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ABSTRACT

In 1998, fourth graders participated in the mathematics component of the Washington Assessment of Student Learning for the second year. A study of the results was conducted to determine which districts and schools had more students meeting the state's mathematics standards and how improved achievement came about. Data was gathered through interviews of education leaders in 53 buildings and 20 school districts that showed significant gains in the percentage of fourth graders meeting or exceeding the mathematics standards. There was no single curriculum, test, strategy, or material that helped the successful schools and districts increase the number of students meeting the standards. The difference was made through the deliberate efforts of teachers and administrators to coordinate and strengthen all the pieces of a comprehensive program. Insights from participants are summarized. Five appendixes contain supplemental data about the school and district programs. (SLD)

Organizing for Success

A Study About Mathematics Assessment Results in Washington State

Dr. Terry Bergeson
State Superintendent of
Public Instruction

July 1999

Organizing for Success

A Study About
Mathematics Assessment Results
in Washington State

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Writing and Editorial Assistance
by Lois A. Stiegemeier

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Organizing for Success

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July 1999

Dedicated to

Peggy G. Vatter

who cared deeply about children,

learning, and teaching.

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Introduction

Spring 1998 was the second year fourth graders participated in the mathematics component of the Washington Assessment of Student Learning (WASL). Scores released in September 1998 indicated a statewide 9.8 percent increase of fourth graders meeting or exceeding the mathematics standards over 1997 WASL results. Which districts and buildings experienced more students meeting the math standards? How did they help more students reach the standards? Could other educators benefit from anecdotal data about the successful districts and buildings to help their students? These questions led the Office of Superintendent of Public Instruction (OSPI) and the Commission on Student Learning (CSL) to conduct a limited study in November and December 1998.

Data was gathered through interviews of education leaders in 53 buildings and 20 school districts that showed significant gains in the percentage of fourth grade students meeting or exceeding mathematics standards from 1997 to 1998 (see Appendix A for complete list). Buildings included in the study demonstrated an increase of 30 percentage points, regardless of the number of fourth graders tested. Districts had at least a 10 percentage point increase with a minimum of 400 fourth graders tested. Interview questions focused on a number of areas, including curriculum, instruction, assessment, textbooks and materials. Data was also collected on professional development practices and leadership.

Organizing for Success

A Study About Mathematics Assessment Results in Washington State

Executive Summary

There was no single curriculum, text, strategy, or material that helped these schools and districts make significant increases in the number of students meeting the mathematics standards. Rather, the difference was made through the deliberate effort of teachers and administrators to coordinate and strengthen all the pieces that go together in a comprehensive program for delivery of curriculum, instruction, assessment, and professional development aligned with Washington's standards and assessment practices in mathematics.

Anecdotal data from survey participants led us to the following insights:

1. Attitude, commitment, and focus of teachers and administrators are key to success in student learning.

Attitude

- Teachers believed they could make a change in student learning.
- Teachers believed that each student can learn if given meaningful experiences in mathematics.
- Educators believed that working together to promote change would make it happen.

Commitment

- Educators in these buildings and districts made a commitment to take on the challenge of helping more students meet the standards in mathematics.
- Educators made a plan and stuck with it, knowing that change happens over time.
- Teachers demonstrated a willingness to assess classroom practices openly and honestly, using student learning as the primary criteria to determine their focus.
- Resources—human, material, and financial—were used in a collaborative manner to support their efforts.

Focus

- Teachers and administrators in the successful schools and districts used meaningful classroom experiences and professional development activities to target the teaching and learning of mathematics.
- Curriculum was aligned to the essential academic learning requirements (EALRs) and the Washington Assessment of Student Learning (WASL).
- Teachers focused on learning intentional teaching skills.
- Teachers and administrators used data (1998 fourth grade WASL results) to make mathematics program decisions and guide their professional development activities.

2. *Professional development was essential to improve classroom instruction to impact student learning.*

- Professional development was designed locally to fit the needs of teachers.
- Professional development focused on components of the EALRs and instructional and assessment practices in mathematics.
- Professional development provided opportunities for teachers to apply and reflect on classroom practice over time.
- Professional development was provided in a variety of ways and over a period of time.

3. *No specific program or supplementary program made the difference.*

- Alignment of the mathematics program with the EALRs and the WASL was more important than any one curriculum or text.
- Teachers used supplementary materials to fill in the gaps identified in the alignment process to make their mathematics program complete.

WHAT MATTERS? STUDY RESULTS

NO SINGLE ANSWER

There was no single curriculum, text, strategy, or material that helped the educators in these schools and districts make significant increases in the numbers of students meeting the mathematics standards. There was, however, a common set of activities that engaged teachers to redefine and strengthen their own knowledge in curriculum and skills in instruction and assessment practices as they related to mathematics and pedagogy. Significant time, energy, and resources were focused on the deliberate improvement of mathematics education in these schools and districts.

> *"The most critical thing is recognizing that improvement in student achievement comes from time, attention, and focus on something and must be consistent and sustained over time."*
> *Bellingham School District*

A Focus on Mathematics

These schools and districts exhibited a purposeful focus on mathematics in a number of key areas. Teacher discussions and activities revolved around mathematics instruction and assessment practices. Curriculum was aligned with the essential academic learning requirements (EALRs) and the Washington Assessment of Student Learning (WASL). Intentional teaching of the mathematical skills assessed by the WASL was included in the focus. Many educators used fourth grade WASL results from 1997 to determine what professional development would be meaningful for teachers.

> *"Pick your focus and stick to it, and take one step at a time."*
> *Adams Elementary Schoo*

Educators deliberately focused on mathematics in 50 of the 53 school sites. Teachers spent time in professional development sessions discussing and learning about mathematics content, instruction, and assessment. This alignment helped clarify the meaning of the

> *"Don't lose sight of the target, but make sure it's not a race to the finish, but that we are all headed in the same direction ... and make this journey together."*
> *Marysville School District*

mathematics EALRs and promoted ongoing teacher discussions and reflections about what the EALRs would look like in a classroom setting. The three schools that did not focus on mathematics focused on writing. They noted, however, that their professional development plans and activities for writing had a special component for communication in mathematics. Did the focus on mathematics detract from reading? WASL data indicated that 94 percent of the buildings and 100 percent of the districts that increased the number of students meeting the mathematics standards also increased the number of students meeting or exceeding the reading standards.

> *"There are many ways to make improvement, but make them intentional."*
> *Kittitas Elementary Schoo*

A combination of factors contributed to the success of the educators in these schools and districts as they focused on mathematics achievement. Factors mentioned most often in the interviews were:

- Leadership.
- Attitude of educators.
- Program changes.
- Professional development.

Leadership

Leaders, both designated and informal, played an important role in strengthening knowledge, instruction, and assessment practices in mathematics. Buildings (79 percent) and districts (80 percent) reported having one or more leaders in mathematics. Leaders facilitated discourse, acted as peer coaches, and implemented professional development activities in content, instruction, and assessment practices. Leaders included teachers on special assignment (TOSA) who served as building or district mathematics specialists, building-level leadership teams, curriculum directors, and principals.

> *"[We] provided the elementary grades with a roving primary support teacher; she ... focused on performance tasks that students were not familiar with."*
> *Mukilteo School District*

Attitude of Educators

Teachers and administrators believed that they could make a difference in student learning. They also believed that students can learn if they are given meaningful experiences in mathematics and that if they worked together to promote change, it would happen.

> *"Access to opportunity is the issue—not poverty or ethnic lines."*
> *Vancouver School District*

Program Changes

Program changes focused on curriculum, instruction, and assessment in mathematics that supported the EALRs. Most program changes occurred within a time frame that provided fourth graders tested in 1998 the benefit of only one year of change.

> *"[There was] a three-year effort to align to the EALRs. What we ask teachers to teach is aligned with the EALRs."*
> *Issaquah School District*

Number of Years 4th Graders Have Benefited From Changes in Mathematics Program

	1 Year	2 Years	3 Years	4 Years	5 Years
Number of Buildings (53 buildings surveyed)	42	4	1	4	2
Number of Districts (20 districts surveyed)	10	4	4	1	1

Reported instructional changes also included a move to **daily** mathematics instruction, with 81 percent of the buildings providing 45–60 minutes of daily instruction. Most (85 percent) of the districts also reported daily mathematics instruction. Of the districts reporting daily mathematics instruction, 88 percent provided 45–60 minutes of mathematics instruction per day. Three districts (15 percent) indicated that decisions on the amount of instructional time were determined at the building level. Our research shows that time on task has emerged as an important variable in student achievement.

> *"[We] increased class time from 30 minutes every other day to one hour daily."*
> *Quilcene Elementary School*

A number of textbooks were used, ranging from those published in 1986 to the present. The text reported as most often used in the schools was Addison-Wesley. However, several different publishing dates were given, so not all schools were using the same text. At the district level, of 17 districts reporting which texts were used most often, 18 percent (three) reported use of Addison-Wesley, while another 18 percent reported use of Everyday Math.

More important than a particular textbook was the way text and supplementary materials were evaluated and used. Schools and districts aligned their existing mathematics programs to the EALRs and the WASL. By doing so, they identified the gaps in their primary text and supplemented those gaps with other materials. Appendix E is a list of the mathematics textbooks and supplementary materials used in the schools and districts interviewed.

Professional Development

Professional development was a key factor supporting positive change in classroom instruction. **Professional development activities were focused, sustained, and related to the daily responsibilities and realities of the teachers.** Nearly all (96 percent) of the buildings reported professional development activities in mathematics; the other 4 percent reported providing mathematics professional development in previous years or were currently focusing on writing or reading in the content area. Formal follow-up activities at the building level were reported in 47 percent of the buildings. All districts planned and implemented both initial and formal follow-up professional development activities in mathematics throughout the school year. Data for both buildings and districts indicated time spent on professional development in mathematics ranged from 0 to 190 hours. Most schools and districts spent between 11 and 30 hours per year on mathematics professional development.

> *"Quality professional development must be ongoing and provide time for the teacher to reflect and put it into practice."*
> *Sumner School District*

Professional development was structured to embed the new methods into daily classroom instruction. Most included initial training coupled with ongoing follow-up activities as illustrated by these examples.

Initial Training	Follow-Up Activities
8-hour district training	1.5-hour weekly meetings focused on mathematics.
One-day mini-conference (Washington State Mathematics Council)	Series of 3-hour workshops (early release days), followed by collaborative grade-level work group meetings (substitutes provided).
Half-day district training on assessment in instruction (District workshops)	10–12 weeks of video lessons which model problem solving lessons developed by the district cadre. Each building in the district develops a plan for use of videos.
Institutes—Three six-hour sessions	Half-day and after-school workshops throughout the year.
Week-long training for math leadership teams	2-day training and ongoing assistance for building staff provided by leadership teams. 2-day follow-up retreat for leadership teams.

No matter how it was delivered, professional development in all cases focused on content and instruction related to Washington's EALRs and assessment practices. In many cases, professional development activities included components of the *Example Test* and the *Mathematics Toolkit* developed by the Commission on Student Learning. The NCS Mentor was also used in professional development, although not as frequently due to either lack of awareness or limited technology available for schools to use this tool. Topics of professional development activities included instructional practices, assessment practices, mathematics content, writing and reading in mathematics, and the EALRs.

> ***"Teachers reported in their reflections that the most valuable experiences were the in-classroom demonstrations and the coaching side by side."***
>
> ***Tahoma School District***

Professional development was provided through various delivery systems using several different models. The common element in nearly all the staff training was that it extended over time and included time for staff to practice new skills. Professional development activities included:

Initial Training

- Workshops
- Mini-conferences
- Classes
- Institutes (2–5 days)

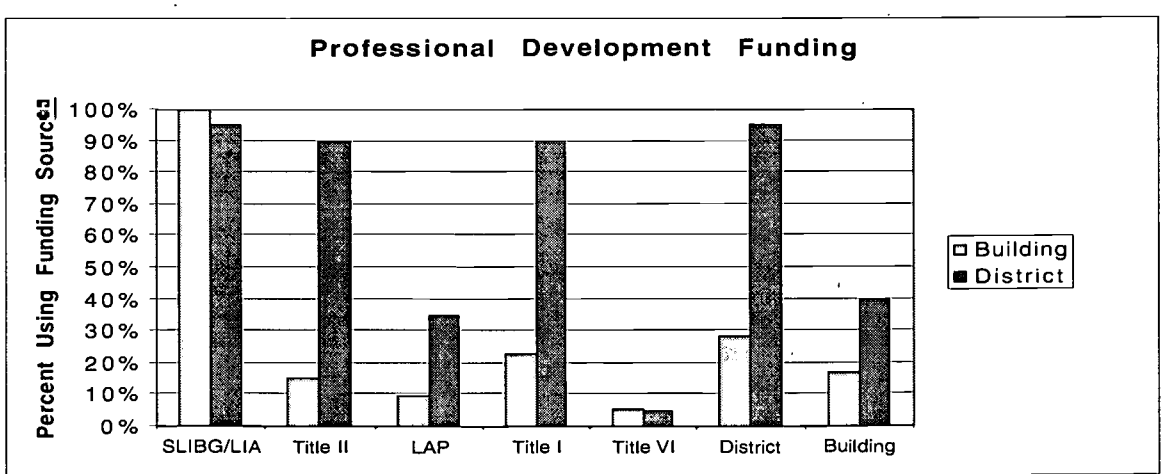
Follow-Up Activities

- Workshops
- Cross-level and grade-level meetings
- Informal or formal discussion or study groups
- Regular monthly or weekly meetings
- Common time after school
- Self-study/individual growth plans
- Staff meetings
- Committee meetings
- Per diem days for projects
- Coaching and peer mentoring
- Math cadre workshops and training
- Leadership team meetings
- Peer networks
- Building mini-conferences
- Family math nights

Delivery System

- Washington State Mathematics Council trainers
- ESD trainers
- Teachers on special assignment (TOSA)
- Teacher cadres
- District math specialist
- Math clu

Schools and districts used a combination of federal and state funds to support professional development. Funding sources mentioned most by interviewees included student learning improvement block grants (SLIBGs) or learning improvement allocations (LIAs), Learning Assistance Program (LAP), Title I, Title II Eisenhower Professional Development Program, Title VI of the Elementary and Secondary Education Act (ESEA), and district and building funds.



Funds were used in a variety of ways, including:

- Stipends and substitutes for teachers to attend professional development activities and accomplish committee work throughout the school year.
- Title I-funded personnel who attended professional development activities or, in some cases, Title I funds used to sponsor professional development activities.
- Salaries for TOSAs as they provided training for teachers.
- Fees for professional development providers.

Technology

Data related to the use of technology is inconclusive. Although 47 percent of schools and 60 percent of districts indicated they used technology at some level, the levels were not defined. Of the very limited information gathered, uses of technology at the elementary level appeared to be drill and practice or calculators, although we were unable to determine at what grade levels. A sophisticated use of multimedia technology as a tool for professional development was reported by one district.

Volunteers and Class Characteristics

Data collected on the use of volunteers in the classroom and class characteristics is too vague to draw conclusions about impact on student performance.

What Lessons Can Be Learned?

Many of the schools and districts in the study had followed a similar path to success. It included the following steps:

Goal Setting

- Provide for teacher participation.
- Use student performance data to identify areas of need.
- Assess staff's existing knowledge base and belief system.
- Identify the strengths and weaknesses in curriculum, texts, and mathematics program.
- Analyze the context in which teachers teach and students learn.
- Establish a limited number of measurable goals linked to student achievement.

Planning

- Decide how to reach measurable goals.
- Include provisions in plan for:
  Curriculum alignment, development, and implementation.
  Professional development.
  Text or mathematics program alignment.
  Review and evaluation of practice.
  Collaborative work by teachers.

Implementation

- Focus on content as well as instructional and assessment practices.
- Foster teamwork between staff.
- Allow plenty of time and opportunity for teacher collaboration and discussion.

Evaluation and Reflection

- Use data to monitor and assess performance.
- Promote dialogue among staff about instructional and assessment practices.
- Use experience and data to guide further improvements.

Resources

Resources

This list of World Wide Web sites is current as of June 7, 1999. Text descriptions taken from the sites are framed in quotes. These Web sites are provided as resources for schools and districts wishing to improve their mathematics program.

American Association for the Advancement of Science
http://aaas.org

"The American Association for the Advancement of Science (AAAS) is a nonprofit professional society dedicated to the advancement of scientific and technological excellence across all disciplines and to the public's understanding of science and technology. AAAS is among the oldest societies in America, having been founded in Philadelphia in 1848."

This site contains information about membership and meetings, *Science* online, news and information, ScienceNOW, international programs, science and policy programs, education and human resource programs and Project 2061, the K-12 reform project. A notable resource under the Project 2061 is the report *Middle Grades Mathematics Textbooks: A Benchmark-Based Evaluation.* You can find the report at http://project2061.aaas.org.

Association for Supervision and Curriculum Development
http://www.ascd.org/

"ASCD is an international, nonprofit, nonpartisan education association committed to the mission of forging covenants in teaching and learning for the success of all learners. ASCD provides professional development in curriculum and supervision, initiates and supports activities to provide educational equity for all students, and serves as a world class leader in education information services."

The ASCD site contains information about ASCD, information on educational issues, and publications and multimedia. One notable publication, *Results: the Key to Continuous School Improvement* by Mike Schmoker (ASCD, 1996) focuses on three critical elements of school improvement: teamwork, goals, and regular collection and analysis of performance data.

Education Development Center, Inc.
http://edc.org

"With 250 projects around the globe, EDC is one of the world's leading nonprofit education organizations. We conduct research and develop programs in such areas as early child development, K-12 education, health promotion, workforce preparation, learning technologies, and institutional reform."

This site has information about their themes and projects, publications, summer institutes, and Web sites. One notable publication is *Choosing a Standards-Based Mathematics Curriculum* (1998) by L.T. Goldsmith, J. Mark, and I. Kantrov.

Eisenhower National Clearinghouse

http://www.enc.org

"The Eisenhower National Clearinghouse for mathematics and science education (ENC) is funded through a contract with the U.S. Department of Education to provide K-12 teachers with a central source of information on mathematics and science curriculum materials."

The ENC site contains reference services, links to regional assistance centers and demonstration sites, CD-ROM and print publications. A publication of note is *Ideas That Work: Mathematics Professional Development* (1998). A new project of ENC is Teacher Change: Improving K-12 Mathematics. "This is a collection of resources for educators and professional development providers to help facilitate discussion and reflection on improving K-12 mathematics. You can reach the Teacher Change site at http://change.enc.org/."

The Math Forum

http://forum.swarthmore.edu/

"Our goal is to build an online community of teachers, students, researchers, parents, educators, and citizens at all levels who have an interest in math and math education."

The Math Forum includes resources, discussion groups, an Internet newsletter, and Web units and lessons.

National Council of Supervisors of Mathematics

http://forum.swarthmore.edu/ncsm/

"Welcome to the home page of the National Council of Supervisors of Mathematics (NCSM), a resource site for those interested in leadership in mathematics."

This site includes information about NCSM, meetings and conferences, publications, leadership academies, and other resources.

National Council of Teachers of Mathematics

http://www.nctm.org

"Founded in 1920, the National Council of Teachers of Mathematics (NCTM) is dedicated to improving mathematics teaching and learning from preschool through postsecondary school."

This site contains information about NCTM and links to related sites. One notable publication is *A Guide for Reviewing School Mathematics Programs* (NCTM, 1991).

National Institute for Science Education

http://www.wcer.wisc.edu/nise/

"The National Institute for Science Education seeks to address the totality of the science education enterprise, to assess its effectiveness and examine what new activities need to be established, what activities are no longer needed, and what new approaches will enhance science education."

This site includes news, publications, conferences, and links to related sites. Research, dissemination, and management information is also available at the National Institute for Science Education. One notable publication for those working to make changes in mathematics education is *Designing Professional Development for Teachers of Science and Mathematics* (Corwin Press, 1998) authored by Susan Loucks Horsely, Peter W. Hewson, Nancy Love, and Katherine E. Stiles.

National Staff Development Council

http://nsdc.org

"The National Staff Development Council (NSDC) is the largest nonprofit professional association committed to ensuring success for all students through staff development and school improvement. The council's fundamental purpose is to address the issues confronted by all participants in the reform process. The council views high quality staff development as essential to creating schools in which all students and staff members are learners who continually improve their performance."

This site has information about the organization, conferences, standards, programs, a bookstore, library, and links. Notable publications: *Achieving Your Vision of Professional Development* (SERVE, 1997) and the *NSDC Standards for Staff Development*. You can also purchase the Susan Loucks-Horsely book listed above in the NSDC online bookstore.

Office of Superintendent of Public Instruction

www.k12.wa.us

The OSPI site includes information about the superintendent, accountability and reform, learning and teaching, policy and legislation, publications and resources, special education, teacher certifications, tips for parents, and education links. By following the OSPI menu for Accountability and Educational Reform, you can obtain information about the Washington Assessment Training and Resource Centers. These regional training centers throughout the state make assessment and EALRs expertise available to teachers.

Science and Mathematics Consortium for Northwest Schools

http://www.col-ed.org/smcnws/

"The Science and Mathematics Consortium for Northwest Schools is one of the ten 'Regional Eisenhower Consortia' established by Congress and administered by the U.S. Department of Education. We intend this Web site to be used by teachers and other educators to (1) access information and resources that may be time consuming to find elsewhere and (2) enhance their ability to teach mathematics and science."

This site has information about recent, current, and future projects; the Third International Math and Science Study (TIMSS); assessment resources; math and science funding sources; and links to the ENC and other Eisenhower consortia.

Washington-Alaska Textbook Representative Association

This association does not maintain a Web site but can assist districts in contacting textbook representatives when reviewing texts for adoption. You can reach this organization by contacting:

Washington-Alaska Textbook Representative Association
c/o Barbara Baker, Editor
11510 105th Place NE
Kirkland, WA 98033
Phone: 425/823-0836
Fax: 425/821-5254
E-Mail: denmother@worldnet.att.net

Washington State Mathematics Council

http://www.wsmc.net

"Dedicated to quality mathematics education through teacher workshops, professional conferences, student competition, and engaging publications."

This site contains membership information; a calendar of events; information about the Northwest Mathematics Conference; *Washington Mathematics*, the official publication; and links to other sites.

Appendices

Appendix A

Schools and Districts Studied

Table 1

Schools Studied

Building	District	Number of Students Tested	Percentage Change in Students Meeting Mathematics Standards
Sunset	Bellevue	80	33.3
Carl Cozier	Bellingham	81	33.4
Silverdale	Central Kitsap	90	31.1
Broadway	Central Valley	43	42.8
Opportunity	Central Valley	64	31.0
Valley View	Ellensburg	75	36.1
Lake Dolloff	Federal Way	81	34.2
Mirror Lake	Federal Way	50	33.6
Custer	Ferndale	69	34.0
Monte Cristo	Granite Falls	144	36.2
Sunny Hills	Issaquah	78	31.8
Hawthorne	Kennewick	55	40.5
Kittitas	Kittitas	43	30.7
Mark Twain	Lake Washington	65	36.6
Peter Kirk	Lake Washington	60	39.5
Evergreen	Mead	76	33.8
Mossyrock	Mossyrock	57	31.3
Acme	Mount Baker	37	42.8
Endeavor	Mukilteo	66	45.4
Mukilteo	Mukilteo	84	41.6
Pacific Beach	North Beach	13	50.0
Lacey	North Thurston	66	55.2
Bear Creek	Northshore	71	30.4
Fernwood	Northshore	71	37.7
Hollywood Hill	Northshore	81	42.1
Moorlands	Northshore	98	36.6
Westhill	Northshore	53	35.8
P. C. Janz	Odessa	28	39.9
Vaughn	Peninsula	76	55.1
Jefferson	Port Angeles	76	52.1
Hilltop	Puyallup	48	32.8
Quilcene	Quilcene	24	33.3
Maplewood Heights	Renton	79	32.6
Sierra Heights	Renton	88	49.2
Republic	Republic	42	36.2
Rosalia	Rosalia	22	33.8
Greenwood	Seattle	44	50.4
Samish	Sedro-Woolley	38	51.7
Brookside	Shoreline	73	39.1
Meridian Park	Shoreline	79	32.2
Skamania	Skamania	11	38.6
Riverview	Snohomish	76	61.7
Fall City	Snoqualmie Valley	78	41.7

Table 1 (cont'd)
Schools Studied

Building	District	Number of Students Tested	Percentage Change in Students Meeting Mathematics Standards
Adams	Spokane	65	38.5
Franklin	Spokane	50	41.3
McAlder	Sumner	76	56.3
Outlook	Sunnyside	48	33.8
Touchet	Touchet	15	38.4
Benjamin Franklin	Vancouver	37	40.1
Minnehaha	Vancouver	71	30.2
Truman	Vancouver	92	30.1
Edison	Walla Walla	52	45.7
Ness	West Valley/Spokane	45	37.8

Table 2
Districts Studied

District	Number of Students Tested	Percentage Change in Students Meeting Mathematics Standards
Bellingham	785	11.3
Central Valley	794	15.8
Issaquah	987	12.6
Lake Washington	1809	11.5
Marysville	849	10.3
Mead	580	10.0
Mukilteo	1021	21.3
North Kitsap	537	14.8
North Thurston	919	16.8
Northshore	1597	15.1
Oak Harbor	497	10.1
Peninsula	645	18.4
Renton	959	17.0
Shoreline	790	18.5
Spokane	2379	10.9
Sumner	574	15.3
Tahoma	435	17.1
Vancouver	1551	13.9
Walla Walla	424	15.9
Wenatchee	486	12.0

Appendix B

Questions Used to Collect Information for This Study

Mathematics Program

1. Have you made identifiable changes in your mathematics program that you think could account for the improvement? Examples might be class size; new materials; changes in curriculum, instruction, or assessment practices.
2. Were these changes different from changes made the previous year?
3. How many years have the 1998 fourth graders benefited from the changes?
4. How many years have the 1997 fourth graders benefited from the changes?
5. What is the amount of mathematics instructional time?
6. Is that time provided daily?
7. Has there been a change in the amount of instructional time from last year?
8. What textbook or materials do you use in Grades K–4?
9. What supplementary materials do you use?
10. Do you use technology in mathematics? Explain.
11. Do you use volunteers in your mathematics program? If so, how are they used?

Professional Development

12. What professional development activities were provided that focused on mathematics?
13. How much time was spent on professional development?
14. What types of follow-up activities were made available?
15. What funding sources did you use for the professional development? Choices given were SLIBGs/LIAs, Title I, Title II, Title VI, LAP, building funds, district funds, other.
16. What was the focus of the professional development? Choices included assessment, test taking skills, writing/reading in the content area, mathematics content, teaching methods, EALRs, other.
17. Did you use the example test developed by CSL in professional development? NCS Mentor? *CSL Toolkit*?

Mathematics Leadership

18. Do you have an identified building leader? If so, is his/her role formal or informal?
19. Do you have a district mathematics specialist? If so, when is he/she available to help?
20. What type of assistance is provided?
21. What is his/her grade level experience? Choices given were elementary, middle, high school, and other.
22. Does the specialist have an endorsement or advanced degree?

Instructional Staff

23. How many teachers are at this site/district?
24. What percentage of teachers in your building have less than two years of experience? Three to five years? Six to ten? More than ten years of experience?
25. What percentage of your teachers have low knowledge of the essential academic learning requirements? Some knowledge? Moderate knowledge? High knowledge?

Students

26. Is the class composition typical of previous years?

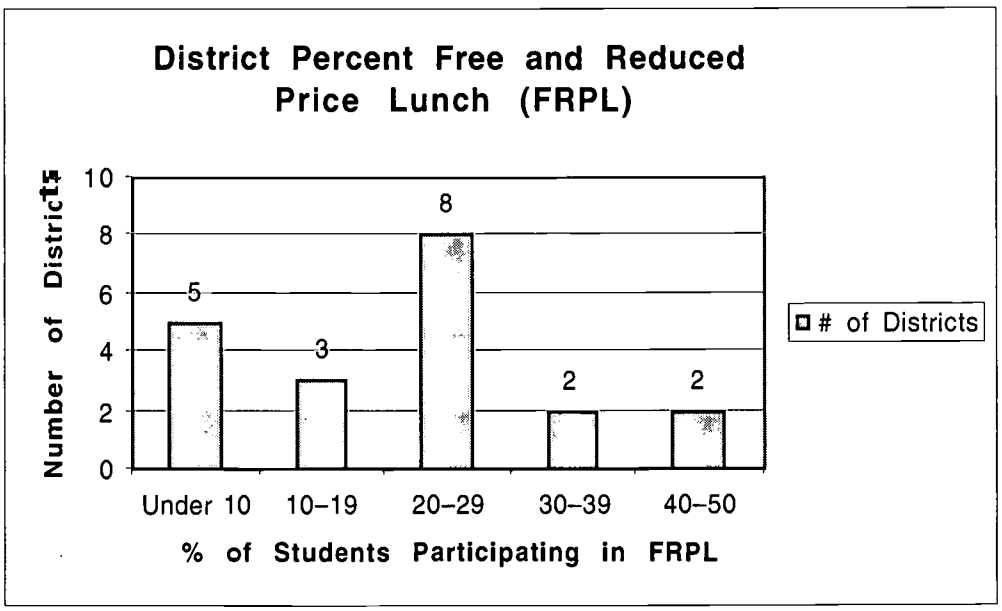
Wisdom

27. What one piece of advice would you give to other schools or districts focusing on improving their mathematics program?

Appendix C
Student and Teacher Demographics

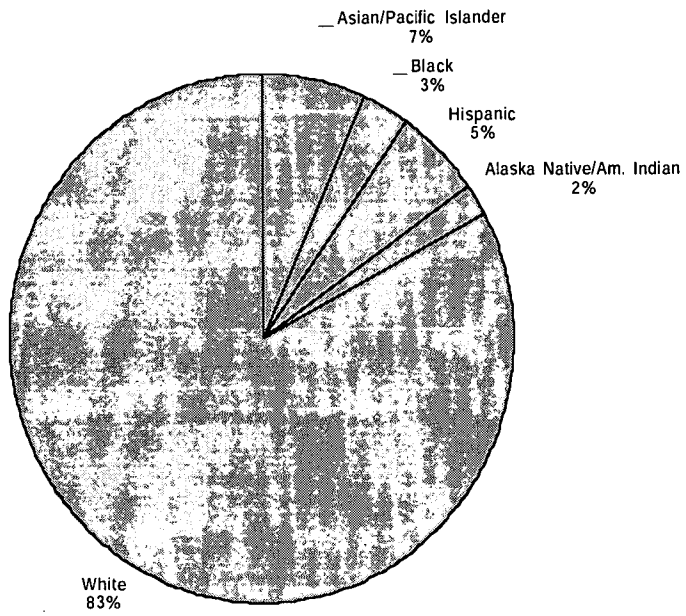
Student Demographics

Data regarding poverty and race is critical when evaluating student performance and availability of learning opportunities for all students. Building and district demographics indicated a wide range in the percentage of students in poverty within these educational environments. Data indicated that between 4 percent and 77 percent of students in the studied buildings received free and reduced price lunch (FRPL). Over half (55 percent) of the 53 buildings were between 30 percent and 77 percent low-income students as measured by FRPL. District-level FRPL data spanned a range of 4.6 percent to 42.8 percent; 10 percent of studied districts had 26 percent to 42.8 percent of their students eligible for FRPL. See Tables 3 and 4 for complete district and building data.



Ethnicity data indicated that racial diversity at the building level ranged from a low of 2.8 percent to a high of 50.2 percent. Racial diversity at the district level ranged from 6.5 percent to 40.4 percent. The following chart shows the overall ethnicity of the districts studied.

District Ethnicity



Two districts had a high percentage of Hispanic students (21.9 percent and 25.6 percent). Five districts had between 11 percent and 16.9 percent Asian/Pacific Islander students. The highest percentages of black students were seen in two districts, one with 17.8 percent and the other with 8.7 percent. The highest percentages of Alaskan Native/American Indian students were 7.2 percent and 6.2 percent.

Table 3
Building Summary of Poverty and Ethnicity Data
Grade 4—Spring 1998

Building	Percentage Free/ Reduced Lunch ('97)	Percentage Asian/ Pacific Islander	Percentage Black	Percentage Hispanic	Percentage Alaskan Native/ Am. Indian	Percentage White
Pacific Beach	77	1.0	3.9	7.8	25.2	62.1
Broadway	68	0.0	0.6	5.0	1.9	92.6
Outlook	64	0.7	0.4	49.1	0.0	49.8
Mossyrock	59	0.0	0.3	6.9	4.3	88.5
McAlder	57	3.1	2.7	6.5	2.2	85.7
Opportunity	56	2.0	0.7	1.6	5.9	89.8
Ness	53	0.4	1.6	3.5	1.6	93.0
Edison	52	1.4	2.4	16.7	0.7	78.8
Republic	50	0.7	0.0	0.4	1.7	97.2
Kittitas	48	0.8	0.4	10.5	0.8	87.6
Rosalia	48	1.0	0.7	1.0	7.7	89.6
Quilcene	46	1.3	0.3	1.3	4.1	93.2
Touchet	46	0.4	0.0	29.6	0.4	69.6
Minnehaha	46	2.9	7.2	3.2	2.3	84.5
Hawthorne	43	1.8	5.3	12.9	0.3	79.8
Acme	43	0.0	1.6	5.1	12.7	80.6
Jefferson	43	1.0	0.7	3.3	8.6	86.5
Franklin	43	1.4	7.2	1.9	2.8	86.7
Mirror Lake	42	16.2	17.7	7.7	0.9	57.5
Lacey	42	10.9	8.0	7.6	4.4	69.2
Greenwood	42	21.6	10.1	13.5	3.4	51.5
Monte Cristo	40	0.9	0.0	2.6	1.9	94.7
Vaughn	40	2.8	2.0	3.2	1.2	90.8
Adams	40	2.9	3.8	2.7	1.5	89.2
Skamania	39	1.0	0.0	2.0	2.0	94.9
Carl Cozier	37	5.5	3.0	7.3	2.1	82.1
Samish	35	1.0	0.0	4.0	1.5	93.5
Evergreen	33	0.8	1.1	2.1	1.9	94.1
Custer	32	1.4	0.5	5.3	1.2	91.7
Benjamin Franklin	30	2.6	3.0	0.9	0.4	93.2
Valley View	29	1.3	2.0	4.8	1.5	90.5
Lake Dolloff	29	8.5	13.9	3.6	2.2	71.9
Sierra Heights	27	15.3	8.3	9.9	1.2	65.2
Truman	25	5.8	3.2	1.9	2.1	87.2
P.C. Jantz	22	0.0	3.1	0.6	0.0	96.2
Riverview	22	2.4	0.4	1.8	1.2	94.1
Westhill	20	4.9	1.6	5.2	2.7	85.5
Hilltop	20	4.2	1.9	1.6	0.0	92.3
Brookside	19	11.5	4.3	2.3	1.4	80.5
Meridian Park	18	18.8	4.6	2.7	1.1	72.9
Silverdale	17	10.0	3.1	4.1	1.6	81.3
Endeavor	17	14.5	2.4	1.9	0.9	80.4
Fall City	15	2.0	0.7	3.5	0.0	93.8
Sunset	14	8.8	6.8	15.6	0.6	68.2

Table 3 (cont'd)
Building Summary of Poverty and Ethnicity Data
Grade 4—Spring 1998

Building	Percentage Free/ Reduced Lunch ('97)	Percentage Asian/ Pacific Islander	Percentage Black	Percentage Hispanic	Percentage Alaskan Native/ Am. Indian	Percentage White
Mark Twain	14	11.1	2.2	7.0	0.6	79.1
Maplewood Heights	12	6.7	5.4	2.7	1. 5	83.8
Moorlands	10	9.2	1.0	2.1	0.8	87.0
Peter Kirk	9	4.0	1.6	2.2	2.0	90.2
Fernwood	9	3.4	0.6	2.2	0.8	93.0
Mukilteo	8	5.9	2.1	1.7	1.0	89.3
Hollywood Hill	6	7.0	1.5	2.8	0.6	88.1
Sunny Hills	5	9.5	1.1	1.2	0.4	87.9
Bear Creek	4	3.0	1.4	3.0	0.5	92.3

Table 4
District Summary of Poverty and Ethnicity Data
Grade 4—Spring 1998

District	Percentage Free/ Reduced Lunch ('97)	Percentage Asian/ Pacific Islander	Percentage Black	Percentage Hispanic	Percentage Alaskan Native/ Am. Indian	Percentage White
Spokane	42.8	3.0	3.9	2.3	3.9	86.9
Walla Walla	41.5	1.8	1.4	21.9	0.8	74.1
Wenatchee	38.6	1.6	0.4	25.6	1.4	71.0
Vancouver	36.1	4.7	3.8	5.6	2.2	83.8
North Thurston	28.6	12.9	8.7	5.8	2.7	70.0
Renton	27.9	16.8	17.8	4.4	1.5	59.6
North Kitsap	27.5	3.7	1.7	3.0	6.2	85.4
Mukilteo	27.1	11.0	4.2	4.4	1.3	79.1
Bellingham	26.8	5.5	1.7	5.1	2.5	85.3
Central Valley	26.1	1.8	1.2	1.7	1.8	93.5
Marysville	22.7	3.9	1.2	3.3	7.2	84.5
Sumner	21.2	2.3	1.2	3.7	2.3	90.6
Mead	17.2	1.8	1.2	1.5	1.1	94.4
Peninsula	15.7	2.2	1.3	2.0	1.7	92.8
Shoreline	15.1	16.9	3.8	3.2	1.1	74.9
Tahoma	9.4	2.4	1.5	1.9	1.0	93.2
Lake Washington	8.5	9.6	2.2	3.6	0.6	84.1
Northshore	6.7	6.5	1.3	2.6	0.9	88.7
Oak Harbor	4.6	14.4	5.9	4.2	1.4	74.1
Issaquah	4.6	8.1	1.5	2.2	0.6	87.1

Teacher Demographics*

Estimated years of teacher experience were reported only at the building level and were based on the best estimate of interviewees. Interviewees reported the majority of teachers in these successful buildings were teachers who had a minimum of ten years of experience in the classroom.

Teaching Experience			
Under 2 Years	**3–5 Years**	**6–10 Years**	**10+ Years**
5%	9%	21%	65%

Interviewees also reported on the level of teacher knowledge regarding the EALRs. Their responses were based on their general observations. Teachers were reported to have a moderate to high knowledge of the EALRs in mathematics.

Teacher Knowledge of Essential Academic Learning Requirements				
	Low	**Some**	**Moderate**	**High**
Building	1%	17%	45%	37%
District	3.5%	19%	47.9%	29.6%

*This information was reported by interviewees based on their observations of teachers in their building. Data collected was not used to draw conclusions about student learning.

Appendix D
Instructional Time

Amount of Daily Instructional Time			
Buildings Reporting (53)		**Districts Reporting (20)**	
30–40 minutes	1	Building decision*	4
45–50 minutes	10	45–60 minutes	3
45–60 minutes	7	50–60 minutes	4
50 minutes	5	60 minutes	7
50–60 minutes	2	60–75 minutes	1
60 minutes	19	75 minutes	1
60–90 minutes	8		
Over 90 minutes	1		
Percent buildings with daily instruction	100%	Percent districts with daily instruction	85% reported daily instruction 80% identified number of minutes

*These districts reported that the amount of instructional time was a building decision. We have no information on the amount of instructional time—or even whether it was daily—devoted to mathematics in these districts. One district reported daily instruction but was unable to identify the number of minutes as that is determined by individual buildings in the district.

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