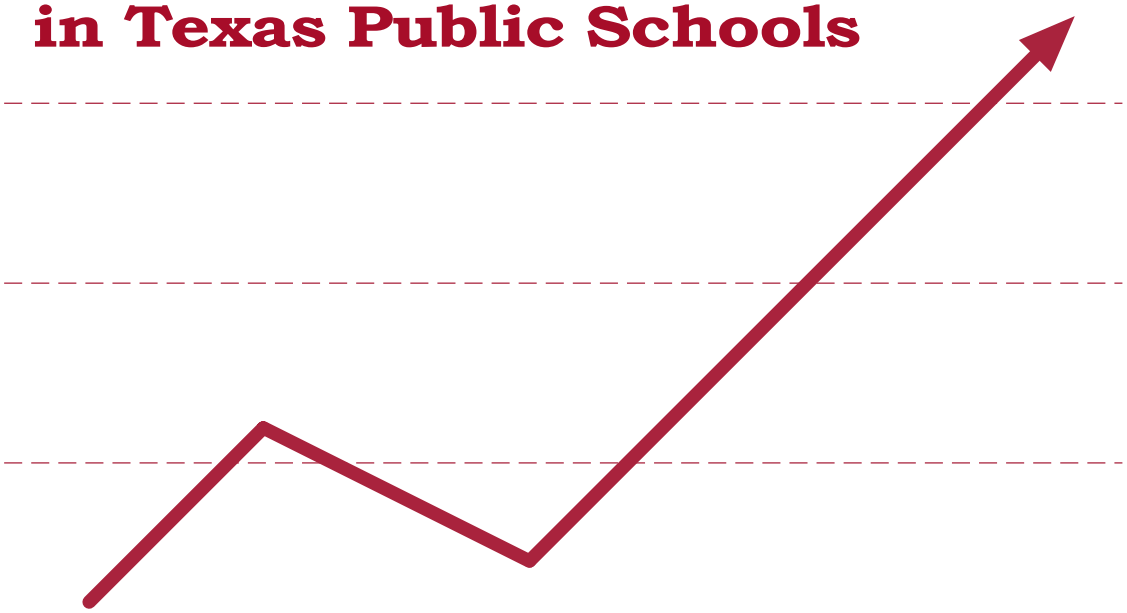
A Longitudinal Study of Primary School Classrooms and Grade 3 Performance in Texas Public Schools



STATEWIDE TEXAS EDUCATIONAL PROGRESS STUDY

REPORT NO. 6B DECEMBER 1999

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Abstract. Student performance in Grade 3 was evaluated based on instructional practices, classroom materials, and computer use in Grades 1 and 3. This longitudinal study of primary education in Texas was initiated in the 1995-96 school year, when data were collected from first-grade teachers. Teachers provided information not only on teaching practices and materials, but also on student preparedness and mastery of the curriculum in core subject areas. The survey was repeated, for the same students, with third-grade teachers in 1997-98, and supplemented with annual data available in the Public Education Information Management System and student performance data on a standardized, state-wide performance test.

Almost all first- and third-grade teachers were found to be using a variety of developmentally appropriate instructional practices in their classrooms. The teachers reported that the instructional materials available to them provided very good coverage of state-mandated curriculum elements. More than 80 percent of primary-age students were using computers once a week. Differences in student performance were not strongly associated with any of these factors, perhaps because so few differences in the factors themselves were found.

The student performance measures, based on teacher assessment and standardized testing, were highly correlated with one another. Student performance was strongly related to student *readiness to learn* and self-help skills. In some cases, poorer student performance appeared to be associated with the absence of relatively specialized instructional materials.

Keywords. *elementary education, teaching methods, elementary teachers, third grade, first grade, student achievement*

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A Longitudinal Study of Primary School Classrooms and Grade 3 Performance in Texas Public Schools

Statewide Texas Educational Progress Study

Report No. 6B **December 1999**

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Highlights

- ➢ Student performance in Grade 3 was strongly associated with *readiness to begin* Grades 1 and 3 and the demonstration of self-help skills in both grades.

- ➢ Almost all first- and third-grade teachers were using instructional practices that encourage learning and support the acquisition of academic skills by young children.

- ➢ Making adjustments in teaching style to match learning styles in Grade 3 classrooms was associated with improved mastery of the Essential Elements and better performance on the Texas Assessment of Academic Skills tests in Grade 3.

- ➢ The majority of first- and third-grade teachers reported that classroom materials adequately addressed the Essential Elements and were developmentally and culturally appropriate.

- ➢ Shortages of multicultural, multimedia and below-grade-level materials, as well as materials in languages other than English, were associated with poorer student performance in language arts, science, and social studies.

- ➢ The use of computers in Grade 3 to search for information and write paragraphs and stories was associated with improved performance in the language arts.

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Executive Summary

Systemwide Elementary Reform Project

The Systemwide Elementary Reform (SER) project is a series of studies begun with a group of first graders and their teachers in the 1995-96 school year. *Grade 3 Classrooms and Student Performance in Texas Public Schools* profiled third graders and their teachers and classrooms in 1997-98. In this report, student performance in Grade 3 was evaluated based on instructional practices, classroom materials, and computer use in Grades 1 and 3.

Readiness to Begin

Performance in Grade 3 was strongly associated with *readiness to begin* in Grades 1 and 3 and with frequent demonstration of self-help skills by students in Grades 1 and 3. Far fewer students judged *not ready to begin* mastered *most* or *all* of the Essential Elements in language arts, mathematics, science, and social studies in both Grades 1 and 3 than did students judged *ready to begin*. Students assessed *not ready to begin* when they started first grade could, with quality instruction in Grades 1 and 2, be ready for the academic demands of Grade 3 and perform well on the Grade 3 TAAS tests. The results highlight the role of primary grade teachers, trained in how young children learn, in helping students develop the readiness skills they need. In addition, high-quality preschool instruction can help students develop readiness skills.

Instructional Practices

Based on our sample of teachers, almost all primary school teachers in Texas were using instructional practices recommended for elementary education. At least once a week, the teachers appeared to be using a variety of instructional techniques, approaches to grouping students, and supplemental activities and materials such as learning centers, enrichment activities, and manipulatives.

Teachers' assessments of how well their students had mastered the Essential Elements of the mathematics and language arts curricula were strongly correlated with student scores on the standardized Texas Assessment of Academic Skills (TAAS) tests.

More Grade 1 than Grade 3 teachers reported using basal readers on a weekly basis. By Grade 3, teachers were using learning centers somewhat less often and fewer hands-on materials in language arts and social studies than in Grade 1. This could have been a reflection of the students' developing ability to use print and lecture-based materials. Alternatively, there may have been fewer suitable, hands-on curricula available for these subjects at the upper primary grades.

Grade 3 teachers were nearly twice as likely as Grade 1 teachers to group students for in-class, team teaching. Grouping for in-class, team teaching is most often used when special teachers enter the regular classroom to provide services for gifted/talented, Title I, or special education students. By Grade 3, more students had been identified for these services than in Grade 1. Extra instructional assistance and in-class, team teaching were associated with lower performance on the TAAS and Essential Elements indicators in language arts, mathematics, and science. This suggests that students who were having difficulties had been identified and were receiving assistance. We could not evaluate the effectiveness of assistance because we did not know how the children would have performed in its absence.

In each of the four core subject areas, infrequent adjustment of teaching style to match students' learning styles was associated with lower mastery of the Essential Elements. Nevertheless, switching modalities biweekly or less occurred in only four percent of the classrooms.

Our results were in agreement with Grouws and Ceballa's (1999) finding that the frequency of mathematics homework was positively associated with higher mathematics scores.

Instructional Materials

The majority of teachers in both the first and third grades reported that the instructional materials provided very good coverage of the Essential Elements. In addition, the majority of first-grade and third-grade teachers reported using manipulatives for science and mathematics. Few teachers in either grade reported lacking Spanish-language or other-language materials, and the majority of teachers at both grades reported materials to be developmentally and culturally appropriate.

About half of the Grade 1 classrooms lacked the above-grade-level, below-grade-level, multimedia, and multicultural materials they needed. In third grade, the lack of these materials was less acute. This may have reflected the greater variation in needs of children entering first grade.

Our results confirmed the importance of developmentally appropriate materials. Materials shortages were associated with lower student performance on four out of six indicators, namely, TAAS reading and mastery of the Essential Elements in language arts, social studies, and science. This relationship did not appear for mathematics, indicating that the development and/or dissemination of appropriate materials was more pressing in other subject areas.

Almost all teachers were using computers during instruction. Many first- and third-grade students used computers to solve mathematics problems and for drill and practice. Few students used the computer to solve scientific problems. In general, the use of computers was similar in Grades 1 and 3. However, more Grade 1 than Grade 3 students used computers for an accelerated reading program or to search for information. More Grade 3 students used computers to write paragraphs and stories.

Students from Grade 1 classrooms that did not regularly use computers to search for information tended to have lower TAAS reading scores. Not using computers to write paragraphs and stories in Grade 1 was associated with lower levels of mastery of the language arts Essential Elements. These results were consistent with Squire (1999), who reported that students who were more frequently engaged in interactive learning processes in language arts had higher achievement scores than students receiving passive instruction. Our findings also supported the notion that reading is not a solitary process, but rather, involves language and literature-rich activities, explicit teaching of skills to develop fluency with print, and writing.

Conclusions

Campus and district administrators can contribute to student performance by ensuring that teachers have the appropriate instructional materials for the students in their classes. There may be a need to develop quality materials for upper-primary language arts, science, and social studies curricula that are culturally-, linguistically-, and age-appropriate.

The relationships between self-help skills and performance on the TAAS and the mastery of the Essential Elements highlight the need for high-quality preschool, prekindergarten, and kindergarten experiences.

Self-help and readiness skills should be taught and reinforced. The quality of preschool programs, prekindergarten, kindergarten, and primary programs should continue to be evaluated to ensure the developmental and cultural appropriateness of what is offered. Without developmentally appropriate, primary programs for young children, the benefits of high-quality preschool programs can be lost very quickly (SREB, 1994).

There is also a continuing need for professional development for primary-school teachers in areas such as developmentally- and culturally-appropriate practices, matching teaching practices to learners' styles, working with students in English-as-a-second-language programs, and development of appropriate curriculum materials.

INTRODUCTION

"The primary grades hold the potential for starting children on a course of lifelong learning" (Bredekamp, 1987). From a developmental perspective, early childhood, ages three through eight, is qualitatively different from later school years and adulthood. Children display different learning styles and progress at quite different rates. Instructional practices and methods of assessing student performance suitable for young children differ from those for their older counterparts. This means, in turn, that methods for evaluating the performance of primary education differ from those for evaluating higher grades.

In 1995, the Texas Education Agency (TEA) initiated the Statewide Texas Educational Progress Study (STEPS) for monitoring statewide, educational progress over time. STEPS emphasizes grade levels with the most comparable student performance data, namely, Grades 4 through 12. Recognizing the importance and distinctive characteristics of primary education, the Systemwide Elementary Reform (SER) project was implemented to supplement STEPS by covering the primary grades. The SER project aims to enhance understanding of public education in Texas by establishing demographic, program participation, and performance trends; monitoring the effects of policy changes on those trends; and modeling the relationships between context, processes, and results.

The SER series (see box on page 6) includes studies begun with a group of first graders and their teachers in the 1995-96 school year. This report follows those first graders through third grade. The focus is on instructional practices and materials in first and third grade classrooms, and student performance at the end of third grade. A companion report focuses on student characteristics, instructional practices, and student performance in third grade.

How were these students doing? Were they *ready to begin* third grade? How well were their classrooms equipped? Did they work in small groups, large groups, and one-to-one with the teacher? Had they mastered third-grade reading and mathemathics skills by the end of the year? These and other questions are addressed in these two companion reports.

Reports in the SER Series

First Steps in School: An Examination of Grade 1 in Texas Public Schools – Summary Report, Report No. 4, August 1997

First Steps in School: An Examination of Grade 1 in Texas Public Schools – Technical Report, Report No. 4A, August 1997

Systemwide Elementary Reform (SER) Grade 2 Interim Report, Report No. 5, August 1997

Grade 3 Classrooms and Student Performance in Texas Public Schools, Report No. 6A, December 1999

A Longitudinal Study of Primary School Classrooms and Grade 3 Performance in Texas Public Schools, Report No. 6B, December 1999

Other Reports in the STEPS Series

The Development of Accountability Systems Nationwide and in Texas, Report No. 1, April 1996

Case Studies of Successful Campuses: Responses to a High-Stakes State Accountability System, Report No. 2, May 1996

A Study of Student Mobility in Texas Public Schools, Report No. 3, March 1997

LITERATURE REVIEW

Early Childhood Development

Child development experts view growth and development between the ages of three and eight years of age as a continuum (Bredekamp, 1987). The sequence of developmental stages during this period is uniform, but the pace of development is highly variable. A group of children of the same age will likely be in different stages of development.

Students who start the primary grades ready to learn are much more likely to be successful in school. General readiness includes social maturity (interacting positively with other children) and emotional maturity (having a conscience and self-control); the ability to communicate needs, wants, and thoughts verbally in one's primary language; enthusiasm about new activities; the ability to help oneself (asking a question when one doesn't know what to do); and a positive attitude towards learning (TEA, 1997).

Instructional Practices

Appropriate practice

Instructional practices and assessment in primary school must take into account the uneven preparedness, differential rates of development, and distinctive learning styles of children between the ages of three and eight (see Figure 1 on page 8). The best instructional practices depend on the developmental stage of the child, rather than age. Effective practices accommodate children's varied learning styles and rates of development. Although specific instructional practices depend on the learning style and developmental stage of the child, some general principles of instructional practice have been proposed for this age group. These practices may also be applied in quality preschool programs to aid children in developing school readiness.

Learning Styles

Part of developmentally-appropriate instruction includes providing instruction to students in ways that match their learning styles (Dunn & Dunn, 1992). Visual learners, estimated to be 40 percent of primary age children, may respond best to free reading or silent reading; auditory learners, estimated to be 20 percent of primary age children, may respond best to songs or oral reading; and tactile, or kinesthetic, learners, estimated to be 40 percent of primary age children, may respond best to writing or puppetry (McIllwain, 1994). If, for example, instruction is oriented to visual learning experiences, nearly 60 percent of the students are not being reached. Instruction not tailored to learning style can lead to poor performance. According to McIllwain, 88 percent of all dropouts were kinesthetic learners.

Figure 1. Principles of Appropriate Practice for Primary-Age Children

- Teachers of young children must always be cognizant of "the whole child."
- The curriculum should be integrated throughout the primary grades.
- Children in the primary grades should be engaged in active rather than passive activities.
- The curriculum must provide many developmentally-appropriate materials for children to explore and think about, and opportunities for interaction and communication with other children and adults.
- The content of the curriculum must be relevant, engaging, and meaningful to the children themselves.
- Primary-age children should be provided opportunities to work in small groups on projects that provide rich content for conversation, and teachers should facilitate discussions among children by making comments and soliciting children's opinions and ideas.
- Teachers must recognize the importance of developing positive peer-group relationships, and must provide opportunities and support for cooperative, small-group projects that not only develop cognitive ability but also promote peer interaction.
- The younger the children, and the more diverse their backgrounds, the wider the variety of teaching methods and materials required.
- Curriculum and teaching methods should be designed so that children not only acquire knowledge and skills, but also acquire the disposition or inclination to use them.

Note. From the "NAEYC [National Association for the Education of Young Children] Position Statement on Developmentally Appropriate Practice in the Primary Grades Serving 5- Through 8-Year-Olds" (pp. 63-66) in *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*, 1987, by S. Bredekamp (Ed.), Washington, DC: NAEYC.

Interactive Learning

Problem-solving is the foundation of a young child's learning (Britz & Richard, 1992). Piaget (1937/1952) stated that children understand only what they discover or invent themselves. Discovery within the problem-solving process is the vehicle for learning. Children versed in problem-solving have a life-long skill that is useful in all areas of learning.

Children are active learners (Piaget, 1937/1952). Interactive learning is far more effective than passive learning. Squire (1999) summarized data from a number of research studies that indicated that students engaged in interactive learning processes in language arts had better achievement than students receiving passive instruction.

Student Grouping

Cooperative learning is the grouping of students with diverse abilities to work together toward a common goal. It has been shown to be an effective instructional practice for primary-age children. Madden, Stevens, and Slavin (1986) reported that

student achievement can be increased if state-of-the-art principles of classroom organization, motivation, and instruction are used in the context of a cooperative learning program. Slavin (1987a) reviewed research indicating that when classroom structure allowed students to work cooperatively on learning tasks, they benefited academically as well as socially. Slavin (1987b) reported that, of 33 studies that examined the effectiveness of cooperative learning on student achievement, 22 indicated this strategy had a positive effect on student achievement.

Another instructional method that has been shown to be effective, especially for low-achieving students, is heterogeneous grouping, or grouping students with different levels of ability (Pallas, Entwisle, Alexander, & Stluka, 1994). Research by Oakes (1986) and Reuman (1989) indicated that the placement of students in different ability groups might have heightened inequalities in children's academic achievement. Durkin (1987) cited research findings that homogeneous and heterogeneous grouping had little impact on the achievement of high-ability students, but low-ability students had lower achievement levels when homogeneous grouping was used. Sobol and Sobol (1987) suggested that grouping was most effective when the basis on which children were grouped changed frequently, allowing varying interaction opportunities. Grouws and Ceballa (1999) summarized a series of research studies with consistent findings: when small groups of students worked together on mathematics activities, problems, and assignments, their mathematics achievement scores increased.

Homework

Research results on the effectiveness of homework are mixed. Cawelti (1999) summarized the positive results of the assignment and completion of homework on students' academic achievement. The research indicated that the positive effect was greatly increased when homework was graded, commented on, and discussed by teachers.

Cooper (1989) found that numerous factors influenced the effectiveness of homework, one of them being grade level. Unlike junior high school and high school students whose achievement responded well to homework, Cooper found that for elementary students, no amount of homework affected achievement.

Reading Instruction

An effective, comprehensive reading program combines language- and literature-rich activities with explicit teaching of the skills needed to develop fluency with print. A balanced approach to reading aims to combine emphasizing meaning, understanding, and the love of language with automatic recognition of a growing number of words and the ability to recognize new words.

Pressley and Rankin (1994) observed instruction in the classes of several hundred teachers whose students consistently outperformed others in reading achievement. No matter what the individual teachers called their methods ("whole-language" or "skills-

based"), what they did was remarkably similar. They consistently used a balanced approach that incorporated direct and organized skill instruction into a broader, language-rich and literature-comprehensive language arts program.

Providing a wide variety of literature for students to read greatly enhances children's reading (Sobol & Sobol, 1987). Squire (1999) summarized a number of research studies that indicated that extensive reading of a wide variety of materials, both in school and outside of school, resulted in substantial growth in the vocabulary, comprehension abilities, and information base of students.

Materials and Computer Technology

Sobol and Sobol (1987) emphasized that learning in primary-age children develops from the concrete to the representational to the abstract. Therefore, students should experience mathematics concepts first in a variety of physical forms by using manipulatives. Long-term use of concrete materials (or manipulatives), such as blocks or marbles, was positively related to increases in student mathematics achievement and improved student attitudes towards mathematics (Grouws & Ceballa, 1999).

An overemphasis on mastery of narrowly-defined reading and mathematics skills and excessive drill and practice of skills that have been mastered threatens children's dispositions to use the skills they have acquired (Dweck, 1986; Katz & Chard, 1989; Schweinhart, Weikart, & Larner, 1986; Walberg, 1984). Although students should learn number facts, they must spend time developing the ability to solve problems through the use of mathematics (Sobol & Sobol, 1987). The use of calculators and computers is encouraged so that more time can be devoted to problem-solving, estimation, and checking and interpretation of results, rather than drill and practice. Grouws and Ceballa (1999) reported that many research studies have shown that using calculators in mathematics learning resulted in increased academic achievement and improved student attitudes toward mathematics.

Evaluating the Performance of Primary School Students

Assessment techniques should meet the same standards for developmental appropriateness as curricula. The SREB recommended that, in kindergarten through Grade 3, each child's assessment be based on prior performance and the development of critical skills (1994, p. 15).

Standardized, norm-referenced tests and numeric or letter grades are familiar assessment instruments. In the early primary grades, these instruments may be complemented or supplanted by performance inventories, portfolios, or narrative progress reports (TEA, 1997). The use of multiple techniques can be valuable for assessing primary-age children.

STUDY APPROACH

The SER studies were designed to provide information on the classroom experiences and educational progress of students in primary school in Texas, taking into account the variability in *readiness to begin* school and in classroom behaviors. The framework and much of the information used in these studies were provided by the Public Education Information Management System (PEIMS) and the Academic Excellence Indicator System (AEIS). Supplementary information was gathered on instructional practices, student performance, and related topics. In this report, the focus is on components most directly under the influence of the classroom teacher, namely, instructional practices and materials, the use of computer technology, and student behavior.

Cross-sectional and longitudinal features were central to the research approach. The cross-sectional component involved selecting a group of Texas first graders that represented the students, teachers, schools, and districts throughout Texas. This enabled us to collect consistent information directly from teachers for a relatively small number of students who reflected the diversity of school experiences in Texas. In particular, data on instructional practices and materials, use of technology, school readiness, and classroom behaviors not collected routinely were gathered.

The longitudinal component involved monitoring the entering first graders through three years of school. First- and third-grade teachers provided information about the classroom environment and student performance. These data supplemented annual student, school, and district data drawn from PEIMS. The teacher assessments provided consistent, appropriate measures of student mastery of skills in the first and third grades. Their assessments complemented the statewide, standardized test taken by all Texas students for the first time in the spring of their third-grade year.

Four questions provided the structure for this report:

1) How did teaching processes, including teaching practices, materials, and the use of technology change between Grade 1 and Grade 3?

2) What instructional practices and materials, student behaviors, and uses of technology were associated with student performance on the Grade 3 Texas Assessment of Academic Skills (TAAS) tests?

3) What instructional practices and materials, student behaviors, and uses of technology were associated with student mastery of the Essential Elements in Grade 3?

4) How did a student's readiness to learn in Grade 1 and Grade 3 relate to his or her Grade 3 performance?

METHODS

PEIMS

The PEIMS maintained by TEA includes data on student demographics, campus and district personnel, finances, and organization. All public school districts are required to submit PEIMS data to TEA annually (Texas Education Code [TEC] §42.006). In addition, contractors provide annual data to TEA on the TAAS and other standardized tests. These sources of data form the foundation of the AEIS. The AEIS provides comprehensive profiles of the institutional characteristics and performance of Texas public schools districts and campuses.

The TAAS is a standardized, criterion-referenced test administered to public school students statewide (TEC §39.023). It is designed to measure problem-solving and critical thinking skills required in the Essential Elements of the state-mandated curriculum. Through 1997-98, the Essential Elements were the statewide guide to what students should be able to do in each grade level and in each subject (formerly Chapter 75 of the Texas Administrative Code).

The Texas Learning Index (TLI) was developed to assess student progress across grades and subjects on the TAAS tests. A TLI score of 70 corresponds to the passing standard at each grade level.

Texas students begin taking TAAS tests in third grade. In the spring of 1998, the TAAS for third graders was based on the Essential Elements in reading and mathematics (Figure 2).[1]

[1] In 1997, the State Board of Education approved the Texas Essential Knowledge and Skills (TEKS) to replace the Essential Elements beginning in the 1998-99 school year (TAC Chapters 110-128). After alignment with the TEKS, the 1999-2000 TAAS will be based on the TEKS objectives.

Figure 2. Instructional Objectives of the Texas Assessment of Academic Skills, Grade 3, Spring 1998

Reading Objectives	Mathematics Objectives
• word meaning	Concepts
• supporting ideas	• number concepts
• relationship and outcomes	• algebraic/mathematical relations and functions
• inferences and generalizations	• geometric properties and relationship
• point of view, propaganda, and fact and nonfact	• measurement concepts
	• probability and statistics
	Operations
	• use of addition to solve problems
	• use of subtraction to solve problems
	• use of multiplication/division to solve problems
	Problem-solving
	• problem-solving: estimation/reasonableness
	• problem-solving using solution strategies
	• problem-solving using mathematical representation

Exemptions are allowed for some students receiving special education services and some students with limited English proficiency (TEC §39.027). At Grade 3, Spanish versions of the TAAS tests are given to students who are fluent in Spanish as determined by campus Language Proficiency Assessment Committees.

In order to produce a sample of Grade 1 students who resembled all Grade 1 students in the state demographically, 85 campuses were drawn in a stratified-random sample based on district type and campus accountability rating (see Glossary on page 27). Campuses were drawn randomly from four district types (*non-metro, rural, suburban,* and *urban*) and two campus accountability ratings (*Acceptable* and *Recognized*). Five campuses with *Exemplary* accountability ratings, five campuses with *Low-performing* accountability ratings, and five campuses on a year-round calendar were added. Prior to the distribution of the survey, one campus declined to participate, bringing the number of campuses to 99. For the Grade 1 survey in 1995-96, responses were gathered and analyzed for 9,325 students and 466 teachers. For more information on the sampling techniques and development of the Grade 1 survey, please see *First Steps in School: An Examination of Grade 1 in Texas Public Schools – Technical Report* (TEA, 1997).

Grade 3 surveys for the 1997-98 school year were sent to the same campuses selected for the Grade 1 sample, except for one school that no longer existed. Of the 98 schools that received surveys, six schools did not complete or did not return them. Of the surveys returned, 527 lacked some or all information due to a lack of parental consent.

Grade 3 surveys were received for 7,216 students and 415 teachers. This report focused on the 4,479 students for whom we had both Grade 1 and Grade 3 survey data. Fifty-two percent of the students in the Grade 1 survey (4,846 students) had left the state, left the public school system, or changed schools.

Supplemental Surveys

Each participating Grade 1 (1995-96) and Grade 3 (1997-98) teacher provided information on staffing, organization, instructional practices and materials, student behaviors, and use of computer technology. Some questions on staff development were omitted from the Grade 3 questionnaire, and in a few instances, response categories were revised for the Grade 3 questionnaire. Otherwise, the questionnaires were identical.

In addition, each teacher completed a questionnaire about each student enrolled. Questions focused on enrollment information, academic progress, contact with parents, classroom behaviors, and discipline. Of particular interest in this study were teacher assessments of student *readiness to begin* the grade level, student mastery of the Essential Elements in the core subject areas, and student classroom behaviors.

Each Grade 1 and Grade 3 teacher participating in this study was asked to provide his or her best professional appraisal of how many grade-level Essential Elements each student in their class had mastered. Teachers evaluated Essential Elements mastery in seven subjects: language arts, mathematics, science, social studies, fine arts, health, and physical education. The core subject areas in the curriculum — language arts, mathematics, science, and social studies — were used in this study. Teachers were asked to indicate one of five responses, ranging from *mastering none of the Essential Elements in this subject area* to *mastering all of the Essential Elements in this subject area.*

Statistical Methods

The Grade 3 survey data were compiled and compared to state data for Grade 3 and to the survey data that had been collected for Grade 1. Correlations among the performance measures were estimated, as well as the correlation between each performance measure and instructional or classroom variable. In addition, regression analysis was used to examine the relationship between each performance variable and a selected set of instructional and classroom variables. These methods provided information on the strength of relationships between variables but did not test causality.

RESULTS

First- and Third-Grade Classrooms

Several practices were employed routinely by almost all first- and third-grade teachers: enrichment activities, assigning homework, switching teaching modalities to match students' needs (Table 1), one-to-one and whole-class instruction, using an assortment of children's books, reading aloud to students, allowing students to read uninterrupted, and using manipulatives in mathematics and science (Figure 4 on page 19).

Between first and third grade, the number of teachers using learning centers decreased, and the number of teachers involved in team-teaching increased (Figure 3 on page 18). In addition, more Grade 1 teachers reported providing hands-on materials in language arts and social studies than did Grade 3 teachers (Figure 4).

Over three-quarters of the first- and third-grade teachers reported that their classroom materials adequately addressed the Essential Elements for their grade in a *very good* or *excellent* manner and were developmentally and culturally appropriate (Table 2 on page 18). More first-grade teachers reported lacking materials than did their third-grade counterparts: above-grade-level, below-grade-level, multimedia, multicultural, and up-to-date materials (Figure 3).

Table 1. Teaching Practices in Grade 1 and Grade 3

	Grade 1		Grade 3	
How often do teachers use enrichments with any or all students in the class?	daily	31%	daily	32%
	2-3 times per week	43%	weekly	53%
	weekly	22%	biweekly	10%
	monthly or less	3%	monthly or less	4%
	do not use	1%		
How often do teachers use different teaching modalities to match the different learning styles of students in the class?	daily	55%	daily	75%
	2-3 times per week	27%	weekly	20%
	weekly	12%	biweekly	2%
	monthly or less	5%	monthly or less	2%
	do not use	1%		
How often do Grade 1 teachers assign homework in general?	daily	45%		
	2-4 times per week	39%		
	weekly	13%		
	monthly or less	2%		
	do not use	2%		

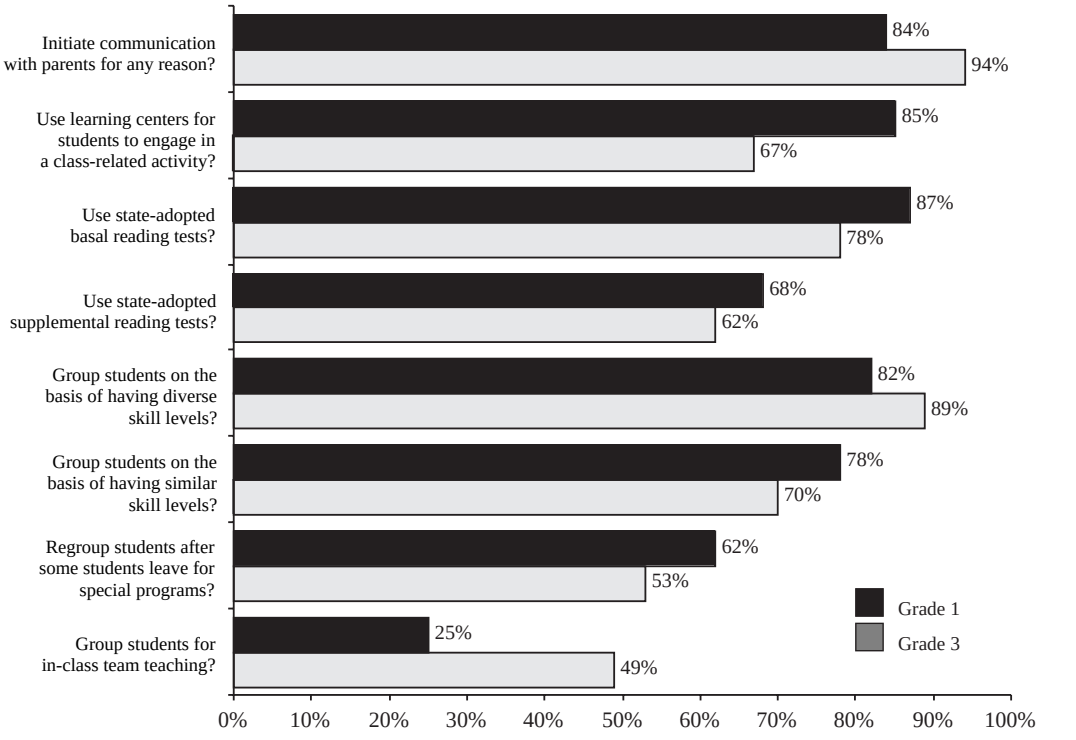
Grade 3 Teachers Only	Daily	Weekly	Biweekly	Monthly or Less	Do Not Teach
How often do Grade 3 teachers assign mathematics homework?	54%	29%	7%	3%	6%
How often do Grade 3 teachers assign language arts homework?	34%	40%	11%	6%	6%
How often do Grade 3 teachers assign science homework?	2%	26%	22%	40%	10%
How often do Grade 3 teachers assign social studies homework?	2%	29%	23%	38%	8%

Fewer Grade 3 teachers reported using a computer during instruction than did Grade 1 teachers. Computers were used more for information searches and accelerated reading programs in Grade 1 than in Grade 3 (Figure 5). More students in Grade 3 used computers at least once a week for writing than Grade 1 students.

Table 2. Materials Addressing Essential Elements in Grade 1 and Grade 3

	Grade 1		Grade 3	
How adequately do materials address Essential Elements?	Response	Percentage	Response	Percentage
	marginal	2%	*marginal*	1%
	reasonable	19%	*reasonable*	15%
	very good	50%	*very good*	54%
	excellent	29%	*excellent*	30%

Figure 3. Teaching Practices in Grade 1 and Grade 3



Note. Teachers were asked if they employed the practice at least once a week.

Figure 4. Teaching Materials in Grade 1 and Grade 3 Classrooms

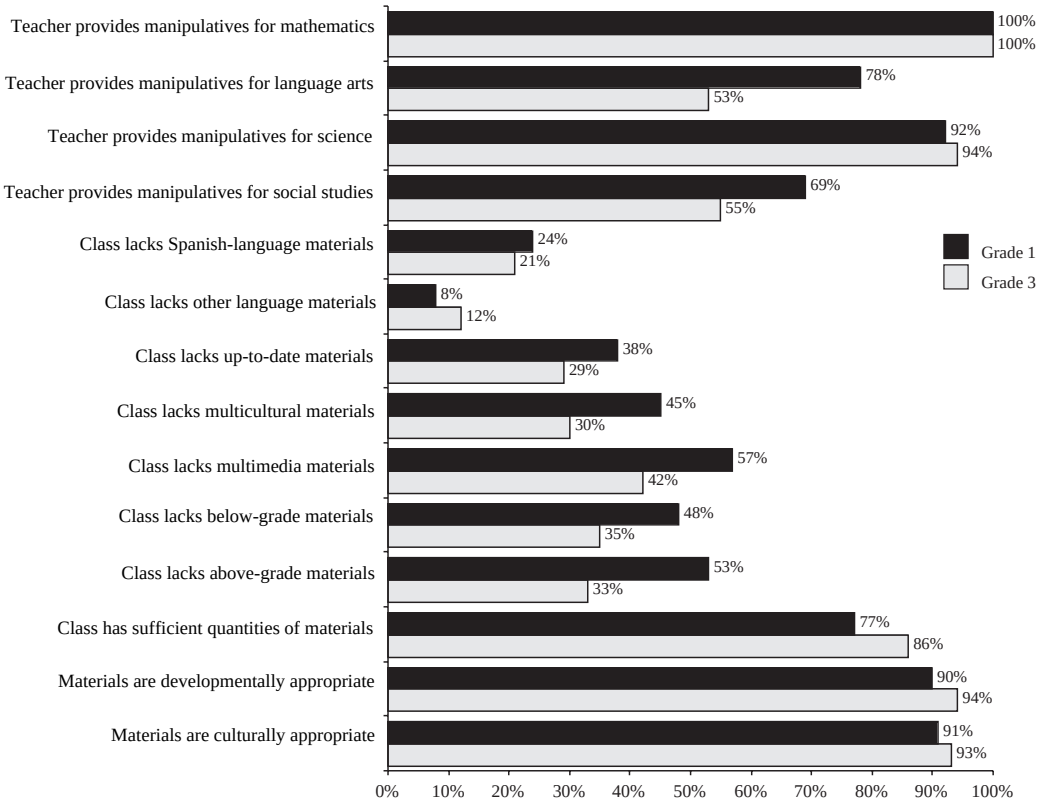
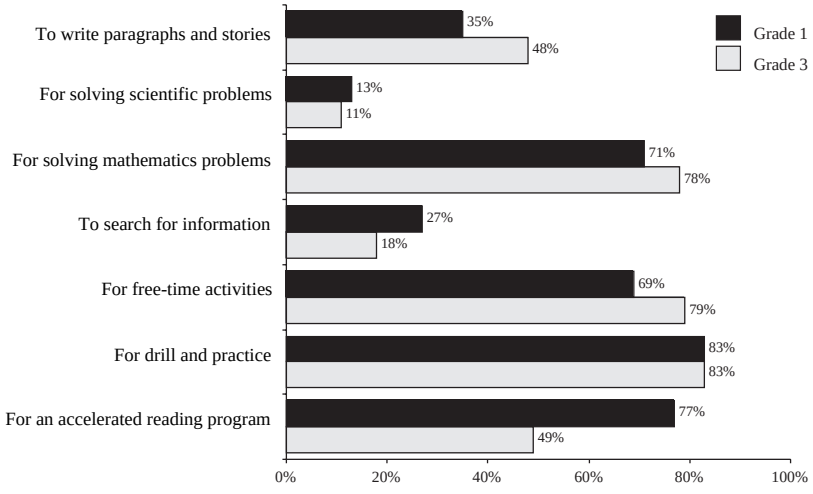


Figure 5. Computer Use in Grade 3 Classrooms



Note. Teachers were asked if computers were used for each purpose at least once a week.

Mastery of the Essential Elements and Performance on the TAAS Tests

In both reading and mathematics, mastery of the Essential Elements was strongly related to high performance on the TAAS tests (Table 3). Moreover, if a student performed well on the mathematics TAAS, he or she was very likely to perform well on the reading TAAS.

Table 3. Strength of Association Between Grade 3 Performance Measures

	Texas Learning Index (TLI)	
	Mathematics	**Reading**
TLI		
Mathematics	—	**Strong**
Reading	**Strong**	—
Mastery of Essential Elements		
Mathematics	**Strong**	Moderate
Language Arts	Moderate	**Strong**
Science	Moderate	Moderate
Social Studies	Moderate	Moderate

Note. A moderate association indicates a correlation coefficient of 0.40 to 0.59. A strong association indicates a coefficient of .60 to 1.00.

Students, Classrooms, and Performance

Two factors were consistently associated with higher performance on the reading and mathematics TAAS tests and mastery of the Essential Elements in the four core subject areas. Students judged by their Grade 1 and Grade 3 teachers to be *frequent* users of adequate self-help skills generally had higher TAAS scores and a higher perceived mastery of the Essential Elements. Also, students in Grade 3 classrooms with instructional materials that were developmentally appropriate generally scored well on the TAAS and were judged to have mastered *most* of the Essential Elements.

An area frequently associated with poorer mastery of the Essential Elements or poorer TAAS performance was a lack of various types of instructional materials. For example, lower scores on the reading TAAS were associated with Grade 1 classrooms that had insufficient multicultural instructional materials and Grade 3 classrooms that had insufficient multimedia materials. Insufficient language materials to work effectively with students speaking neither English nor Spanish in Grade 1 was associated with poorer mastery of the language arts, science, and social studies Essential Elements in Grade 3. In addition, poorer mastery of language arts Essential Elements in Grade 3 was related to the lack of sufficient Spanish-language materials in Grade 3. Finally, lack of below-grade-level materials was related to poorer mastery of the social studies Essential Elements in Grade 3.

Aside from self-help skills and instructional materials, some classroom features were associated with individual performance measures. Higher mathematics TLI scores were positively related to weekly or biweekly math homework and negatively associated with extra instructional assistance in Grade 3. Mastery of the Essential Elements in mathematics was positively associated with more frequent adjustments in teaching style and negatively associated with team teaching in Grade 3.

Lower TAAS reading scores were associated with extra instructional assistance in Grade 3, infrequent adjustments in teaching style, and not having used a computer at least once a week for information searches in Grade 1. Students who received extra instructional assistance in Grade 3 were likely to master fewer of the Essential Elements in language arts, as were students who did not use a computer for writing in Grade 1.

Mastery of the Essential Elements in the third-grade science curriculum was positively associated with frequent assignment of math homework and the use of different teaching modalities. These were the same two factors associated with performance on the mathematics TAAS. Mastery of social studies Essential Elements was also positively related to matching teaching modalities to student learning styles in Grade 3.

Readiness to Begin and Student Performance

The majority of students (62%) were judged *ready to begin* in both Grades 1 and 3 (Figure 6). Far fewer students were judged *not ready* in both grades (16%).

More students judged *ready* mastered *most* or *all* of the Essential Elements in the four core subject areas than students judged *not ready* (Table 4 on page 22). *Readiness to begin* Grades 1 and 3 was strongly related to TAAS performance (Table 5 on page 22). More students judged *ready to begin* in both Grades 1 and 3 passed the TAAS than students judged *ready to begin* only Grade 1 or Grade 3, or judged *not ready to begin* in both Grades 1 and 3.

Figure 6. Students Judged *Ready to Begin* Grade 1 and Grade 3

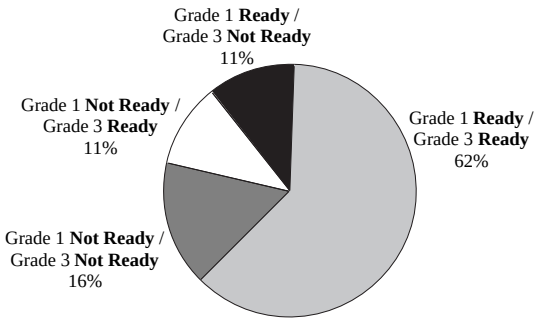


Table 4. *Readiness to Begin* and Mastery of *Most* or *All* of the Essential Elements in Grade 3

		Subject Area			
		Language Arts	Mathematics	Science	Social Studies
Grade 1	***Ready***	87%	89%	91%	91%
	Not Ready	46%	53%	59%	59%
Grade 3	***Ready***	93%	95%	95%	96%
	Not Ready	33%	39%	47%	48%

Table 5. *Readiness to Begin* Grades 1 and 3 and Performance on the Texas Assessment of Academic Skills in Grade 3

			Grade 1	
			Ready	***Not Ready***
Grade 3	***Ready***	Passed mathematics TAAS	87%	61%
		Passed reading TAAS	89%	67%
	Not Ready	Passed mathematics TAAS	45%	25%
		Passed reading TAAS	50%	29%

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GLOSSARY

District type. Districts are classified on a scale ranging from *major urban* to *rural*. Size, growth rate, and proximity to urban areas determine the appropriate group. *Charter school* districts constitute a category that does not use these criteria.

Major urban are the largest school districts in the state, serving the six metropolitan areas of Houston, Dallas, San Antonio, Fort Worth, Austin, and El Paso. A district is designated *major urban* if the county population is greater than 650,000, it is the largest in the county, and there are greater than 35 percent low-income students in the school district. If a district is not the largest in the county, it is classified *major urban* if the number of students is 75 percent of the largest district and there are more than 35 percent low-income students in the district.

A *major suburban* district is contiguous to a *major urban* district and the number of students in membership is at least 3 percent of the *major urban* district. If a district is not contiguous to a *major urban* area, then an enrollment of 15 percent of the *major urban* district or an enrollment of at least 4,500 is required to be classified as a *major suburban* district.

A district is designated as *other central city* if the district is not contiguous to one of the *major urban* districts, the county population is between 100,000 and 650,000, and it is the largest district in the county or its population is 75 percent of the largest district.

An *other central city suburban* district is in a county with a population of between 100,000 and 650,000, and the number of students in membership is at least 15 percent of the largest district in the county. If a district is contiguous to a *central city* district, has a population greater than 3 percent of that district's, and the number of students in membership is greater than the corresponding median figure for the state, it is also *central city suburban*.

A district is considered an *independent town* district if it is in a county having a population of 25,000 to 100,000, or if the number of students in membership is greater than 75 percent of the largest district.

Non-metropolitan, fast-growing districts are those that do not fit in any of the above categories, have at least 300 students enrolled, and exhibit a five-year growth rate of at least 20 percent.

Non-metropolitan, stable districts are those that do not fit in any of the above categories and have an enrollment exceeding the state median.

Rural districts are those that do not fit in any of the above categories. *Rural* districts have an enrollment of less than 300; or an enrollment between 300 and the state median and a growth rate less than 20 percent.

Campus accountability rating. Each campus in Texas receives an annual accountability rating from the Texas Education Agency.[2] The accountability system for 1995 used performance on the TAAS in the spring of 1995, annual dropout rates for 1993-94, and student attendance rates for 1993-94, as the base indicators to determine campus ratings. The general conditions for the 1995 ratings were:

Rating	TAAS Score	Dropout Rate	Attendance Rate
Exemplary	≥ 90%	≤ 1.0%	≥ 94%
Recognized	70-89%	1.1-3.5%	≥ 94%
Acceptable	25-69%	3.6-6.0%	No requirement
Low-performing	≤ 25%	≥ 6.0%	No requirement

Not rated campuses are prekindergarten, kindergarten, or early education centers that do not have ratings because standardized tests are not available at those grade levels. *Not applicable* indicates first-year charter schools and schools for which data are insufficient. Alternative education campuses are rated as *alternative education—acceptable* or *alternative education—needs peer review.*

[2] Texas Education Agency, *Accountability Manual: The 1994-95 accountability rating system for Texas public schools and school districts* (Austin,TX: Author, 1994).

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