immediately. This week we did team relays on the chalkboard by multiplying three digits by three digits. The small group allows the students more opportunity to practice their multiplication and support one another during the activity. I am able to identify this and give the extra attention to those struggling with the math ideas.

• [Student] has trouble in large group settings. Increased confidence with immediate response allows the teacher the opportunity to do a variety of activities to fit all learning needs.

• Many of the at-risk students do much better when they are able to learn and practice on the computer. The reduced class size makes it easier to manage the use of six computers in the classroom.

• During reading time I have recruited volunteers for each day so I can break my class into three groups of nine students (teacher, volunteer, and special service personnel). The entire class is engaged in quality interaction so there is no time for the at-risk kids to be disengaged.
• I feel like a broken record but consistently the at-risk kids behave better in small groups and learn more. I have better control and I am able to quickly diagnose their progress.

PROJECT AND STRATEGY COSTS

Introduction

The purpose of the Elementary School Class Size Reduction Pilot Project was to assess the effectiveness of reduced class size, combined with other teaching interventions, on student achievement and attitude, school discipline, and parental involvement. Each participating school was granted $197,600 per school year to develop and implement strategies towards accomplishing these goals. A simple cost analysis provides information on (1) the project’s overall costs per classroom; (2) the approximate cost of implementing each strategy; and (3) a description of how project funds were spent.

Project Cost

Site C extended the project to 18 classrooms, affecting 415 students annually. The cost of the project over the three years is shown in Table 47.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Cost</th>
<th>Number of Classrooms</th>
<th>Cost per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$197,600</td>
<td>18</td>
<td>$10,978</td>
</tr>
<tr>
<td>1995</td>
<td>$197,600</td>
<td>18</td>
<td>$10,994</td>
</tr>
<tr>
<td>1996</td>
<td>$197,600</td>
<td>18</td>
<td>$10,978</td>
</tr>
</tbody>
</table>

Strategy Costs

Site C employed four strategies—staff development, improved school climate, technology, and parent and community volunteering—to reduce class size and improve education. These strategies were described in detail in previous sections of this report and are summarized below:

- **Staff Development**: Site C devoted time and resources toward additional professional training for teachers.
- **Improved School Climate**: Site C developed integrated psychological and motivational programs designed to ensure students had the psychological foundation necessary to achieve academically.
- **Technology**: Site C integrated the use of technology into the curriculum to enhance learning and provide opportunities for small-group instruction.
- **Parent and Community Volunteering**: Site C recruited and trained volunteers to assist teachers with educational activities.

Figure 11 on the following page displays the annual cost per classroom of implementing these strategies. It should be noted that strategy implementation costs will vary from school to school, depending on the following variable-cost items:
Teacher and other personnel salary and benefit costs may differ, depending on the experience of the individuals on staff.

A half-time technology coordinator was funded by the school district at no cost to the project. If other schools do not already have a technology coordinator, hiring one will be an additional cost.

Figure 11. Site C Strategy Implementation Costs per Classroom

Cost Analysis Description

Project and strategy costs were approximated using Site C’s fiscal year project. The cost analysis was conducted in two phases. Phase 1 determined the purpose behind each budget expenditure. Phase 2 matched the purpose with the strategy to determine the approximate cost of implementing each strategy.

Phase One

First, each budget line item was classified as to the type of expenditure it represented. In pursuing its strategies to reduce class size and improve education, Site C spent its project funds in four ways: (1) hiring more staff, referred to as “additional personnel,” (2) training staff, referred to as “staff development;” (3) recruiting and organizing volunteers, referred to as “volunteers;” or (4) purchasing computer equipment, referred to as “technology.” An approximate breakdown of the amount of project funds spent for each of these purposes is provided in Figure 12.

In calculating this breakdown, we assumed that since hiring more staff, providing additional staff training, recruiting volunteers, or purchasing technology all have administrative costs in addition to the actual budget item cost, budget items representing general overhead or administrative costs, such as “telephone” or “postage” should be apportioned among additional personnel, staff development, volunteers, and technology according to their percent share of the total budget. For example, in FY1994 Site C spent 26 percent of its project funds on adding personnel, 26 percent on staff development, 12 percent on recruiting and training volunteers, and 36 percent on purchasing technological equipment.
Consequently, 26 percent of the line item "support staff" was charged to additional personnel, 26 percent to staff development, 12 percent to volunteers, and 36 percent to technology. Other assumptions we made in the course of conducting the cost analysis include:

- Substitutes or temporaries received no benefits.
- Employee benefits were based on the same fixed percentage of salary for all individuals receiving benefits.
- "Other purchased services," "supplies," and "discretionary material" were additional general overhead or administrative costs apportioned in the same manner as "postage" or "telephone"—according to percent share of the total budget.
- The "support staff" expenditure was for a half-time grant secretary and therefore was treated as "additional personnel."

**Phase Two**

Once the purpose of each expenditure was determined it was then possible to match an expenditure to a particular strategy. The staff development strategy included all expenditures under staff development. The improving school climate strategy included the salary and benefit expenditures of hiring a counselor to the staff, plus a percentage of administrative costs. The technology strategy included all expenditures under technology. Finally, the strategy of parent and community volunteering included the expenditures under volunteers.

**Cost-Benefit Summary**

The study looked at the mean change in grade equivalent for cohorts of students who participated in the pilot program all three years. Grade equivalence indicates the amount of learning achieved by students as compared to the national average, given in year and month increments. For example, a grade equivalent change of 1.8 means a scholastic achievement equal to one year and eight months of schooling on a national average. This grade equivalent is then compared to the actual length of schooling undergone by each student. For example, if a grade equivalent change of 1.8 (one year and eight months) occurred over a time period of 1.6 (one year and six months), this indicates achieved
student learning above the national average. If the change in grade equivalent occurred over a time period of 1.9 (one year and nine months), this would indicate achieved student learning below the national average. Finally, if a 1.8 change in grade equivalent occurred over a time period of 1.8 months, this indicates achieved student learning equal to the national average.

The study then compared the mean change in grade equivalent on the Iowa Tests of Basic Skills (ITBS) to the project's estimated mean program cost per classroom. The following table displays the mean change in grade equivalent in mathematics, reading, and language arts for a third grade cohort that participated in Site C's *Elementary Class Size Reduction Pilot Project* from Fall 1993 to Winter 1996.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Time Period</th>
<th>Grade Equivalent</th>
<th>Number of Classrooms in Project</th>
<th>Mean Program Cost Per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>2.4</td>
<td>2.7</td>
<td>18</td>
<td>$5,883</td>
</tr>
<tr>
<td>Reading</td>
<td>2.4</td>
<td>2.6</td>
<td>18</td>
<td>$5,883</td>
</tr>
<tr>
<td>Language Arts</td>
<td>2.4</td>
<td>2.8</td>
<td>18</td>
<td>$5,883</td>
</tr>
</tbody>
</table>

**Estimated Mean Program Cost per Classroom**

Site C's mean program cost per classroom was estimated by: (1) differentiating program costs from project costs, and (2) allocating capital expenditure costs over the use-life of the investment. The purpose for differentiating between program and project costs was to identify ongoing costs, or costs that will continue to be present as the program continues, from startup or grant imposed costs. Program costs were defined as those costs necessary to the ongoing operation of Site C's Class Size Reduction Project. Under this definition, items such as administrative costs imposed by the grant or startup costs associated with designing the program were not included in calculating the annual program cost. Second, capital expenditures, such as purchasing computers, were spread out over the use-life of the investment in order to avoid overestimating annual program costs.

We made the following assumptions in calculating the mean program cost per classroom for Site C:

- Support staff were hired to perform grant administrative tasks and therefore were considered a project and not a program cost.
- An estimated 75 percent of staff development was used to develop a vision of the project. Therefore, those expenditures providing for staff development—substitutes/temporaries, professional/technical services, travel, stipends, postage, telephone, supplies, and other purchased services—were calculated at a 25 percent rate.
- Capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

**SUMMARY**

*Elementary School Class Size Reduction Pilot Project* at Site C was successfully implemented according to the original proposal. Concurrent scheduling changes, staff development, and increased personnel assisting in the classroom created a difficult and frustrating first year for the majority of teachers. They learned that they had attempted to do too much too soon. The second and third year of the grant allowed for improvements and revisions that enabled the staff to adjust to the most significant features of the grant—scheduling changes, new instructional practices, and technology.
The addition of a half-time technology specialist for the 1994-95 and 1995-96 school years provided the staff with much-needed assistance in integrating new technology into the curriculum. Staff members, representing a wide range of computer literacy (from no skills to very skilled, needed more than after-school sessions and occasional classes to get started. The additional training sessions offered to all teachers twice per month before school were a welcome opportunity to upgrade and level out the staffs' computer skills. Focusing staff development on technology also eased the tension and frustration of staff who were required, during the first year, to implement and adapt to schedule changes, teaching strategies conducive to small group instruction, and a new self-esteem program.

The major concerns that faced the staff were the increased planning time necessary to implement the changes, training to change their approach to teaching, working with the additional personnel in the classroom, and changing schedules to accommodate reduced PTR time. After a difficult start-up year, the staff bonded together and made revisions to support manageable change. The focus of staff development, the additional support for technology, and a more supportive principal encouraged the staff. At the close of the final grant year, the teachers were able to look back with pride on the changes and improvements in the school and in the way they teach and interact with staff and students. The highlights of the project include an increased satisfaction with teaching; improved attitude, academic achievement and behavior of the students; and creation of a team-work environment that changed the isolation of traditional classroom teaching.

The staff at Site C experienced a challenging and rewarding three years; they were satisfied that they had three years of increased opportunities to work with small groups of students. Project success was also encouraged by the improved community and parent perceptions of the school. Parents were pleased with the education their children were receiving and supported the changes made by the staff at Site C. The improved community perception, increased parental involvement, and improved educational atmosphere all served to increase teachers' willingness to change and become "partners in enthusiastic life-long learning."
SITE D

BACKGROUND DESCRIPTION

Site D offers a kindergarten through sixth-grade elementary school program to approximately 315 students. The certified staff consists of 13 classroom teachers and 6 special service and support personnel. All staff members participated in the project to reduce class size during language arts and mathematics instruction time.

The ethnic make-up of the student population is Caucasian, 85 percent; Native-American (Alaska Native and American Indian), 11 percent; Hispanic-American, 2 percent; Asian-American, 1.5 percent; and African-American, 0.5 percent. During the 1995-96 school year, approximately 37 percent of the student population—an increase of 12 percent since the start of the project—was identified as “at risk” using the following criteria: socio-economic factors (qualify for free or reduced-price lunch), Chapter One (remedial services in reading and mathematics), special education certification, and English as a Second Language.

Since the school opened in 1987, the administration and staff at Site D have committed themselves to developing a supportive and positive educational environment for all students. Practices to help create that environment include site-based decision making, extensive community involvement, and innovative teaching practices. The school is recognized in the district for leadership in forensics, drama, technology, mathematics, recycling, emergency preparedness, and other innovative academic programs. At the start of the 1993-94 school year, Site D received a nationally recognized Blue Ribbon School of Excellence Award. This prestigious award is based on school excellence in leadership, staff and community involvement, student performance, climate, and progress toward national Goals 2000.

General project goals at Site D included:

- Reducing class size in reading and mathematics, focusing on the primary-grades
- Improving students’ Iowa Test of Basic Skills (ITBS) scores in reading, language arts, and mathematics
- Increasing the use of nonstandard testing (including observations and other measures) in reading, writing, and mathematics
- Improving students’ attitudes toward reading, writing, and mathematics
- Improving the attendance of students with poor attendance
- Improving the behavior of students with behavior problems
- Increasing the use of technology to enhance programs and provide enrichment opportunities
- Training teachers in strategies for improving instruction

STRATEGIES TO ACHIEVE GOALS

The Elementary School Class Size Reduction Pilot Project provided the school with the opportunity and funding to continue to improve and update its educational program through the following strategies: (1) parallel block scheduling and flexible staff allocation, (2) increased technology, and (3) staff development. The school used an overlapping extended-day program for kindergarten classes and set up a volunteer training program for parents who worked in the classrooms.
Parallel Block Scheduling and Flexible Staff Allocation

Two sessions of parallel block time were scheduled daily for every first- through sixth-grade classroom. One session allowed half the students in a class group to participate in music, library, or physical education, while the other half remained in the regular classroom. The second session allowed half the students in a class group to work in one of the school’s three computer labs. During this supervised computer lab time, aides and volunteers worked with the students. They maintained daily individual and class progress reports and reviewed them with students, teachers, and parents.

Flexible staff allocation allowed classroom teachers to use additional trained staff to assist in the classroom during the parallel block time and to work with students during reading, language arts, and mathematics instruction. Examples of this included the special education teacher and the librarian becoming first-grade reading teachers for one hour per day, allowing the first-grade class to be divided into small groups for reading instruction. Other staff members—such as the Chapter One tutor, bilingual tutor, and the reading specialist—also worked with small groups or provided individual instruction.

Trained parent volunteers and older students assisted in further reducing the pupil-teacher ratio. Under the direction of the classroom teacher, they worked directly with small groups of students; intermediate students (grades 4-6) acted as cross-grade tutors for students in the primary-grades. Parallel block scheduling, combined with flexible staff allocation, provided the classroom teacher with a minimum of two hours per day of small group instruction time.

Increased Technology

A 28-station Macintosh LC 520 lab (with built-in compact disk drives) was the project’s principal addition to technology. (This lab is divided into two stations with one lab used for research and the second for productions. Students use the computers, designed specifically for the schoolroom, to publish their work and to complement an existing 12-station GS lab for computer-assisted instruction and a 12-station Mastery lab for monitoring student progress in math and keyboarding skills.) The teachers used technology to reduce the pupil-teacher ratio by sending half their classes at a time to the computer labs, where a full-time aide was available to help them. Kindergarten through fourth-grade students spent 30 minutes each day in one of these labs, rotating regularly, depending on curriculum and program emphasis. Fifth and sixth-graders spent 45 minutes each day in one of the labs. Classroom teachers collaborated once a week with the technology staff to plan program delivery and objectives for students.

The general emphases of technology for the first year of the grant were familiarizing and training teachers and students in the necessary skills to use the hardware and software, exploring technology potential, and increasing computer use in all aspects of teaching and learning. This emphasis continued through the 1995-96 school year, with the addition of more computers in the classroom (12 computers from the GS lab were distributed among three primary classrooms) and an increase in the integration of computer technology across the curriculum.

Staff Development

Staff development was an integral part of Site D’s strategy for improving student achievement, attitude, and behavior as well as increasing parents’ involvement and participation in their children’s education. A comprehensive training component was in place for parents and teachers to increase and improve their understanding and implementation of changing educational practices. Two types of training—introductory and intensive—were used to increase teaching and learning effectiveness. Introductory training was used to acquaint teachers and parents with the basic tenets of a subject, to review research on the subject, to answer broad questions, and to develop a common vocabulary for all participants. Intensive training was used to modify behavior. Intensive training included instruction and modeling of a subject or practice; practice teaching with peers and with the class; and collaboration with and feedback from peers. The two training areas were designed to encourage and support the use of new educational ideas and strategies.
Overlapping Extended Kindergarten Day Program

To reduce pupil-teacher ratio (PTR) at the kindergarten level, the classroom teachers used an overlapping extended day program. Under this arrangement, half the children attended school from 8:50 a.m. to 1:20 p.m., and half attended from 10:50 a.m. to 3:20 p.m. Each child attended school for 4.5 hours, but for 2 of those hours only 10 to 12 students were in each group. When all 24 students were present, class time was used for large-group special activities such as physical education, music, library, computers, lunch, and recess. This program, adopted in the final quarter of 1992, continued through the 1995-96 school year, with teachers having the additional grant-related benefits of staff and volunteer training and scheduled collaboration time.

The kindergarten teachers also maintained a program for preschoolers and their parents to help acquaint them with the school. Once a month, the parents and children were invited to attend the program at the school. At this time they had access to the gym or music room. Parents facilitated the lessons with parents and children, and those in attendance received packets of pre-school activities for home use. Parents were also given information on school readiness and general parenting skills while the preschoolers were engaged in an activity.

While this primary strand was an important feature of the grant proposal, it received no additional funding and was run exclusively by classroom teachers and parents. The future emphasis of this preschool strand will include increasing parent supervision, with teachers acting as mentors.

Parent Volunteers

The school has an active Parent-Teacher Association (PTA), with membership of over 150 during the 1995-96 year. Parents participated in school district committees, in-service days, school board meetings, read-at-home programs, state issues conferences, talent shows, parent-to-parent training, toddler rooms, family fun nights, holiday gifts, community clothing drives, and many other school-community events.

A parent volunteer coordinator trained and recruited parents to assist in general school chores, to work in the classrooms, and to help teachers with small-group instruction. Teachers were in contact with parents through the PTA, phone calls, weekly newsletters, weekly parent computer nights, and other school-related activities. Informal training for lunchroom and library helpers was on-going and provided as needed to parents. All parent training was provided at no cost to the school, except in the time donated by staff, parents, and community resource personnel. An on-site toddler room supported and staffed by PTA members was available for parent volunteers.

PROJECT MODIFICATIONS

Changes in the second year and third year of the Elementary School Class Size Reduction Pilot Project at Site D were made in budget allocation, technology, staff training, and personnel.

Budget Reallocations

Grant goals merged with school goals, and district in-service training days were used for grant-related staff development. Of the four introductory days of training before school, two were provided through the grant and two were scheduled during regular district in-service days. The savings (two percent of the total grant) was used for administration, clerical services, and accounting required by the district and ISER.
**Technology**

During the first year of the project, computer labs were used to reduce class size. This practice continued through the second year, with computers used in both classrooms and in labs.

- Three labs of the 24 to 26 stations were used for reducing class size during 1993-94. The GS lab was used for software; the Mastery Lab was used for keyboarding and math facts; and the Mac lab was used for CDs and word processing.

- Three labs (one of 28 stations and two of 12 stations) were used in 1995-96. The GS lab was redistributed to the primary classrooms (4 stations per class); the Mastery Lab remained the same. The Maclab was divided in two, with one used for research and the other for production in the 1994-95 year.

- The building was wired to Ethernet standards.

- Each classroom teacher received a Mac 575 networked to the labs.

- Twenty-four Alpha Smmts were purchased for use in grades 4-6.

- Collaboration for technology was scheduled during the school day rather than before school.

- Computer classes offered by the college using district instructors during the 1993-94 school year did not meet the school's needs. So Site D collaborated with the North Peninsula Recreation Service Area to offer a six-week computer class to the community.

**Video Training Component**

During the first year of the grant, teachers were all required to complete a video describing a training session they attended and incorporated into their classroom. These videos were found to be ineffective and time-consuming. Teachers reported that observing classrooms and informal reviews and presentations of training sessions were more effective strategies for sharing the information. For the 1994-95 school year, a single video combining a "math manipulative" lesson in each classroom was compiled.

**Other Modifications**

- The special education student population was integrated into the regular classroom approximately 98 percent of the time.

- Four new staff members (replacing existing staff) were hired, trained, and integrated into the school.

- The scheduling committee moved from being a short-term committee to being a standing committee meeting on a regular basis.

No changes were made in the *Elementary School Class Size Reduction Pilot Project* at Site D for the 1995-96 school year. The school continued with its original objective of increasing use of technology across the curriculum and made additional purchases of technology equipment for use in classrooms. The teachers made the decision to purchase additional Alpha Smarts (inexpensive portable word processors) instead of a computer.

The emphasis of staff development for the 1995-96 school year was technology. Two introductory training days were held for all staff members before the school year. The focus of the two-day training session was further integrating technology into the curriculum. Each teacher developed a one-page curriculum map for the school year; reviewed programs and equipment including HyperStudio, CDs, and Quicktake cameras; and developed a ClarisWorks flyer to be sent home instead of a letter.
All classroom teachers had six intensive training days in technology to be taken during the project. The administration encouraged teams of teachers (6 to 10 at a time) to attend training followed by an assimilation day as a group to determine how the training would be integrated into the curriculum. Regularly scheduled in-service days were used to provide teachers with the opportunity to share the information and make recommendations to the entire staff.

At the beginning of the 1995-96 school year, a questionnaire was sent to all parents asking in what ways they would be interested in participating at the school. The information went through an intense follow-through process and each parent was contacted, and options for matching needs with interests were discussed. This resulted in a schedule for parent volunteers to work each day in the lunchroom, in their children’s classrooms, in other classrooms with the large numbers of students, in the office, in the computer lab, or in the library. Volunteers with young children were able to leave them in a toddler room run by parents and supported by the PTA.

Parents were presented information about volunteer involvement during a kindergarten pre-registration day held in the spring. As an increased incentive to encourage involvement, school personnel called parents of all incoming kindergarten students and parents new to Site D. To maintain continuity in the volunteer program, the volunteer coordinator trained a new parent to resume these responsibilities for the coming school year.

**PROJECT OUTCOMES**

This segment of the report answers seven research questions proposed by the Alaska Department of Education at the start of the *Elementary School Class Size Reduction Pilot Project*. In preparing this section we used project documentation and evaluation activities completed between Fall 1993 and Spring 1996; they examine student academic achievement and attitude, school climate and discipline, teacher innovation, and parental involvement.

1. **Did the program at Site D meet its class size goals?**

**Goal 1: Reducing class sizes in reading and mathematics, focusing on the primary-grades**

*The primary-grades get the extra teachers, the librarian, and the music teacher; were hoping we can keep this setup next year. (First-grade Teacher)*

All project participants agreed this goal was met. The attention to small-group time at the primary level, often with groups of 6:1 or less with the help of parent volunteers and special service and support personnel, was evident during every site visit made by the evaluator during 1995-96. Primary teachers agreed that the small-group time allowed them to attend to individual students on a very personal level as well as to engage the students in project-oriented activities requiring a significant degree of sophistication. With small groups the coordination of supplies for various activities can more easily be accommodated, and productive use of class time with frequent and substantive student-teacher interactions increased.

Data collected from the teachers’ daily records show that in 1995-96 teachers had an average of 10.5 hours per week of substantive interaction time with a pupil-teacher ratio (PTR) of 15:1 or less for grades 1 through 4 and 20:1 or less for grades 5 and 6. In addition to computer labs and parallel block time, additional teachers, computers in class, and volunteers helped the classroom teachers further reduce the PTR to accommodate groups of 6:1 or less (see Figure 13). For the 1993-94 school year, the weekly time with reduced class size was 9.5 hours; for the 1994-95 school year, 13.3 hours. The drop in 1995-96 time occurred because the intermediate-grade teachers kept their whole classes for one day a week.
The teachers' daily records allow us to make an estimate of time the average student spent in smaller classes. As Figure 14 shows, for an average student this translates into approximately 7.9 hours per week of available small-group instruction time.

Kindergarten

At the kindergarten level the overlapping extended day allowed one kindergarten class to have two hours of reduced class size time. This schedule, developed by the teachers and supported by the kindergarten parents, had been implemented at the school before the grant. These classroom teachers developed this no-cost approach to reducing class size and benefited from project-related activities including the computer lab, computer in the classroom, staff development, and parent volunteer training.
Under this arrangement in 1995-96, the first half of the class attended school from 8:50 a.m. to 1:20 p.m., and the second half attended from 10:50 a.m. to 3:20 p.m. Each child attended school for 4.5 hours—but for 2 of those hours, only approximately 12 students were in each group. The overlapping time block of 1.5 hours when all students were present included large-group special activities such as physical education, music, library, and computers as well as lunch and recess. Table 49 shows a sample of the daily kindergarten schedule.

Table 49. Site D Kindergarten Schedule

<table>
<thead>
<tr>
<th>24 students 8:50 - 10:50</th>
<th>24 students 10:50 - 1:20</th>
<th>12 students - 1:20-3:20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Arts, Science, Social Studies, Art, Math</td>
<td>Story time, Special (music, P.E.), Lunch/recess, Computer, Centers</td>
<td>Language Arts, Science, Social Studies, Art, Math</td>
</tr>
</tbody>
</table>

Table 50 shows a sample of a multi-grade (kindergarten and first grade) schedule in 1995-96. First-grade students attended for the entire day—6.5 hours—and kindergarten students attended for 4.5 hours. This class configuration, set up at the beginning of the year, accommodated the grade-level mix of new students and increased the opportunity for Site D to implement the multi-grade approach to learning. Other split classes at this site included a first/second grade and second/third grade combination.

Table 50. Kindergarten and First Multi-grade Class Schedule

(A.M.)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kdg &amp; 1st</td>
<td>Kdg</td>
<td>Kdg &amp; 1st</td>
<td>Kdg &amp; 1st</td>
<td>Kdg &amp; 1st</td>
<td>Kdg &amp; 1st</td>
</tr>
<tr>
<td>Science</td>
<td>1st-specials</td>
<td>whole group</td>
<td>lunch</td>
<td>1st-grade-recess</td>
<td>Special services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Kdg-computer lab</td>
<td>1st-grade-L. A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Kdg-math</td>
</tr>
</tbody>
</table>

(P.M.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-math</td>
<td>1st</td>
<td>1st</td>
<td>1st</td>
<td>1st</td>
<td>1st</td>
</tr>
<tr>
<td>Kdg-specials</td>
<td>Kdg dismissal</td>
<td>reading</td>
<td>recess</td>
<td>reading w/ extra teacher</td>
<td>computer lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3:20 dismissal</td>
</tr>
</tbody>
</table>

Goal 2: Improving students’ ITBS scores in reading, language arts, and mathematics
(Refer to Research Question 5).

Goal 3: Increasing the use of nonstandard testing (including observations and other measures) in reading, writing, and mathematics

*There are more opportunities to do in-depth assessment when the groups are smaller. I do more math assessment using story problems to observe students’ critical thinking skills. I couldn’t do this with a whole class. I need to see what strategies the child uses. If they’re right I reinforce them and if they are wrong I correct them and move on.* (First-grade teacher)

Examples of nonstandard testing and authentic assessments include observations, teacher-prepared performance tests, and student portfolios. While authentic assessments are not new to Site D, teachers consistently report on the increased opportunity to conduct in-depth, authentic assessments as a result of the Elementary School Class Size Reduction Pilot Project. Sharing perspectives on student performance and planning lessons according to the students’ needs have been major benefits of the
increased collaboration between special service personnel, volunteers, and grade-level teachers. This shared perspective allows for more insightful and in-depth assessment of students performance.

Teachers report the need to understand the thought process, particularly of the primary students, in order to see what strategies they are using. To accomplish this requires uninterrupted, focused time with a single child or in very small groups (3-4) of children. Teachers at the intermediate level also need these very small groups for assessment. As a result of reduced PTR, teachers were able to increase the use of analytical writing assessments, drama, and math projects along with the ongoing strategy of observing and monitoring students’ understanding of tasks.

**Goal 4: improving students’ attitudes toward reading, writing, and mathematics**

"My class has 3 students with a tradition of spending a lot of time in the principal’s office. They are not reformed, but they have had a wonderful year. They have some trouble with transition time, but in class they are challenged, working hard, and on-task. They certainly do better during periods of reduced PTR time. They need and like the recognition they get in small groups." (Fourth-grade teacher)

"In small groups the students are more confident, especially the quiet students. I see student attitude toward learning change and also I see parent expectations change. They expect their children to be successful in school." (Third-grade teacher)

**Student Survey Results**

All students attending kindergarten through sixth-grades at Site D completed a survey on their perception of school and learning at the end of the 1993-94, 1994-95, and 1995-96 school years. The survey asked for information on attitudes toward learning and school. While student mobility rates (moving in and out of the school) restrict comparisons, survey results showed students in participating classes having positive and favorable attitudes toward school during all years of the project.

Asked if they like school, 51 percent of the students in 1995-96 responded “always” and 43 percent “sometimes.” The responses about whether they liked reading and math were positive. Ninety-six percent of the students reported feeling school is a safe place, and only 3 percent reported not feeling good about how they were doing at school. Overall, as in the 1993-94 and 1994-95 survey results, students reported favorable attitudes toward learning, school, and safety (see Table 51).

Students were also asked to describe their favorite school activity. Of all students responding, 33 percent said physical education and sports were favorites; 15 percent; music, drama, and dance; and 9 percent, computer lab. Other favorite activities in order of preference included arts and crafts, mathematics, reading, and social/Alaska studies.

**Table 51. Site D Students’ Perceptions About School**

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>Don't Know</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like school?</td>
<td>51%</td>
<td>43%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like reading at your school?</td>
<td>55%</td>
<td>40%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you like doing math at your school?</td>
<td>53%</td>
<td>41%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel your school is a safe place?</td>
<td>72%</td>
<td>24%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you feel good about how you are doing at school?</td>
<td>62%</td>
<td>34%</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Do most of the kids in your class follow the rules?</td>
<td>28%</td>
<td>68%</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Number of students responding = 292
Teachers reported the increased use of technology across the curriculum as having a positive influence on students’ attitude toward learning. They reported it as one area where few instructions are necessary and students are always eager to work on projects through to completion. The opportunity to individualize the instruction, along with the mastery over the network system, excites the students. Writing in particular showed a dramatic improvement with the use of computers, according to the teachers. The increased frequency of writing and the ease of revising and editing all improved the students’ writing skills.

Goal 5: Improving the attendance of students with poor attendance

We stress to the parents that we do have our small group time and getting to school on time is important. For the child whose attendance is a problem, the principal calls the parents or guardians to inquire about the child and to remind them of the importance of consistent attendance. (First-grade teacher)

Attendance as an indicator of project impact has been a problem for all schools involved in the Elementary School Class Size Reduction Pilot Project. Since attendance is the responsibility of the parents more than the students, assessment of project impact on this area is questionable. Teachers reported illness and the tendency of families in this community to vacation in winter as significantly influencing the reported average absence rate of 9 students per week, per class. For students with chronic attendance problems, the principal contacts the home to discuss the situation and to remind parents of the importance of their children’s regular attendance.

Goal 6: Improving the behavior of students with behavior problems

Behavior has improved immensely. I think the students have the opportunity and the tools, particularly with technology, to apply themselves to their area of interest. The loss of privileges, especially computer time, is really important and one they don’t risk losing. (QUEST/technology specialist)

The changes have definitely improved behavior. Small groups make it easier to keep the children involved and distractions a minimum. The chances for success are greater when the teacher can have groups of 2 or 3 rather than 26, with 13 students engaged and 13 distracted, confused, and unfocused. (First-grade teacher)

In this study the following definitions are used to describe classroom climate, behavior, and academic achievement from the teacher’s perspective. Classroom climate means the general physical and interpersonal atmosphere in the classroom and takes into account the students’ behavior and involvement in the assigned learning tasks. Class behavior means any student response to a stimulus—whether an internal thought or impulse or an external intrusion. Academic achievement means weekly assessment of students’ academic performance, using measures other than standardized tests.

Teachers rated class climate as excellent 69 percent of the time in 1995-95 and class behavior as excellent 53 percent of the time during periods of reduced class size. Academic achievement as a result of reduced PTR was reported as excellent 77 percent of the time and good 23 percent of the time. Ninety-five percent of the classroom teachers reported being very satisfied with reduced PTR (see Table 52). These figures remained relatively consistent throughout the three years of the grant, with teacher satisfaction reported higher during the final year.
Table 52. Site D Teacher Rating of Class Climate and Class Behavior During Whole-Class and Reduced PTR time, Overall Rating of Academic Achievement as a Result of Lower PTR, and Teacher Satisfaction with Lower PTR

<table>
<thead>
<tr>
<th>Weekly Class Description</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class climate with reduced PTR</td>
<td>0%</td>
<td>0%</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Class climate whole class</td>
<td>0%</td>
<td>16%</td>
<td>64%</td>
<td>20%</td>
</tr>
<tr>
<td>Class behavior with reduced PTR</td>
<td>0%</td>
<td>1%</td>
<td>46%</td>
<td>53%</td>
</tr>
<tr>
<td>Class behavior whole class</td>
<td>1%</td>
<td>27%</td>
<td>59%</td>
<td>13%</td>
</tr>
<tr>
<td>Academic achievement as a result of reduced PTR</td>
<td>0%</td>
<td>0%</td>
<td>23%</td>
<td>77%</td>
</tr>
<tr>
<td>Teacher satisfaction with Reduced PTR</td>
<td>Very Satisfied 95%</td>
<td>Somewhat Satisfied 5%</td>
<td>Not Satisfied 0%</td>
<td></td>
</tr>
</tbody>
</table>

Teachers and administrators admit that small classes are no panacea for troubled and disruptive students. However, behavior is substantially improved in class, and the quality of student-teacher interaction time is enhanced. All teachers agreed that keeping students on-task (uninterrupted time spent on productive learning activities) and engaged in learning, with sufficient attention to meet their individual needs, goes a long way toward improving behavior. Statements made by parents, observations of the evaluator, and behavior records kept by the principal all support these findings. The reports on behavior are exclusively for in-class behavior and do not represent students’ behavior during recess, lunch, or on the bus before or after school.

The kids like the attention, even in the sixth-grade. One child came in new to the school very frustrated and withdrawn. While he still has trouble with academics, he participates and works hard. (Sixth-grade teacher)

Goal 7: Increasing the use of technology to enhance programs and provide enrichment opportunity

Computers are like a pencil to these students: another tool for learning.(First-grade teacher)

Teachers unanimously agreed in 1995-96 that technology had been integrated into the overall curriculum and provided abundant enrichment opportunities. As Site D ended its third year of immersion in technology, the skill and comfort level with computer use among the students and teachers were dramatically higher than in the 1993-94 school year. Several teachers had no prior experience with computers and, lacking familiarity, initially resisted using them for instruction. As the project progressed and staff development opportunities were made available, attitudes toward computers changed. Also, a weekly computer night, staffed voluntarily by a teacher and aide, provided parents the opportunity to familiarize themselves with the existing technology. Students, with their unreserved approach to technology, became pragmatic resources for staff as well as for newly enrolled students.

The following statements are samples of classroom teachers’ descriptions of their increased use of technology:

- My class has done electronic portfolios, HyperStudio, state research projects, and each made a tri-fold brochure for their state on HyperStudio. We have been integrating technology with every area of the curriculum using the lab and computers in the classroom. If there has been a positive change in the students’ attitude toward school, it’s been due to the use of technology. When we talk about a project, the kids can’t wait to be left alone to get going on it. (Fourth-grade teacher)

- It is an understatement to say “yes.” I was originally shy of the undertaking, but now I am so excited about it all. We can work on the programs and I am on the road to accomplishing so many things. The grant and technology helps me get over the feeling that I didn’t have to know it all before we got started. (Sixth-grade teacher)
• Opportunities for use in kindergarten are so varied; we use it more here than in other grades. I have 6 computers in my room, and I use them for language and math enrichment and reinforcement. Just knowing how to operate the computers gives the students tremendous confidence. At this age kids are either hesitant to use the computer or they are just going to hit at the keyboard and assume things will come out right. Here they learn specific features of the computer and how to log on, select fonts, and pull up their own disks. At this time of the year, spring, they may ask to go to the bathroom during computer time but not for help with the computer. (Kindergarten teacher)

• With the help of parent volunteers, the students are publishing the stories they write. They usually begin a story outline in the lab, and back in the classroom they begin the writing. These kids know how to navigate the technology; they have the language to figure it out and feel very comfortable with it all. For the kids coming in new to the school, I see a big difference in their approach to computers, but they catch up so fast when they help each other. The computer definitely augments the range of learning style in the classroom. (First-grade teacher)

• We have had invaluable technology training. Without our training the kids couldn’t do half of what they do. While some kids know far more than I know, the learning has a chain reaction, and the teacher is a critical part of it all. Here, the kids love the alpha smarts; they use them for notes, chapter reviews, and typing their own essays. It is just overwhelming. (Third-grade teacher)

• The classroom teacher has a very difficult time matching the needs of a broad range of students. With technology, the students who are advancing fast have the opportunity to extend themselves and go on. The students who are struggling to meet the criteria within the regular classroom, with inclusion as a model, have the opportunity to use the computer as a tool, especially when their fine motor ability is so poor. They can type their papers, and they look just as good as anybody else’s. In math, with mastery development, math fast track, and drill and practice, basic memorization of math facts have to be in place. The computer is a patient teacher who goes over and over these facts with the child, providing instant feedback and enough entertainment so they don’t get bored. (QUEST/technology specialist)

Goal 8: Training teachers in strategies for improving instruction

Staff Development

Staff development was an integral part of Site D’s strategy for improving student achievement, attitude, and behavior and for increasing parental involvement and participation in their children’s education. A comprehensive training component was in place for parents and teachers to increase and improve their understanding and implementation of changing educational practices.

The following is a sample of training sessions staff members at Site D participated in since the 1993-94 school year.

Introductory Training

• Total quality management
• Grant requirements
• Successful team building
• Technology (ClarisWorks)
• Technology (curriculum for computer labs)
• Language arts software, network programs, and CD-ROMS
• Language arts thematic and interdisciplinary integrated instruction
• Technology and mastery math
• Technology authentic assessment in language arts
• Language arts curriculum and software review
• Small group strategies
• Language arts literature circles and technology (CD-ROM)
• Technology (UACN, E-Mail, Internet)
District In-Service

- Technology: Preparing Young Americans for the 21st Century
- School Goals: Assessment techniques, collaboration, and technology
- Development of portfolio standards throughout the school
- Development of grade-level standards for word processing
- Electronic portfolio assessment

Teachers' In-Service training

- Language arts curriculum design
- Cooperative learning
- Reading, writing, and math integration
- Alaska reading conference
- Integrating technology into the curriculum
- Reading recovery
- Apple computers of tomorrow
- Technology integration
- Cooperative learning follow-up
- MECC software demonstration
- Peakview Elementary School in Colorado: an Education and Technology Model School
- Young children and literacy
- Early childhood education and motor development
- Technology planning
- Lego Dacto Technology workshop
- Visit to Idaho technology schools
- Electronic portfolio training
- Technology and Learning Conference in Atlanta
- Alaska State Math and Science Conference

Principal's In-service Training

- Total quality management
- Manager’s role as coach
- New schools of thought
- Rigorous and relevant curriculum
- Introductory and on-going training for Hyper Studio
- Alpha Smart training
- Technology tips provided by staff (on-going)
- Training on use of spreadsheets
- Skills for Excellence in-service
- Several teachers attended Alaska State Technology Conference. The principal and ‘technology specialist’ presented: One Solution—Three-Year Technology Plan
- Visual Math training for 4th through 6th-grade teachers
- All-day grant training with K-3 teachers
- Nancy Norman on math assessment
- Mary Laycock on math manipulatives for use in the classroom
- Intervention skills for at-risk students

Other District training opportunities

- NWREL Partnerships in Learning conference in Seattle
- NWREL Alternative Assessment workshop in Portland.
2. What instructional innovations in reading and mathematics did Site D use along with the class size reduction?

All classes in the project used a variety of teaching strategies throughout the day. Teaching strategies documented in weekly logs and observed by the evaluator included guided practice, team-teaching, computer-assisted instruction, cooperative learning, whole- and small-group instruction, peer tutoring, learning centers, and independent work. Teachers described the most significant changes made in the instructional strategies as accommodating various learning styles and integrating the curriculum across disciplines (for example, linking literature and reading to the social studies curriculum). Data collected from teachers’ weekly logs show the strategies teachers used and the percentage of weeks they used each strategy (Table 53).

Table 53. Site D Teachers’ Report of Instructional Strategies Used in the Classroom

<table>
<thead>
<tr>
<th>Instructional Strategy</th>
<th>Percent of weeks teachers reported the strategy used in the classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-directed Instruction.</td>
<td>An instructional method whereby the teacher provides the information that will enable the students to perform a task or meet an objective. 100%</td>
</tr>
<tr>
<td>Whole-group Instruction.</td>
<td>An arrangement whereby a class of students receives instruction by one teacher. 100%</td>
</tr>
<tr>
<td>Guided Practice.</td>
<td>An instructional method by which students attempt to perform tasks independently but where the teacher is available for immediate and direct feedback. This strategy is generally used for new tasks. 100%</td>
</tr>
<tr>
<td>Small-group Instruction.</td>
<td>An arrangement whereby students receive instruction in groups generally no larger than six. 100%</td>
</tr>
<tr>
<td>Individual Instruction.</td>
<td>An arrangement whereby a student receives instruction by a teacher and not as part of a class, e.g., instruction for a single person or a one-on-one teaching situation. 99%</td>
</tr>
<tr>
<td>Independent Work.</td>
<td>The process of acquiring new learning or new information on one’s own or under limited guidance of an instructor. 98%</td>
</tr>
<tr>
<td>Cooperative Learning.</td>
<td>An instructional method by which students cooperate in small teams to learn material that is initially presented by the teacher. Students take responsibility for their learning, for their teammate’s learning, and for classroom management by checking, monitoring, helping one another with problems, and encouraging one another to achieve. 95%</td>
</tr>
<tr>
<td>Computer-assisted Instruction.</td>
<td>Programmed instruction using an electronic computer as the principal medium of instruction. 98%</td>
</tr>
<tr>
<td>Learning Centers.</td>
<td>An arrangement where complete lessons are set up in various stations and small groups of children or individual students work at them. Centers can have adult supervision, direction provided by the teacher, or be self-explanatory. 45%</td>
</tr>
<tr>
<td>Peer Tutoring.</td>
<td>The practice of having students of the same or similar age assist with the instruction of other students who may need supplemental aid. 95%</td>
</tr>
</tbody>
</table>

3. What training in support of instructional innovation for the class size reduction program did the school provide to teachers, other staff members, and parents?

(Refer to Research Question 1)
Parent Training

Parent volunteer training was ongoing and extensive throughout the three years of the grant. A parent volunteer coordinator encouraged, trained, and recruited parents to assist in general school chores as well as to help teachers with small-group instruction. Teachers were in contact with parents through the PTA, phone calls, weekly newsletters, weekly parent computer nights, and many other school-related activities.

A sample of specific parent training sessions includes:

- **Technology training.** Computer training in Macintosh, System 7, and ClarisWorks
- **Monthly Preschooler Time.** An opportunity for all parents in the area to hear about a topic and for their preschoolers to enjoy movement, music, and books
- **Monthly parents’ training sessions sponsored by the PTA.** Sessions videotaped and stored in the parents’ resource room
- **Computer skills for parent volunteers.** Classes offered in the computer lab in conjunction with the local college and the school district
- **Parents as teachers.** Training parents in effective questioning skills for use with individuals and small groups, classroom dynamics, how to address certain types of behaviors, and how to help students and not hinder their learning

All parent training was provided at no cost to the school, except in the time donated by staff, parents, and community resource personnel. Informal training for lunchroom and library helpers was provided as needed to parents who volunteered after the start of the school year. Parents also could get training in office procedures, work room equipment use, and library procedures. All these training sessions include orientation to district policies, Site D practices, student confidentiality issues, emergency preparedness, and basic ethics.

4. What roles do parents, volunteers, tutors, and technology play in instruction?

*The perception here is that we are a team, and quality education takes coordination between home and school. We [parents] are not here to criticize but to support the teachers. We were lucky that this perception was already in place. In the classroom the teachers explain the purpose of what they are doing. This has always been a great part of what has gone on here at Site D. The school needs to make parents feel welcome to be here—being able to walk in and say "hello," and "may I help you," and someone would answer, "Oh, yes, come on in." They need to be relaxed with the parents and talk to us on our level.* (Parent volunteer)

Parents of students attending Site D were involved with the grant from the initial planning stage. They were kept informed of grant activities through routine and frequent home-school communication and through the PTA. Surveys were conducted at the end of each grant year to assess parents’ awareness of and involvement in the project, parents’ opinions about any improvements in the school program because of the grant, and parents’ perceptions about the school.

Table 54 shows the percentage of parents who were aware of the project components in 1995-96 and who felt the project had a positive impact on their children’s education. Eighty-eight percent reported the computer lab splits had a positive impact on their children’s education; 75 percent felt the parallel block scheduling had a positive effect; 70 percent felt volunteers had a positive impact. Sixty-seven percent reported assisting their children’s teachers with school activities.
Sixty-three percent of the parents responding to the survey had children attend Site D before the start of the grant. Of this group, 66 percent felt the program offered to their child was better because of the Elementary School Class Size Reduction Pilot Project and 30 percent were undecided (see Table 55).

Table 55. Site D Percent of Parents with Child in a Non-Grant Class During the 1993-94 School Year Who Feel the Program is Better Because of the Grant

<table>
<thead>
<tr>
<th>Percent</th>
<th>Yes</th>
<th>No</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>66%</td>
<td>1%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Number of parents responding = 87

Parents’ Perceptions About the School

Parents’ perceptions about Site D were positive in 1995-96. Ninety-four percent of respondents reported that their children enjoyed coming to school; 93 percent knew how their children were doing at school; 91 percent were pleased with the school’s effort to communicate with them; and 80 percent said the project had provided them with opportunities to get involved in their children’s education (Table 56).

Table 56. Site D Parents’ Perceptions About the School

<table>
<thead>
<tr>
<th>Perception</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child enjoys coming to school.</td>
<td>57%</td>
<td>37%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>The project has provided opportunities for me to get involved in my child’s education</td>
<td>39%</td>
<td>41%</td>
<td>16%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Changes to the school program, as a result of the project, have improved my child’s attitude toward school</td>
<td>35%</td>
<td>32%</td>
<td>25%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>I feel I know how my child is doing at school.</td>
<td>51%</td>
<td>42%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>I am pleased with the school’s communication efforts.</td>
<td>45%</td>
<td>46%</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Number of parents responding = 63
Parent Comments

The following is a representative list of parents' comments about the Elementary School Class Size Reduction Pilot Project:

Positive

• I would love to see the block scheduling and the computer labs continue. I feel the reduced class size has caused my children’s interest and enthusiasm in school to flourish.

• Keep computer labs and block scheduling if at all possible. These have had the greatest impact on my children’s education. As a direct result of the grant, they are excited about learning and love school.

• Site D was a great school before the project, but this project allowed the entire school to focus on reducing class size and become an even better school. As a result Site D isn’t just a great school, it’s an incredible one.

• The block scheduling was very beneficial because I saw, as a volunteer, how much more the smaller class size benefits the students. More one-on-one with the students and more personalized learning. It’s great!

• The staff here at Site D deserves a great applause—they all worked together to make this project work to its fullest potential.

• This program has provided my son’s teacher the opportunity to be much more cognizant of my son’s abilities, needs, and accomplishments. Small-group instruction has enhanced the learning process and his confidence level as well. While all components of this program have been beneficial, block scheduling and computers have been the most significant contributors.

Negative

• It works in some classes because they are smaller than others. I feel the class sizes are still big and some kids don’t get the help they need.

Mixed

• I think a lot of the volunteer work here is good, but there are some jobs that seem like they should be paid positions.

Volunteers

Parent volunteers are so important. They recognize that there has been work done to get them involved and to make them feel comfortable. They play an integral role in how the school is run and in the activities we undertake. We couldn’t do it without them. Overall, I think we are more comfortable taking risks because parents are involved in the decision making process. (Third-grade teacher)

Data collected from the teachers’ weekly logs showed an average of 3 parents or community volunteers spending 2 1/2 hours per week volunteering in the classrooms in 1995-96. This does not take into account special events where large numbers of parents were available for assistance in the classroom for longer periods of time but does include individual and small-group instruction in language arts, mathematics, and writing; forensics; tutoring; testing; reading to children and listening to them read; material preparation and general clerical work; computers; and general classroom supervision.

During the data collection period, volunteers overwhelmingly received a rating of excellent for the quality of their performance in the classroom.
Tutors

The special education tutors, including special service teachers and Chapter One aides, assisted the special needs children either in the classroom or in “pull out” situations, where they were removed from the classroom and taught in small groups with other special needs students. This extended use of resource personnel helped the classroom teachers reduce the PTR and assist special needs children in classrooms with their peers. The tutors were accountable to the regular classroom teacher and became involved in team teaching by working with regular as well as special education students. While they were able to assist with small-group instruction in the classroom, their main focus was attending to the students qualifying for the special services.

Technology

(Refer to Question 1, Goal 7)

5. How did the class size reduction and the instructional innovation affect measured language arts and mathematics achievement?

Comparative Data on Student Achievement

One of the principal goals of the Elementary School Class Size Reduction Pilot Project was to improve student learning in math and language arts. Since students presumably learn in virtually any school program, the relevant question is whether the rate of student learning under each school’s project was higher than it would have been had the project changes not been made.

We cannot know how much students in the Elementary School Class Size Reduction Pilot Project would have learned had they not been in a project classroom. Our best sources of comparison are students in other classrooms or other schools. Yet these students may benefit from other, unmeasured instructional innovations. Other students may also differ from project students in ways that cause them to learn at different rates, or they may begin their formal schooling at different levels of knowledge. Whatever comparison groups we use, then, will be imperfect. We think the best comparison group to use is that composed of other students in the United States. We wanted to see if students in the Elementary School Class Size Reduction Pilot Project improved their level of academic achievement over time, relative to other students in the United States.

To compare the academic achievement of project students with U.S. students, we used tests of achievement that are applied nationally for students in second through sixth grades and individually administered norm-referenced and diagnostic tests for students in kindergarten and first grade. The three tests used to determine academic achievement are:

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa Tests of Basic Skills (ITBS)</td>
<td>These multiple choice tests are the most widely used measures of academic achievement in math and language arts. It is possible to compare individual student scores with the distribution of scores nationally.</td>
</tr>
<tr>
<td>Peabody Picture Vocabulary Test (PPVT)</td>
<td>These individually administered norm-referenced tests are designed primarily to measure a subject’s receptive (hearing) vocabulary for Standard American English. The test provides an estimate of a student’s verbal ability, and in this sense it is an achievement test since it shows the extent of English vocabulary acquisition.</td>
</tr>
</tbody>
</table>
KeyMath

These are individually administered diagnostic inventories of essential mathematics designed to provide a comprehensive assessment of a student's understanding of basic concepts and application of mathematics. Basic concepts assesses the foundation of knowledge upon which all of elementary mathematics is based. Applications assesses the use of knowledge and computational skills.

The Iowa Tests of Basic Skills is a measure of student achievement. The major advantage of the Iowa Test of Basic Skills is that it is the most widely used measure of academic achievement in language arts and mathematics. With these multiple choice tests, it is possible to compare individual student's scores with the distribution of scores nationally.

The Peabody Picture Vocabulary Test (PPVT) and KeyMath assessments were selected by consensus of the project coordinators, the project evaluator, and the Department of Education. Both tests are regarded as appropriate for providing a general overview of primary students' academic achievement in language and mathematics.

To provide a baseline measure of student achievement, we worked with the school district to arrange for project students in grades 2-6 to take the Iowa Test of Basic Skills (Form K) in October 1993 and another version of the test in April 1994 and 1995 and Winter 1996. The producers of the test, Riverside Publishing, scored the results and provided data tapes for analysis. Students in kindergarten and first grades at Site D were given individually administered norm-referenced and diagnostic tests in the Fall of 1994 and Spring of 1995 and 1996. Classroom teachers administered and scored the tests and ISER performed the analysis of these test results.

The State of Alaska reports statewide and district testing results in terms of national percentile ranks. We used national percentile ranks and grade equivalent to measure the ITBS and KeyMath results of project students relative to all U.S. students. We used percentile rank as a measure of academic achievement for students taking the PPVT. We tracked the math and language arts achievement of individual students in each project school. An analysis of academic growth as measured by these tests for all students and for at-risk students, where numbers of students are sufficient, are analyzed separately. At-risk students are identified as having increased probability for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), or English as a Second Language. A description of these methods of reporting test results follows.

National Percentile Rank

Indicating the percentage of students taking the test nationally who scored lower on the test than the individual student.

Grade Equivalent

Indicating the year and month of schooling of students nationally that corresponds with the student's test performance. By comparing the student's actual grade level (e.g. 4.2 years) with the grade equivalent (e.g. 4.6 years) it is possible to tell if the student is learning at a faster, or slower, or similar rate as students in the U.S. as a whole.

Test results should be interpreted with caution. The period of time between administration of pre- and post-tests for the KeyMath and PPVT was 18 months and for the ITBS 28 months—relatively short periods on which to base conclusions about the impact of the project.

All students in kindergarten through sixth grade at Site D participated in the Elementary School Class Size Reduction Pilot Project. Students in kindergarten and first grade were tested using PPVT and KeyMath assessments in Fall 1994, Spring 1995. These same cohorts were given the ITBS in the
Spring of 1996—so we have no comparative data for this group for this test. Students in grades 2, 3, and 5 were tested using the ITBS in Fall 1993, Spring 1994, Spring 1995, and Winter 1996. Students in grade four were tested in Fall 1993, Spring 1995, and Winter 1996. Fourth grade cohorts were not tested in Spring 1994 because they took a state-administered test instead of a project assessment. Students in grade six were not tested because they also took a state-administered test in Spring 1994 and were no longer attending Site D in Spring 1995.

National percentile rank, an average for students taking the test nationally, increased for kindergarten students in basic concepts and decreased in applications. Percentile rank for first grade students increased in both areas. (See Table 57.)

<table>
<thead>
<tr>
<th>KeyMath</th>
<th>NATIONAL PERCENTILE</th>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Basic Concepts</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Site D</td>
<td>K</td>
<td>48</td>
<td>55</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>54</td>
<td>61</td>
<td>78</td>
</tr>
</tbody>
</table>

Table 58 shows the national percentile rank for at-risk students in kindergarten and first grade at Site D. Results show an increase in basic concepts for kindergarten students and an increase in basic concepts and applications for first grade students.

Students at Site D demonstrated an increase in grade equivalent from Fall 1994 to Spring 1995. The mean change for kindergarten students in basic concepts was eight months and for applications it was six months. The mean change for first grade students in the areas of basic concepts and applications was nine months. (See Table 59.)

<table>
<thead>
<tr>
<th>KeyMath</th>
<th>GRADE EQUIVALENT</th>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Basic Concepts</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Site D</td>
<td>K</td>
<td>36</td>
<td>.4</td>
<td>.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>45</td>
<td>1.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Table 60 shows an increase in grade equivalent of eight months on basic concepts and six months on applications for at-risk students.

<table>
<thead>
<tr>
<th>School</th>
<th>No. Students Tested</th>
<th>Basic Concepts Mean Change</th>
<th>Applications Mean Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>31</td>
<td>.8</td>
<td>.6</td>
</tr>
</tbody>
</table>

Table 61 shows the national percentile rank of PPVT test results for kindergarten and first grade students. Results show the percentile rank increased for both grades.

<table>
<thead>
<tr>
<th>PPVT School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall 94</th>
<th>Spring 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>K</td>
<td>47</td>
<td>48</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>52</td>
<td>53</td>
<td>59</td>
</tr>
</tbody>
</table>

At-risk students in kindergarten and first grade demonstrated an increase in national percentile rank. (See Table 62.)

<table>
<thead>
<tr>
<th>PPVT School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>PERCENTILE RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>K</td>
<td>25</td>
<td>28 Fall 94</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>17</td>
<td>28 Spring 95</td>
</tr>
</tbody>
</table>

On average, national percentile rank for the second, third and fourth grade cohorts increased in all areas from Fall 1993 to Winter 1996. The fourth grade cohort increased 20 points in math, 25 points in reading and 28 points in language arts. (See Table 63.)

<table>
<thead>
<tr>
<th>ITBS School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Spring '95</th>
<th>Winter '95</th>
<th>Fall '93</th>
<th>Spring '95</th>
<th>Winter '95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>2</td>
<td>32</td>
<td>71</td>
<td>76</td>
<td>54</td>
<td>67</td>
<td>58</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>56</td>
<td>67</td>
<td>55</td>
<td>73</td>
<td>47</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>38</td>
<td>65</td>
<td>85</td>
<td>51</td>
<td>76</td>
<td>44</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>32</td>
<td>53</td>
<td>70</td>
<td>52</td>
<td>62</td>
<td>47</td>
<td>65</td>
</tr>
</tbody>
</table>
Table 64 shows the national percentile rank of at-risk students for all students at Site D. On average, the national percentile rank from Fall 1993 to Winter 1996 increased 21 points in math and language arts and 12 points in reading.

**Table 64. Site D ITBS National Percentile At-Risk Students**

<table>
<thead>
<tr>
<th>School</th>
<th>No. Students Tested</th>
<th>Fall 93</th>
<th>Winter 96</th>
<th>Fall 93</th>
<th>Winter 96</th>
<th>Fall 93</th>
<th>Winter 96</th>
<th>Fall 93</th>
<th>Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>24</td>
<td>39</td>
<td>60</td>
<td>29</td>
<td>41</td>
<td>29</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students at Site D demonstrated an increase in math grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort, was three years, six months; the third grade cohort, three years, two months; and the fourth grade cohort, three years, one month. (See Table 65.)

**Table 65. Site D ITBS Grade Equivalent Mean Change All Students Math**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Spring '95</th>
<th>Winter '96</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>2</td>
<td>32</td>
<td>2.7</td>
<td>5.9</td>
<td></td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>3.5</td>
<td>6.6</td>
<td></td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>38</td>
<td>4.9</td>
<td>9.6</td>
<td></td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>32</td>
<td>5.6</td>
<td>8.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students at Site D demonstrated an increase in reading grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort was two years, nine months; the third grade cohort, three years, four months; and the fourth grade cohort, three years, nine months. (See Table 66.)

**Table 66. Site D ITBS Grade Equivalent Mean Change All Students Reading**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Spring '95</th>
<th>Winter '96</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>2</td>
<td>32</td>
<td>2.7</td>
<td>5.5</td>
<td>3.4</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>3.6</td>
<td>7.0</td>
<td>3.4</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>38</td>
<td>4.4</td>
<td>8.5</td>
<td>3.1</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>32</td>
<td>5.6</td>
<td>7.6</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students at Site D demonstrated an increase in language arts grade equivalent. The mean change from Fall 1993 to Winter 1996 for the second grade cohort, was two years, nine months; third grade cohort, three years, six months; and the fourth grade cohort, four years, seven months. (See Table 67.)

**Table 67. Site D ITBS Grade Equivalent Mean Change All Students Language Arts**

<table>
<thead>
<tr>
<th>School</th>
<th>Grade Cohort</th>
<th>No. Students Tested</th>
<th>Fall '93</th>
<th>Spring '95</th>
<th>Winter '96</th>
<th>Mean Change Fall 93-Spring 95</th>
<th>Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>2</td>
<td>32</td>
<td>2.5</td>
<td>5.3</td>
<td>2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>34</td>
<td>3.4</td>
<td>7.0</td>
<td>3.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>38</td>
<td>4.1</td>
<td>8.9</td>
<td>4.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>32</td>
<td>5.4</td>
<td>8.5</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At-risk students at Site D showed an average increase in grade equivalent. The mean change from Fall 1993 to Winter 1996 in math was three years, one month; in reading, two years, four months; and in language arts, two years, nine months.

### Table 68. Site D ITBS Grade Equivalent Mean Change At-Risk Students

<table>
<thead>
<tr>
<th>School</th>
<th>No. Students Tested</th>
<th>Math Mean Change Fall 93-Winter 96</th>
<th>Reading Mean Change Fall 93-Winter 96</th>
<th>Language Arts Mean Change Fall 93-Winter 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site D</td>
<td>24</td>
<td>3.1</td>
<td>2.4</td>
<td>2.9</td>
</tr>
</tbody>
</table>

6. **How are parent involvement, teacher satisfaction, and student attendance affected by the class size reduction and associated innovations?**

**Parent Involvement:** (Refer to Research Question 4)

**Teacher Satisfaction and Student Attendance:** (Refer to Research Question 1, Goals 5 and 6)

7. **How can this project be replicated at other elementary sites?**

The following statements are recommendations from parents, teachers, and support personnel to elementary schools considering implementing strategies that allow for periods of reduced pupil-teacher ratio without significantly adding to the cost of education:

- Technology works to individualize and improve instruction, but a school must make a long-term commitment supported by sufficient funds for equipment, training, and maintenance.
- Invest in quality technology training and invite parents to participate in the training.
- Let loose of traditional teaching practices. Encourage and support teacher interaction within the school, within the district, and at other schools working toward implementing innovative instructional practices.
- In order to let go of traditional teaching practices, teachers need to see new methods in action. They should visit schools, observe in classrooms, and talk to teachers about how they worked through their changes.
- Use specialists in the classroom at the primary level (resource personnel, music teacher, librarian etc.).
- Make a long-term commitment to change.
- Look closely at parallel block scheduling; this idea alone is terrific and the small-group time is invaluable.
- Implement varied grouping in the classroom environment.
- Use study buddies (older students working with younger students); this works great for both age groups.
- The role of the principal is critical. If the principal is not an instructional leader in authority and academics and well-respected, any change will be difficult.
AT-RISK STUDENTS

Nearly 37 percent of the students attending Site D (an average of 11 students per class) were identified in 1995-96 as at-risk for school failure or learning problems by reason of socio-economic factors (qualify for free or reduced-price lunch), special education certification, Chapter One (remedial services in reading and mathematics), and English as a Second Language.

Teachers reported students experiencing the feeling of success as opposed to failure when provided prompt and frequent assistance with their lessons. They said that when students in the primary-grades are provided the helping hand necessary to keep them focused and confident, they are better able to learn. Older students, particularly those lacking in self-esteem and unsure of their abilities, were described as feeling more comfortable in small classes. However, teachers reported that students with severe learning and behavioral problems continued to disrupt the class regardless of the size. The following represents a sample of teachers’ observations of project impact on their at-risk students.

- During reduced class size time I am able to work independently with a child who is learning to build confidence in his abilities to write creatively and read. Due to this one-on-one situation, he is becoming more independent in his work habits.
- Small groups are good for [this student]. He needs one-on-one attention to help him with reading and writing. In larger groups he sometimes wanders off and doesn’t finish assignments. In smaller groups he gets help when he needs it and stays on task better.
- I believe that without the changes resulting from the grant, I wouldn’t be able to modify the program as much as I do now. We modify in reading (6 groups) and spelling, daily oral language (DOL), and Math (4 groups).
- I have noticed a big difference in full classes compared to half the class, especially with behavior problems and staying on-task. It is so much easier for students who are easily distracted to stay on task in small groups. This really shows in my math classes, where I’m seeing lots of progress.
- I was able to join a small group of students for a math activity as a member and participant right along with the students. This helped the at-risk students stay on task, others to work independently, and me to build positive rapport. The other teams were actively involved in the same math lesson and didn’t require any assistance or monitoring. At-risk students and I had fun together.
- We use manipulatives for introducing, reinforcing, and/or clarifying math concepts. I am able to work one-on-one with students in small groups. I wouldn’t even bring out math manipulatives with a whole group. I spent 20 minutes with a needy student during one of my split times. With the extra help, he advanced through months of math.

PROJECT AND STRATEGY COSTS

Introduction

The purpose of the Elementary School Class Size Reduction Pilot Project was to assess the effectiveness of reduced class size, combined with other teaching interventions, on student achievement and attitude, school discipline, and parent involvement. Each participating school was granted $197,600 per school year to develop and implement strategies towards accomplishing these goals. A simple cost analysis provides information on (1) the project’s overall costs per classroom; (2) the approximate cost of implementing each strategy; and (3) a description of how project funds were spent.
Project Cost

Site D extended the Class Size Reduction Project to 13 classrooms, affecting 315 students annually. The cost of the project over the three years was as follows:

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Cost</th>
<th>Number of Classrooms</th>
<th>Cost per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$197,600</td>
<td>13</td>
<td>$15,200</td>
</tr>
<tr>
<td>1995</td>
<td>$197,600</td>
<td>13</td>
<td>$15,200</td>
</tr>
<tr>
<td>1996</td>
<td>$197,600</td>
<td>13</td>
<td>$15,200</td>
</tr>
</tbody>
</table>

Strategy Costs

Site D employed six strategies—additional personnel, staff development, parallel block scheduling, technology, overlapping extended day program, and parent volunteer training program—to reduce class size and improve education. These strategies were described in detail in previous sections of this report and are summarized below:

- **Additional Personnel**: In order to reduce class size to no more than 30 students, an additional teacher was hired.
- **Staff Development**: Site D also devoted time and resources towards additional professional training for teachers.
- **Parallel Block Scheduling**: Site D combined parallel block scheduling with flexible staff allocation to allow for small group instruction. Parallel block scheduling is a scheduling technique that divides a single class into two halves. One half of the class would be sent out for specialized instruction in physical education, music, or computers; the other half remained for intensified small-group instruction. At the end of the period, the two halves of the class would exchange places. Flexible staff allocation allowed some teachers to play dual roles, which provided classroom teachers the opportunity to use additional staff to reduce pupil-teacher ratios.
- **Technology**: Site D integrated the use of technology into the curriculum to enhance learning and provide opportunities for small-group instruction.
- **Overlapping Extended Day Program**: Site D used this program, which schedules the kindergarten classes into two overlapping shifts, to reduce pupil-teacher ratios.
- **Parent and Community Volunteering**: Site D recruited and trained volunteers to assist teachers with educational activities.

Figure 15 on the following page displays the annual cost per classroom of implementing these strategies. Note that only the first four strategies—additional personnel, staff development, parallel block scheduling, and technology—had implementation costs.
It should be noted that strategy implementation costs will vary from school to school, depending on the following variable-cost items:

- Teacher and other personnel salary and benefit costs may differ depending on the experience of the individuals on staff.
- Site D had to add personnel in order to meet the pupil-teacher ratio mandated by the grant, because it had classes with over 30 students. If a school does not have classes with more than 30 students, this strategy would not be necessary.
- Site D’s staff donated to the school the extra time involved in establishing and maintaining the volunteer program. In addition, Site D provided on-site day care to parent volunteers. Consequently, the Parent and Community Volunteer strategy has the potential to add more costs to another school’s budget than it did for Site D.

### Cost Analysis Description

Project and strategy costs were approximated using Site D’s fiscal year project budgets. The cost analysis was conducted in two phases. Phase 1 determined the purpose behind each budget expenditure. Phase 2 matched the purpose with the strategy in order to determine the approximate cost of implementing each strategy.

#### Phase One

First, each budget line item was classified as to the type of expenditure it represented. In pursuing its strategies to reduce class size and improve education, Site D spent its project funds in four ways:

1. Hiring more staff, referred to as "additional personnel;"
2. Training staff, referred to as "staff development;"
3. Recruiting and organizing volunteers, referred to as "volunteers;"
4. Purchasing computer equipment, referred to as "technology."

An approximate breakdown of the amount of project funds spent for each of these purposes is provided in Figure 16 on the following page.
In calculating this breakdown, we assumed that since hiring more staff, providing additional staff training, recruiting volunteers, or purchasing technology all have administrative costs in addition to the actual budget item cost, budget items representing general overhead or administrative costs, such as “administration/clerical” and “classroom materials and supplies” should be apportioned among additional personnel, staff development, volunteers, and technology according to their percent share of the total budget. For example, in FY1994 Site D spent 27% of its project funds on adding personnel, 10% on staff development, 0% on recruiting and training volunteers, and 63% on purchasing technological equipment. Consequently, 27% of the line item “support staff” was charged to additional personnel, 10% to staff development, 0% to volunteers, and 63% to technology.

**Phase Two**

Once the purpose of each expenditure was determined it was then possible to match an expenditure to a particular strategy. The additional personnel strategy included all expenditures under additional personnel. The staff development strategy included all expenditures under staff development. The parallel block scheduling strategy included the costs of hiring aides. The technology strategy included all expenditures under technology. The Overlapping Extended Day Program strategy was implemented at no cost to the project. Finally, the parent volunteer training program strategy also was implemented at no cost to the project.

**COST-BENEFIT SUMMARY**

The study looked at the mean change in grade equivalent for cohorts of students who participated in the pilot program all three years. Grade equivalence indicates the amount of learning achieved by students as compared to the national average, given in year and month increments. For example, a grade equivalent change of 1.8 means a scholastic achievement equal to one year and eight months of schooling on a national average. This grade equivalent is then compared to the actual length of schooling undergone by each student. For example, if a grade equivalent change of 1.8 (one year and eight months) occurred over a time period of 1.6 (one year and six months), this indicates achieved student learning above the national average. If the change in grade equivalent occurred over a time period of 1.9 (one year and nine months), this would indicate achieved student learning below the
national average. Finally, if a 1.8 change in grade equivalent occurred over a time period of 1.8, this indicates achieved student learning equal to the national average.

The study then compared the mean change in grade equivalent on the Iowa Tests of Basic Skills (ITBS) to the project’s estimated mean program cost per classroom. The following tables display the mean change in grade equivalent in mathematics, reading, and language arts for a second, third, and fourth grade cohort, who participated in Site D’s Elementary Class Size Reduction Pilot Project from Fall 1993 to Winter 1996.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Time Period</th>
<th>Grade Equivalent</th>
<th>Number of Classrooms in Project</th>
<th>Mean Program Cost Per Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>2.4</td>
<td>3.6</td>
<td>13</td>
<td>$8,249</td>
</tr>
<tr>
<td>Reading</td>
<td>2.4</td>
<td>2.9</td>
<td>13</td>
<td>$8,249</td>
</tr>
<tr>
<td>Language Arts</td>
<td>2.4</td>
<td>2.9</td>
<td>13</td>
<td>$8,249</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Discipline</th>
<th>Time Period</th>
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<th>Number of Classrooms in Project</th>
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</tr>
</thead>
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<tr>
<td>Reading</td>
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<td>3.4</td>
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<td>$8,249</td>
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<tr>
<td>Language Arts</td>
<td>2.4</td>
<td>2.6</td>
<td>13</td>
<td>$8,249</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Discipline</th>
<th>Time Period</th>
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</tr>
</thead>
<tbody>
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<tr>
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<tr>
<td>Language Arts</td>
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<td>4.7</td>
<td>13</td>
<td>$8,249</td>
</tr>
</tbody>
</table>

**Estimated Mean Program Cost per Classroom**

Site D’s mean program cost per classroom was estimated by (1) differentiating program costs from project costs, and (2) allocating capital expenditure costs over the use-life of the investment. The purpose of differentiating between program and project costs was to identify ongoing costs, or costs that will continue to be present as the program continues, from startup or grant imposed costs. Program costs were defined as those costs necessary to the ongoing operation of Site D’s Class Size Reduction Project. Under this definition, items such as administrative costs imposed by the grant or startup costs associated with designing the program were not included in calculating the annual program cost. Second, capital expenditures, such as purchasing computers, were spread out over the use-life of the investment in order to avoid overestimating annual program costs.

We made the following assumptions in calculating the mean program cost per classroom for Site D:

- Both a full-time technology aide and a part-time technology coordinator were hired to establish the program. Site D stated that once the program had become established only $25,000 would be needed to fund needed technology site support.
• An estimated 75% of teacher training expenditures were used to startup the program. Once the program was established only 25% of these funds would be required. Therefore, teacher training was calculated at a 25% rate.

• Administration/clerical expenditures were used to perform grant administrative tasks and therefore were considered project and program costs.

• During the first two fiscal years specialized and/or interactive teaching aids were purchased. They were considered startup expenses. Therefore, the expenditures for supplies during the last fiscal year was used in calculating annual program supply costs.

• Capital equipment purchases (computer purchases) were assumed to have a use-life of eight years.

**SUMMARY**

Site D successfully implemented all of its proposed strategies and met all of its goals under the *Elementary School Class Size Reduction Pilot Project*. End-of-the-year evaluations and interviews with parents, teachers, and students reported increased academic achievement, improved attitude and behavior, teacher innovation, and parent involvement. The most significant features at Site D were parallel block scheduling and increased technology. Teacher innovation followed in importance as the periods of reduced class size and staff development provided the critical supports to successfully implement changes in teaching and learning.

The extensive involvement of staff and parents at every stage of the grant, starting from the development of a vision for the school improvement plan to the numerous committees set up to deal with conflicts and controversies, assured a shared ownership and responsibility for project outcomes. Teachers credit the instructional leadership from the principal and the increase in professional interactions with staff as significant contributors to overall satisfaction with the project.

Some concerns reported throughout the three years of the grant included increased length of the school day for teachers, increased amount of planning time and general paperwork, a lack of flexibility in daily class schedules, and the community perception of disproportionate funding among district schools. These concerns were secondary in comparison to the benefits teachers and parents observed over the three years of the grant, including increased computer literacy for parents, teachers, and students; occasions to debate and review educational practices; decrease in discipline problems in the classroom; improved creativity and collaboration; and opportunities to get to know parents and students on a more personal level.

Communication and documentation of the grant implementation at Site D have been extensive, with all teachers reporting “thinking logs” to the principal. These logs described the impact and outcomes of changes in their classrooms. The reports, summarized and distributed weekly among all faculty and staff, served to bond the participants, encourage self-evaluation, and improve the grant to better meet individual and group needs.

The staff at Site D successfully met their initial class size goals. They are proud of their accomplishments and, with the support of the community and parents, are working to make the transition to pre-grant funding and redistribute existing resources to maintain some of the more critical and cost-effective approaches to improving instruction.