NOTE TO USERS

DISSERTATION

AN ANALYSIS OF RELATIONSHIPS BETWEEN EDUCATIONAL PRACTICES FRAMED BY THE NSDC STAFF DEVELOPMENT STANDARDS, SOCIOECONOMIC STATUS, AND THIRD GRADE READING ACHIEVEMENT

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY DAWN M. FERTITTA ENTITLED: AN ANALYSIS OF RELATIONSHIPS BETWEEN EDUCATIONAL PRACTICES FRAMED BY THE NSDC STAFF DEVELOPMENT STANDARDS, SOCIOECONOMIC STATUS, AND THIRD GRADE READING ACHIEVEMENT BE ACCEPTED AS FULLFILING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

AN ANALYSIS OF RELATIONSHIPS BETWEEN EDUCATIONAL PRACTICES FRAMED BY THE NSDC STAFF DEVELOPMENT STANDARDS, SOCIOECONOMIC STATUS, AND THIRD GRADE READING ACHIEVEMENT

This random sample, retrospective comparative research was conducted to examine relationships between the National Staff Development Council (NSDC) staff development standards (SDS) individually; constructs of context, process, and content; collective use (CU); hours of professional development each month (HPD/M); and percent of free and reduced lunch (%FRL) in relation to third grade reading achievement (3RA) of proficient and advanced (P&A) in Colorado. Participants were 69 elementary teachers with 5+ years or greatest experience; 25.27% response rate. The NSDC Standards Assessment Inventory, two additional questions, and 2004 third grade reading Colorado Student Assessment Program were used to answer: (1) What are professional development practices (PDP), %FRL, and 3RA of elementary schools in Colorado? (2) Do PDP or %FRL differ in high and low achieving schools? (3) Are links evident between PDP, %FRL, and P&A? (4) Can PDP or %FRL predict P&A individually or in combination? Data sets (DS) included returned sample (RS), highest achieving 10% (H10%), highest achieving 25% (H25%), lowest achieving 25% (L25%), and lowest achieving 10% (L10%). The RS and accessible population of Colorado were statistically similar.

There were no statistical differences in PDP between high and low achieving schools. Descriptive statistics showed SDS practiced in the frequently-to-always range was four-H10%, five-H25%, two-L25%, seven-L10%, and two-RS. The H10%, H25%, and L25% DS practiced content construct to highest degree. The L10% practiced process construct to highest degree. Leadership and equity standards ranked first or second and learning communities and evaluation standards ranked equally low across all DS. Family involvement standard ranked 12th L10%, 10th L25% and RS, 8th H25%, and 4th H10%. HPD/M was 13.2-RS, 12.23-L25%, 10.41-L10%, 10.31-H25%, and 8.71-H10%. Open-ended question reflected additional PDP related to achievement.

Differences between H10% and L10% showed %FRL was significant, $p < .01$. Differences between H25% and L25% indicated %FRL was significant, $p < .001$. Null hypotheses were rejected for %FRL. Null hypotheses accepted for all SDS, constructs, CU, and HPD/M.

RS held one significant correlation between %FRL and P&A, $p < .01$. Larger than typical negative relationship r (- .682) showed greater %FRL at a school the lower the P&A statistic. Second, L25% held one significant correlation between %FRL and P&A, $p < .01$, larger than typical negative relationship of r (- .616). Null hypotheses for associations between %FRL and P&A for RS and L25% were rejected.

Linear regression indicated %FRL significantly, $p < .001$ predicted P&A; prediction equation = 90.171 + - .415(%FRL of school). Adjusted $R^2 = .491$ showed 49% of variance in P&A was explained by %FRL. CU did not predict P&A. Null hypothesis was rejected for %FRL. Statistics suggested schools of all achievement levels exhibited similar PDP.

A call for future research and policy modification to promote equal opportunities for all students and educators was presented. Suggestions for future research included factors of poverty contributing to reduced achievement; funding programs known to create environments conducive to high achievement; equitable funding formulas; high-stakes testing and achievement; achievement related to federal sanctions and organizational development; family involvement; circumstances of professional development programming and emphasis; survey development identifying practices limiting achievement; and expansion of research in Colorado and other states.

Federal, state, district, and building policy implications included modifying funding formulas; eliminating discrepancies of identified student groups; continuing professional development initiatives; promoting low-stakes testing; eliminating sanctions associated with low achievement; accountability measures based on standards of practice; affirming a common professional development definition, program plan to implement standards of practice, and eliminating barriers; funding supportive collaboration; increasing family and community support; and increasing program options through adequate school district funding. Federal and state legislators working with educators, families, and communities can accomplish the attainable goal of increased achievement for all students.

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DEDICATION

To my husband, Russ, and daughter, Alison, who have encouraged me and blessed my life. Their unlimited support has sustained my ability to attain any goal and help others accomplish theirs. To my parents, grandparents, and husband's parents who fostered the belief; through dedication and perseverance, any achievement can be realized.

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CHAPTER 1: INTRODUCTION

Educators, legislators, and the public are looking for research-based methods to increase student achievement. The No Child Left Behind Act of 2001 (NCLB) federally mandated improvement of student achievement for public education to demonstrate accountability. This research explores relationships between standards of educational practice, socioeconomic status (SES), and third grade reading achievement in Colorado. Chapter 1 broadly outlines components of the study by first discussing historical aspects of a national call for improvement. Standards of educational practice outlined by the National Staff Development Council's (NSDC) staff development standards are then summarized. Next, the underpinning for student learning is illustrated through sections entitled student learning standards and assessments, and early reading acquisition and achievement. Definition of terms is the subsequent section. The study is framed by the statement of the problem, purpose statement, research questions, delimitations, limitations and assumptions, significance of the study, and researcher's perspective.

A National Call for Improvement

The National Commission on Excellence in Education released the report, "A Nation at Risk" (http://www.ed.gov/pubs/NatAtRisk/risk.html) in 1983. Findings indicated American students were academically behind peers from other industrialized nations and achievement scores were steadily declining. Although the report was disputed (Berliner & Biddle, 1995), policy makers embarked on legislation that changed educational practices across the nation. Reform efforts since the release of "A Nation at

Risk" have focused on the three major enterprises of raising content standards and assessments for all students, teaching and teacher education, and overall school restructuring (Darling-Hammond, 1997).

Colorado signed into law the Standards-based Education Reform, in 1993. The state law declared standards-based education and assessments, the system to increase equality for all students and reinforce accountability. A timeline for school districts to implement Colorado model content standards, Colorado Student Assessment Program (CSAP), professional development in standards-based education, and accountability measures such as public meetings was produced. The student assessment program was designed in accordance with the state standards law to test students' knowledge of the academic content standards (Colorado HB93-1313).

Throughout this time of systemic educational change, Goals 2000: Educate America Act (H.R. 1804) was passed in 1994. The public law established eight national education goals to guide states in the direction of educational reform. Of the eight goals, one focused on student achievement and citizenship and one focused on teacher education and professional development (H.R. 1804). Colorado had strong leadership in student achievement due to the standards-based education law. However, there was not a formal direction for comprehensive professional development, recruitment, or teacher preparation nation-wide (Darling-Hammond, 1996), or in the western state.

In April of 1996, the Colorado Basic Literacy Act was passed for primary-aged students. The literacy law required schools to assess literacy and reading comprehension levels of all students in kindergarten through third grade. Two mandated measures were outlined to assist students who performed below grade level. Parents and educators were

to collaborate on development of individual program plans for improvement. School districts were prohibited from passing below grade level performing third graders into a fourth grade reading class until proficiency was reached (http://www.cde.state.co.us).

In 1996, the National Commission on Teaching and America's Future defined educational goals to be achieved by the year 2006. The commission offered specific recommendations in the following general areas in order to "put us on the path to serious, long-term improvements in teaching and learning for America" (p. 5). The educational goals focused on standards for all students and teachers, re-creating teacher training and professional development, assuring recruitment and retainment of qualified teachers, rewarding and encouraging increased knowledge and skills, and the establishment of schools founded on student and teacher success (Darling-Hammond, 1996).

In 1998, Colorado passed the Educational Accreditation Act assigning accreditation responsibilities of school districts to the State Board of Education and schools to local school boards of education. Primary indicators of accreditation were proficiencies of state standards as verified by CSAP results and other factors such as graduation rates, learning gaps, attendance, and dropout rates.

Colorado passed SB99-154, The Performance-Based Teacher Education Programs Act in 1999. This law required higher education to align teacher preparation programs with Colorado model content standards. The eight pre-service teacher standards included knowledge of literacy, mathematics, standards and assessment, classroom and instructional management, individualization of instruction, technology, and democracy, educational governance, and careers in teaching. Teacher candidates must receive a

proficient or advanced rating during practicum work and pass content examinations to be eligible for licensure.

The Colorado School Accountability Report of 2000 was the government provision mandating use of CSAP results to report status of individual schools. Parents receive information on student achievement, teacher experience, salaries, learning gaps, progress of individual student groups, and improvement over time of student groups (http://www.cde.state.co.us).

On January 8, 2002, the NCLB (H.R. 1) was signed into law. The purpose of this reform was "to close the achievement gap through accountability, flexibility, and choice, so that no child is left behind" (p. 1). Title I outlined the amended Elementary and Secondary Education Act of 1965, entitled, "Improving the Academic Achievement of the Disadvantaged". Rationale centered on narrowing the achievement gap between the lowest and highest achieving groups of students and protecting equal educational opportunities for all children. States and local education agencies were held accountable for increasing achievement for all students including the disadvantaged. Criteria for implementation of this included instructional materials, accountability systems, teacher preparation and professional development, and assessments aligned with state academic standards for the common prospect of student achievement. Accountability systems were strengthened through alignment of teaching and learning with state student content standards and assessments. More authority and flexibility were given to school districts and teachers in return for greater responsibility for student performance. Resources were allocated to schools and school districts identified as having the greatest need of improving while options were given to those students to change schools.

To promote additional education reform efforts, Title I endorsed the following areas. Use of research-based instructional strategies and challenging content was outlined. Increased quality instruction was targeted through professional development. A coordinated effort of services with other agencies was promoted. An enriched and accelerated school program to increase the amount and quality of instructional time was provided. Parents were offered meaningful occasions to take part in schooling their children.

State administration of Title I included standards, assessments, accountability, and public reporting. The development of challenging academic content standards was intended to assure all children had an equitable and fair chance for a high quality education. The state assessment program for academic content standards was designed to measure all children's progress toward demonstration of proficiency. Responsibility for the number of students reaching a satisfactory level of achievement on state academic content standards assessments included each state, school district, and school building determining attainment of adequate yearly progress (AYP) (H.R. 1).

Colorado defined AYP as 95% of students taking CSAP tests and percentages of student's test results of partially proficient, proficient, and advanced increasing every 3 years to result in 100% of students performing within theses categories by the end of 12 years in 2014. Other indicators and safe harbor provisions were included for performance targets. Other indicators for elementary and middle schools were percentages of students performing at the advanced level. Safe harbor provisions included reducing percentages of non-proficient students by 10% from the previous year (http://www.cde.state.co.us).

To ensure the identifiers of AYP have been maintained, NCLB holds each state accountable for inclusion of penalties and rewards targeted to individual school districts and school buildings for achievement of students in accordance with state definition (H.R. 1). Reward programs in Colorado were identified for the highest performing and most improved schools in the state. Schools and school districts surpassing AYP goals for two or more years to significantly close achievement gaps are eligible for NCLB Title I academic achievement awards. Schools and school districts not meeting AYP goals have sanctions and interventions imposed through Colorado's accreditation process (Colorado application accountability workbook – http://www.cde.state.co.us). Inability to demonstrate improvement over a 3-year period transfers administration of the public school from the local board of education to a committee in charge of the school as a public charter school. Public reporting has taken the form of annual report cards from states, districts, and school buildings by using aggregated and disaggregated data to demonstrate the level of achieving AYP (H.R. 1).

Accountability for quality public schools in Colorado includes student learning standards, assessments, and increased numbers of highly qualified teachers and principals. Student proficiency on state standards tests represents the measure of accountability as defined by NCLB. In return for more flexibility in decision making power and funding for professional development, school districts and principals are held accountable for increased achievement of students. Under NCLB, states define indicators constituting a highly qualified educator. Colorado defined a highly qualified teacher in core academic subjects as holding a bachelor's degree and state teaching certification, and having ability to demonstrate subject area competence (http://www.cde.state.co.us).

Title II of the NCLB, entitled, "Preparing, Training, and Recruiting High Quality Teachers and Principals" created partnerships to increase student academic achievement by improving the quality of teachers and principals' professional skills and by increasing the amount of highly qualified educators in schools. Funding was earmarked for 18 programs focused on accountability, increasing the qualified teaching pool, and professional development. Professional development program areas included those coordinating professional development for teachers and principals, developing systems to measure program outcomes, increasing cost-effectiveness and accessibility, increasing training to integrate technology and analyze data, increasing professional development for principals and superintendents, providing assistance to teachers becoming highly qualified, and supporting programs to help teachers use the state academic content standards and assessments to enhance instruction and realize increased student achievement. The NCLB has been a federal effort to link professional development and systemic educational reform to provide structural framework for students to achieve high academic standards (H.R. 1).

Title I and Title II of NCLB are addressed by this research by exploring relationships between professional development and student achievement. The next three sections of chapter 1 establish components of the study. First, the NSDC organization and standards of staff development are introduced. Second, student learning standards and assessments are discussed. Finally, the importance of early reading acquisition and achievement are presented.

Staff Development Standards

The NSDC advocates effective professional development expands knowledge, skills, and attitudes of educators so all students can achieve at high levels. Valued professional development is organized with results in mind, based on standards of learning, and is a consistent element of work environments. Educators are called to utilize theory-driven and research-based staff development standards to enhance effectiveness of teaching and potential of student achievement. Staff development standards of practice have been developed by NSDC, a non-profit professional association whose mission is "to ensure success for all students by serving as the international network for those who improve schools and by advancing individual and organization development". The NSDC recently developed the first valid and reliable survey instrument to measure the frequency educational practices, identified by the 12 staff development standards, are present in a school's professional development program.

In fulfilling its' mission, NSDC offers customized services for schools, school districts, regions, state departments of education, and agencies. Customized services include training, planning, auditing, and consulting. Training focuses on building knowledge and skills. Planning assists in charting achievement of organizational goals. Auditing assesses strengths, needs, and impact of current staff development programs. Consulting entails services of facilitation or advice. The NSDC offers three regularly published professional journals, maintains an on-line bookstore, and hosts an annual national conference. Local affiliations have been organized in 35 states and provinces providing members with opportunities to network. Colorado offers services through an affiliation with NSDC.

The NSDC "views high-quality staff development programs as essential to creating schools in which all students and staff members are learners who continually improve their performance". Individual NSDC staff development standards reflect areas known to increase student achievement. The three major focus areas of context, process, and content guide the staff development standards. Standards of learning communities, leadership, and resources are context oriented. Standards of data-driven, evaluation, research-based, designs and strategies, learning, and collaboration skills are process oriented. Standards of equity, quality teaching, and family involvement are content oriented (http://www.nsdc.org).

Teachers have methods and support needed to influence student achievement when a comprehensive professional development program included identifiers described by NSDC staff development standards. In addition to support charted by staff development standards, teachers are provided direction for what to teach through student learning standards and aligned assessments.

Student Learning Standards and Assessments

Student learning standards and assessments focus the content of "what students should know and be able to do" (http://www.cde.state.co.us). Darling-Hammond (2003) reviewed the National Educational Goals of 1999 to study standards-based reform movements across the nation. Best practices for implementing student learning standards and corresponding assessments were found to improve equalizing effects of educational opportunity for all children through an investment in improving educational systems and teaching processes. A comprehensive approach to standards for teaching and learning was described as promoting better-prepared high quality teachers, gaining greater

performance-based curricula and assessments, producing unbiased and valued resource allocation, and creating additional diagnostic tools for student learning. Standards-based reforms that adopted low-stakes approaches to testing increased students' success. Darling-Hammond stated, "A developmental view of assessment seeks to create the conditions that enable responsive practice" (p. 7).

Best practices for assessing student-learning standards have been outlined by the American Psychological Association, American Educational Research Association, National Council on Measurement in Education, and National Research Council. Standards created for the implementation of state standards tests defined two parameters. Educators are not to use state assessment scores as a single source of data for major decisions about student retention or program placement. State assessment scores are to be used in combination with other local performance measures of student achievement for decision-making purposes regarding individuals (Darling-Hammond, 2003).

Empirical evidence showed increased student achievement through suitable preparation for state standards reading tests by linking teaching objectives to the specific test. Helping students become effective test takers was described as an ongoing process including 40% of time on guided reading and writing instruction, 20% of time fully engaged in reading materials internally motivating to learners for increased meaningful comprehension, 20% of time employing reading strategies for increased comprehension, 10% of time on motivation with attention to testing formats to lower anxiety along with increased sustained daily reading, and 10% of time on testing formats and how to use time effectively through cues and other methods within test questions (Farstrup & Samuels, 2002).

Sanders and Horn (1995) clarified alternative and standardized assessments have distinct places in evaluation. The position statements suggesting alternative assessments measure higher order thinking skills of critical analysis, synthesis, reasoning, and problem solving in comparison to standardized assessments measuring recall only has been disproved through the Scholastic Aptitude Test that tests analytical and reasoning abilities at high levels. Sanders and Horn stated the purpose of teacher-created alternative assessments was to measure what had been learned about a single unique subject in a manner that reflected individualism and good teaching practice. Due to the level of personalization, alternative assessments have been associated with high costs of implementation. In contrast, the purpose of using the relatively low-cost standardized tests has been to compare, generalize, or make decisions based on a learning standard. Sanders and Horn clarified decision making of this kind has the ability to be done on a large scale because the process of standardization includes validity and reliability through norming practices, precise instructions for administration of tests, standard formats for tests, machine scoring of multiple-choice questions, and consistent recording of answers. The extensive process of standardization allows results to draw inferences about the group at large or individual students in relation to established learning standards.

The Colorado student assessment program was created based on the state's academic content standards. Students in Colorado are taught according to and tested for attainment of these learning standards in reading, writing, mathematics, and science. All schools and school districts are measured by the same uniform procedure testing students' knowledge and skills concerning state learning standards. Results of statewide subject tests can be used by educators to improve curricula and instruction. The third

grade reading test results reflect the measure of comprehension, standard 1 of Colorado model content standards (Colorado Department of Education student assessment unit, 2002-2003). Statewide standardized student assessment allowed group comparisons to be made concerning one learning standard. Chapter 3 discusses the reading comprehension test in greater detail.

Early Reading Acquisition and Achievement

The importance of early reading skill development is presented through definition, empirical evidence, and federal law. Fountas and Pinnell (1996) described the developmental journey of learning how to read was contingent on a child's age, personal experiences, and attention span. The four developmental skill stages new readers progress through on their way to independent reading are entitled emergent, early, transitional, and self-extending. Emergent readers attend preschool to early first grade and have developed skills such as gaining information from pictures, linking oral language to print, making meaning through own experiences, attending to and using some aspects of print, noticing how print is used, understanding some words, and using patterns of print in books. Early readers attend kindergarten or first grade and have developed skills of relying less on pictures and more on print for information, having greater control of early reading strategies, knowing several high frequency words, using more than one source of information, reading familiar texts with phrasing and fluency, and possessing reading strategies of monitoring, searching, cross-checking, and self-correction. Transitional readers attend kindergarten through second grade and have developed skills including full control of early reading strategies, reading for meaning by using multiple sources of information, integrating cues while reading, knowing many high frequency

words, noticing pictures but relying on text for information, reading fluently with phrasing most of the time, and reading longer complicated texts. Self-extending readers attend first, second, or third grade and have developed skills needed to flexibly use all sources of information; independently problem solve while reading; read with phrasing, fluency, and meaning; read wide ranges of texts for multiple purposes; continue to learn from reading; read longer complicated texts; and read a variety of genre. Fountas and Pinnell advocated, "...a self-extending system must be in place by grade three" (p. 177).

Students develop reading habits early in schooling based on literacy experiences influencing personal reading ability and life-long reading habits. Cunningham and Stanovich (1997) conducted a longitudinal study on 27 eleventh grade students who participated in an original first grade reading study (n = 56) 10 years earlier. Tests were administered measuring exposure to print, reading comprehension, general knowledge, and vocabulary. Results indicated, "first-grade reading ability was a strong predictor of all of the 11^{th}-grade outcomes and remained so even when measures of cognitive ability were partialed out" (p. 934). Comprehension ability of first graders associated with high verbal ability and analytical knowledge 10 years later.

Cunningham and Stanovich reliably correlated first grade reading ability with exposure to print. Individual differences in exposure to print were found to predict differences in the level of reading comprehension an individual student possessed throughout elementary years and after. Reading habits were found to develop early in a child's life and influenced lifelong reading practices regardless of the depth of comprehension ultimately attained. Greater strength of correlations existed for third and fifth grade reading ability in comparison to first grade results. Wide assortment of

literature allowed students who experienced low reading achievement in first grade to gain reading expertise at their level and reap the same long-term comprehension and application benefits by catching up by third or fifth grade. Cunningham and Stanovich concluded students who became proficient readers by third or fifth grade were able to increase verbal abilities, reading comprehension, and general knowledge to create the foundation for future understanding.

The Reading First law of NCLB was written to support states in making every child a proficient reader through scientific reading instruction, screening, diagnosis, instruction, evaluation, and valid and reliable assessments. By using research on reading instruction and basing instructional decisions on what increased student learning, teachers and schools focus on high quality comprehensive classroom reading instruction for all children in kindergarten through third grade. The Reading First law provided for increased professional development opportunities, scientifically based instructional programs, materials and instruction, valid and reliable screening, ongoing diagnostic classroom assessments, statewide accountability, and leadership structures. Reading First grant monies target school districts and schools with large numbers of poor children and highest percentages of kindergarten through third grade students reading below grade level (H.R. 1).

The developmental nature of learning how to read promotes the need for standards of professional development providing consistency. Uniformity through student learning standards and aligned assessments from one grade to the next is important for learning. Through the use of empirically-based educational practices

defined by NSDC staff development standards, student achievement can be impacted as measured by student learning standards assessments.

Definition of Terms

Staff/Professional Development - Effective staff development is based on theory, research, proven practice, and promotes knowledge, skills, and outlook required of educators so all students can learn and perform at high levels. Programming includes high-quality continuous training with intensive follow up and support in tandem with other growth promoting processes such as study groups, action research, peer coaching, and time for reflection (http://www.nsdc.org). In this study, staff development and professional development are synonymous.

Colorado Model Content Standard for Third Grade Reading – Exact wording and emphasis of the third grade comprehension standard reads as follows:

> Standard 1- Students read and understand a variety of materials. **By the end of third grade, students will be fluent readers with a full range of reading strategies to apply to reading a wide variety of increasingly difficult narrative and expository text at the third grade level. This requires:**
>
> *An understanding of the text* that shall include, but not necessarily limited to, students being able to do the following:
>
> - adjust reading pace to accommodate purpose, style, and difficulty of material;
> - summarize text passages;
> - apply information and make connections from reading.

An integration of cueing systems that shall include, but not necessarily limited to, students being able to do the following:

- apply word attack skills to read new and unfamiliar words (graphophonics);
- use sentence structure, paragraph structure, text organization, and word order (syntax);
- use and apply background experience and context to construct a variety of meanings over developmentally appropriate complex texts (semantics);
- use strategies of sampling, predicting, confirming, and self-correcting quickly, confidently, and independently (graphophonics, syntax, and semantics). (p.2-3)

Third Grade Reading Comprehension Proficient Performance – Exact wording is as follows: Third grade students are proficient in reading comprehension when they can comprehend longer and increasingly difficult text, including poetry. They are able to draw inferences from what they read, follow directions, identify main idea and supporting details, accurately and thoroughly sequence events, draw conclusions, determine cause and effect, reread and search to confirm obvious information and meaning, demonstrate their thorough understanding of text through a written response, understand vocabulary essential to the text.

Third Grade Reading Comprehension Advanced Performance – Exact wording is as follows: Third grade students are advanced in reading comprehension if they can comprehend a variety of texts including narrative (such as realistic fiction, fantasy, and

legends), expository, and poetry in an in-depth manner. [Including] restate and evaluate main idea and significant details, problem and solution, and cause and effect; paraphrase and summarize information; analyze the sequence of events; identify and infer character traits and motives, the theme of a narrative, and meaning from figurative language, including metaphor and personification; interpret complex or content specific vocabulary; reread and search text to confirm less obvious information and meaning; draw conclusions by inferring from the text using higher levels of thinking.

Student Achievement – Teachers assess student achievement in formal and informal ways through alternative methods, criterion referenced tests, and standards assessments to measure growth over time to reflect total educational development. In this study, achievement of third grade students was measured by the spring 2004 CSAP reading standards test. Percentages of students performing in the proficient and advanced categories at the school level were used to represent student achievement of the Colorado model content reading standard of comprehension.

The student assessment unit of the Colorado Department of Education (CDE) posted many resources for educators to understand and interpret standards and assessments such as scoring rubrics and sample test questions. One resource example included possible reasons for improved or low test performances aimed at initiating discussion of school improvement. Worksheets of potential factors included adherence to curriculum and performance standards; alignment of instructional strategies; teacher knowledge and skills; student knowledge and skills; school processes; student mobility; attendance; and percent of free and reduced lunch recipients (http://www.cde.state.co.us).

School Achievement – School achievement refers to efforts put forth by educators influencing the complete educational experience provided for students. In this study, school achievement was represented through application of educational practices outlined by NSDC staff development standards, hours of professional development within the school day each month, and additional information provided by participants.

School Demographics – School demographics refers to school qualities present beyond professional development practices. In this study, school demographics included SES of the school community represented by the percent of free and reduced lunch recipients as posted on the CDE website.

Statement of the Problem

The NCLB holds principals and school districts accountable for student achievement on state standards assessments. Colorado administers rewards and sanctions through formulas of achievement according to student performance on CSAP and other indicators. Loss of school accreditation and administration of a public school results from inability to demonstrate AYP in student achievement over 3 years, according to formulas factoring AYP with other indicators (http://www.cde.state.co.us). Supporting school professionals in implementing educational practices known to increase student achievement through empirical evidence is important for student success on state standards assessments (Cohen, 2000).

Empirical literature presented in chapter 2 identifies high quality professional development practices that increased student achievement, transformed teaching practice, and accomplished school and district goals. Results of each study identified individual or combinations of NSDC staff development standards as affecting student achievement.

Elimination of barriers between professional development and achievement is also presented in chapter 2. The combined results of the professional development body of literature encompassed all NSDC staff development standards and areas identified as limiting achievement. What remained to be explored was the extent school achievement and school demographics affected student achievement. Differences in comprehensive use or degree of emphasis of professional development practices among elementary schools may vary across Colorado in relation to student achievement.

Purpose Statement

The purpose of this research was to examine relationships of educational practice defined by NSDC staff development standards, hours of professional development within the school day each month, and school demographics of SES, defined by the fall 2003 percent of free and reduced lunch recipients to proficient and advanced achievement on the 2004 third grade reading standards test in Colorado. The NSDC Standards Assessment Inventory (NSDC SAI) survey, two additional questions, fall 2003 percent free and reduced lunch variable, and proficient and advanced variable of the 2004 third grade reading CSAP assessment were used to answer the following questions: (1) What are professional development practices, SES, and reading achievement of Colorado elementary schools? (2) Do professional development practices or SES differ in high achieving and low achieving schools? (3) Are links evident between professional development practices, SES, and reading achievement? (4) Can professional development practices and SES predict reading achievement individually or in combination? The research questions are:

Research Questions

1. What are characteristics of the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% data sets as described through descriptive statistics of measures of central tendency, measures of variability, and properties of the distribution in regard to:
    a. NSDC staff development standards of learning communities, leadership, resources, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, equity, quality teaching, and family involvement individually; constructs of context, process, and content; and collective use?
    b. Hours of professional development within the school day each month?
    c. Percentages of third grade students scoring in the unsatisfactory, partially proficient, proficient, advanced, proficient and advanced, and not scored categories on the 2004 third grade reading CSAP assessment?
    d. Percent of free and reduced lunch?
    e. Additional information about the professional development program?
2. Are there differences between groups identified by the highest and lowest scoring 10%; and highest and lowest scoring 25% in reading achievement

measured by the proficient and advanced variable on the 2004 third grade reading CSAP assessment in regard to:

   a. NSDC staff development standards of learning communities, leadership, resources, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, equity, quality teaching, and family involvement individually; constructs of context, process, and content; and collective use?
   b. Hours of professional development within the school day each month?
   c. Percent of free and reduced lunch?

3. Are there associations between the variables of context, process, content, hours of professional development within the school day each month, and percent of free and reduced lunch with proficient and advanced reading achievement in regard to the five data sets identified by:
   a. The returned sample?
   b. The highest scoring 10% of public elementary schools?
   c. The lowest scoring 10% of public elementary schools?
   d. The highest scoring 25% of public elementary schools?
   e. The lowest scoring 25% of public elementary schools?
4. Can collective use, hours of professional development within the school day each month, or percent of free and reduced lunch predict proficient and advanced reading achievement individually or in combination for the returned sample?

Data supporting research variables were accessed from three different sources. Variables associated with research questions (1c), (1d), and (2c) were obtained through the CDE website. The NSDC SAI corresponded to variables identified in research questions (1a) and (2a). Two additional questions defined variables in research questions (1b), (1e), and (2b). All data sources were accessed for research questions (3) and (4).

Rationale of the research questions was based on empirical and theoretical literature discussed in chapter 2 as affecting one or more NSDC staff development standards and educational practices school districts employed. Research questions (1a) and (2a) were supported through empirical studies showing increased student achievement including Cohen (2000), Faires, Nichols, and Rickelman (2000), Farstrup and Samuels (2002), Hallinger, Bickman, and Davis (1996), Jinkins (2001), Marzano, Pickering, and Pollock (2001), Newmann, King, and Youngs (2000), Pritchard and Marshall (2002), Wenglinsky (2002), and Wharton-McDonald, Pressley, and Mistretta Hampston (1998). Variables outlined in research questions (1b), (1d), (2b), (2c), and (1e) were supported by empirical literature and not directly addressed by NSDC SAI. Studies associated with research questions (1b) and (2b) refer to hours of professional development variable and included Cohen (2000), Garet et al. (2001), Newmann et al. (2000), and Pritchard and Marshall (2002) indicating increased student achievement. Empirical studies supporting research questions (1d) and (2c) were Faires et al. (2000), and Wenglinsky (2002). Results indicated professional development for teachers and parents increased achievement of students, while low SES was shown to not limit student achievement. In support of this, Newmann et al. (2000) began research of professional development practices with selected samples of low SES schools and school districts with

high student achievement. Variables associated with research question (1e) were designed to reflect uniqueness of individual professional development programs. The CDE website provided the variable of proficient and advanced third grade reading achievement. Research question (3) was to establish if schools placed varying emphasis on NSDC staff development standards constructs and if hours of professional development each month or SES contributed to an association with student reading achievement. Research question (4) was to determine if collective use of NSDC staff development standards, hours of professional development each month, or percent of free and reduced lunch recipients predicted reading achievement individually or in combination.

Delimitations

This study was outlined as an ex post facto comparative design to investigate relationships between implementation of educational practices defined by NSDC staff development standards, school demographics, and statewide third grade reading achievement. The third grade reading CSAP was selected to reflect reading comprehension at the early acquisition stage. Characteristics of the sample were described through responses to the NSDC SAI, two additional questions, percent of free and reduced lunch recipients, and proficient and advanced reading achievement for the spring 2004 testing period. Comparisons between the highest scoring and lowest scoring 10% and highest scoring and lowest scoring 25% of schools data sets for the proficient and advanced variable were analyzed for differences in implementation of NSDC staff development standards, hours of professional development within the school day each month, and percent of free and reduced lunch recipients. Associations were explored

between context, process, content, and percent of free and reduced lunch with the proficient and advanced variable for highest scoring 10%, lowest scoring 10%, highest scoring 25%, lowest scoring 25%, and returned sample data sets. Linear regression was performed to determine if collective use of staff development standards, hours of professional development, or percent of free and reduced lunch individually predicted reading achievement. If merited, multiple predictors of achievement were used in regression analyses to determine if a combination of variables predicted reading achievement greater than individually.

A random sample of 274 public elementary schools within Colorado provided the source of participants. A letter of introduction addressed to the building principal described the study and criteria of participants. The principal invited one classroom teacher to voluntarily take part in the study who (a) had taught in the public elementary school building for 5 or more years (b) had participated in a variety of professional development opportunities offered by his or her school and school district, particularly within the last year and (c) responded to the questions based on professional development programming over a 3-year period prior to administrating the spring 2004 CSAP reading test. Participants were asked to judge educational practices that were a part of the school environment by completing a summated attitude survey and two additional short response questions. Participant identity was to remain confidential.

This study modified the intended use of NSDC SAI. The NSDC SAI was designed for each faculty member of a school to complete as a self-assessment of needs and discuss results collaboratively to establish a professional development plan. For this research, one participant per building was asked to rate levels of implementation of

NSDC staff development standards and respond to two additional questions. Data from this research reflected application of educational practices at public elementary schools, SES, and early acquisition reading achievement in Colorado.

Limitations and Assumptions

Limitations of this research included comparative research, self-report surveys, student test-taking experience, reporting procedures for state assessment results, and participant selection. First, three limitations of comparative research included the lack randomized group development, manipulation of treatments by the researcher, and internal control of variables. Since all variables occurred in the past, relationships were described. Due to lack of experimental nature of the study, causation of results cannot be assumed. There may have been an extraneous variable considered the true impetus for differences in the variables under investigation. Second, self-report survey research may be affected by the "Hawthorne effect"; prevalent in a study when participants alter behavior due to participation in a study (Gay & Airasian, 2000). The third limitation involved third grade students participating in CSAP testing for the first time, therefore individual results may reflect lack of experience with state standards testing procedures. Percentages of students scoring in the proficient and advanced categories may not be fully reflective of all students who have skills equal to those defined by proficient or advanced. Next, reporting procedures of the CDE assessment database limited schools eligible for this study. Schools with small third grade classes were not required to post proficiency results publicly due to the possibility of identifying individual students. Without assessment percentages, statistical analyses for these schools could not be performed. For this reason, only schools with reported assessment data were selected for

the sample. Finally, the principal of sample schools asked a teacher to volunteer as a research participant. Responses to the leadership standard questions may have been skewed due to this interaction.

Assumptions of this research involved the level of quality teaching in Colorado elementary schools. First, this research assumed Colorado elementary teachers were the highest qualified candidates at the time of hire, and understood Colorado model content standards. Second, those who participated in the study had quality skills and knowledge to draw from five years or more experience.

Significance of the Study

Implementation of professional development in schools was empirically shown to increase student achievement when measured by national academic content assessments (Wenglinsky, 2002), state academic content assessments (Cohen, 2000), state content standards assessments (Huffman, Thomas, & Lawrenz, 2003), and criterion referenced tests (Faires et al., 2000; Newmann et al., 2000; Pritchard & Marshall, 2002). Results of quality professional development programs (Faires et al., 2000; Wenglinsky, 2002) surpassed limiting factors of poverty to affect student achievement in positive ways. Research defined high quality professional development through individual or combinations of NSDC staff development standards based on results of changed teaching practices, increased knowledge and skills, or increased student achievement on standardized or criterion-referenced tests.

The NSDC staff development standards were separately defined and written as a results-driven, standards-based, and job-embedded approach to professional development (http://www.nsdc.org). Schools and school districts may implement NSDC staff

development standards concurrently, in different combinations, or with varying emphasis. Interpretation of educational practices through the NSDC staff development standards framework provides a broader scope of understanding school achievement. This quantitative research contributes to the professional development literature by attempting to measure school achievement and school demographic relationships and differences with student reading achievement.

Implications for results of this study include future professional development research, policy development, and student-achievement related program development. Future research can clarify relationships to greater degrees. Policy creation can strengthen supportive professional development practices designed to increase and avoid barriers to student and educator achievement. Program creation can focus on the statistically significant findings of high performing schools in this research.

Researcher's Perspective

Student achievement-centered professional development literature shares common results of teachers' ability to influence students' academic success. This paper presents a review of literature focused on student achievement when variables related to professional development were pursued. Results of this study may provide further understanding of what educational practices or other variables contributed to student reading achievement, differences between and associations among high and low achieving public elementary schools, and ability of variables to predict student reading achievement. By understanding relationships between standards-based professional development practices and high student achievement, a design of best practices can guide future research, programming, and policy development.

CHAPTER 2: LITERATURE REVIEW

Chapter 2 presents empirical verification of links between professional development and student achievement. First, empirical research identifying increased student achievement or qualities supporting student achievement is reviewed through the framework of the National Staff Development Council's (NSDC) staff development standards. Second, research identifying barriers between professional development and student achievement is reported. By presenting professional development's impact on student achievement as well as barriers to achievement within the environment of change, the full scope of professional development empirical literature and theory was attempted to be established.

Standards of Educational Practice and Student Achievement

The purpose of this section was to report empirical results and reviews focused on standards of educational practice and outcomes of student achievement. Literature ranged from nationwide to single classroom studies representing analyses of school district, school site, and classroom practices. Five studies incorporated a majority of NSDC staff development standards within results. Cohen (2000) outlined a model of instructional policy based on results of teachers' classroom practices directly influencing student achievement measured by a statewide academic content test. Pritchard and Marshall (2002) delineated actions school districts took concerning professional development for student achievement on criterion-referenced tests during a longitudinal study. Johnston, Allington, Guice, and Brooks (1998) researched the influence

organizational structures had on curricular reform including changed teaching practices, implementation of student-centered teaching, student achievement, and long-term change in a multilevel longitudinal study. Garet, Porter, Desimone, Birman, and Yoon (2001) discussed methods of professional development that increased teachers' knowledge and skills leading to changed classroom practices. Newman et al. (2000) summarized comprehensive school-wide factors to be addressed based on an individual schools' current status to affect student achievement.

Cohen (2000) established student achievement was impacted by linking elements of instruction for student learning, assessments, curriculum, and teachers' knowledge and practice. A 1994 survey of California elementary school teachers and test results of the 1994 California Learning Assessment System were examined to develop a student achievement model describing dynamics of educational policy, teachers' opportunity to learn, and teachers' instructional practices. By aligning student curricula, teachers' professional development, teaching methods on learning, student assessment, and teachers' knowledge of curricula and assessments, Cohen found student achievement increased when all were present. Educational reform targeting implementation of content standards was supported through consistent instructional policy, integration of better curricula, quality teaching techniques modeled during professional development similar to those used in the classroom, increased teachers' knowledge of student curriculum, and curricula and assessments considerately linked to teaching. Building relationships between teachers' professional development, teaching methods on learning, alignment of student curricula, student assessments, and teachers' knowledge of curricula and assessments took place over time to increase student achievement.

Pritchard and Marshall (2002) randomly selected school districts in urban, rural, and small towns nationwide, and through mixed methods processes over 4 years, drew conclusions about effective professional development. Results indicated close associations existed between school districts operating under beliefs identified as district health, resulting professional development characteristics, and high student achievement. District health was defined as how well a district managed daily operations including quality of school and district climate, teachers and administrators degree of commitment toward growth and change, evidence of strategic planning focused on district learning processes, ratio of positive to negative attitudes of students, and whether professional development was systematically involved in continuous organizational improvement.

To measure student achievement, a writing assessment was given to students in high and low health districts in fourth, eighth, and eleventh grades. Results indicated little achievement difference in fourth grade, significantly higher achievement ($p \leq .01$) in healthy districts for eighth grade and by eleventh grade, students in high health districts showed a small increase in writing achievement while students in low health districts showed a decrease ($p \leq .01$). The interaction pattern was significant at the $p \leq .01$ level. Results signified district beliefs linked to positive school climate factors and continuous professional development improvement were more closely related to student achievement as the grade level increased. Guidelines for professional development utilized by high achieving districts included those outlined by the Consortium for Policy Research in Education to build district capacity including interpreting and using data, building teacher knowledge and skills, aligning curricula and instruction, and targeting interventions on low performing schools.

Pritchard and Marshall's (2002) results outlined the top 10 strategies high achieving school districts utilized leading to increased student achievement and district-wide impact of professional development through sustained change. Statistically significant characteristics have been listed in order. First, professional development had a protected, designated line item in the budget. Up to 20% of the districts' budgets were expended for classroom instruction and instructional support. Second, professional development programs used assessments of district needs from multiple sources for establishing priorities. Formative and summative means were used to realign teacher learning with student needs to increase success. Third, professional development provided thematic activities aligned with district purpose and offered over time. School level follow up of district professional development initiatives increased understanding and implementation. Fourth, professional development was primarily addressed during work time. District and school schedules were modified so teachers benefited from team planning as well as articulated subject specialist planning. Fifth, administrators took active roles in planning for and participating in professional development activities thereby emphasizing the value, professional development assured system excellence. To increase teacher participation in professional development initiatives, administrators helped with scheduling, communication, and eliminating elements that may have been perceived as barriers. Sixth, professional development was based primarily on the district strategic plan and secondarily on individual selection. District professional development programs were supplemented and strengthened by workshops, conferences, and outside sources drawing on new information for future programming. Seventh, professional development was an expected job responsibility of every employee. Participation was

considered a positive expectation of district culture. Eighth, professional development programming was driven by a shared building focus aligned with district vision and professional development activity formats varied by purpose. Schools were given flexibility in elaborating on professional development initiatives while expanding on district vision thereby contributing to overall growth of the district. Ninth, professional development was driven by a shared district focus on learning for all professionals. School boards, central office staffs, administrators, and teachers shared the same goals to increase student learning. Last, fundamental issues of curriculum and instruction were addressed as part of an integrated district strategy. Professional development initiatives were planned in collaboration with other continuous improvement efforts to provide greater understanding of the relationship with student achievement. Pritchard and Marshall gave examples of professional development tactics in high achieving districts as utilizing combinations of the top 10 strategies leading to successful change. One teacher-initiated professional development example met criteria of 5 of the 10 strategies.

Johnston et al. (1998) researched variations in organizational structure that supported or undermined professional development foundations for school districts and educators while change was being implemented, and compared outcomes to student achievement. A 5-year multilevel study focused on teachers' practices in four elementary schools in four high-poverty school districts (45% to 90% free and reduced lunch recipients) attempting literacy curricular reforms. The research explored differences between administration style contexts (decentralized or centralized) and literacy curriculums (literature-based or textbook-based). Two school districts operated under centralized administration contexts that moved to literature-based curriculums with little

teacher input. The other two school districts were decentralized administration contexts that moved to literature-based curriculums after committees of teachers and administrators recommended changes. Two schools were chosen from each school district, one implementing a literature-based curriculum, and another implementing a textbook-based curriculum.

Johnston et al. (1998) found long-term change occurred in classrooms and schools adopting decentralized methods of organizational structure. Decentralized organizational contexts supported teacher and administrator contributions to decision making and greatly influenced the atmosphere of the district and individual classrooms. Continuing long-term change occurred when teachers had decision making power in less coercive atmospheres and supported one another in trusting environments. Throughout the study, structural school-wide changes took place to increase inclusion of students with disabilities, create new retention and promotion policies, change classroom grouping configurations and schedules, modify configurations of children with teachers, and increase time for students to work with their teacher. Classrooms successfully evolving literacy practices, co-constructed by teachers and students through collaborative inquiry, were in decentralized districts. Classroom practices were characterized by shared decisions, hardworking teachers, collaborative groups of willing volunteers, rich positive descriptions of student achievement, less reliance on workbooks and worksheets, and places where small informal professional learning communities supported one another. The emphasis of change teachers strove to accomplish in their classrooms included communities of learners who thrived in supportive environments of inquiry with less coercive classroom atmospheres.

Achievement of students on state-mandated reading tests over the course of research included stability for decentralized districts and a slight decline for centralized districts. All districts broadened the number of low achieving students taking state tests by changing policy, reducing grade retention, eliminating transitional grades, and including greater numbers of lower achieving students in classrooms. Johnson et al. (1998) stated:

> In fact, although the test scores did not increase, according to our field notes, even in the least changed classrooms there were more instances of children engaging in conversations about books and becoming excited about writing topics than there had been. (p.86)

Johnston recognized the state mandated student assessments did not equivalently measure the extent change was experienced in classrooms.

Garet et al. (2001) conducted a national probability study of 1,027 mathematics and science teachers (72% response rate) who participated in Eisenhower mathematics and science professional development activities including workshops, conferences, study groups, professional networks, collaborative efforts, task force work, and peer coaching. Data from the Teacher Activity Survey described core and structural professional development activities that transformed teaching practices.

Garet et al. (2001) reported significant positive effects of the core features of professional development activities on increased levels of teachers' knowledge and skills, and changed classroom practice as reported by teachers. The core features included content focus, active learning opportunities, and program coherence. Content focus was defined as professional development that improved and deepened teachers' knowledge of

subject area. Active learning opportunities engaged teachers in meaningful analyses of teaching and learning. Program coherence made associations with teachers' past professional experiences, was aligned with student standards and assessments, and fostered collegial communication. Through core professional development components, structural features of professional development significantly affected teacher learning.

Structural features of professional development defined by Garet et al. (2001) transformed teaching practices and included reform activities, duration, and collective participation. Reform activities included study groups, taskforces, networking, and mentoring, in comparison to traditional activities involving only workshops or conferences. Duration referred to professional development sustained over time and had a substantial number of contact hours for greater intensive curricular depth. Groups of teachers from the same school, subject, or grade level who engaged in professional dialog exemplified collective participation.

Research results from Garet et al. (2001) found direct and indirect relationships defining best practices for professional development programs to change teaching practices. Direct significant results had two levels of emphasis. First, a substantial positive effect linked teachers' enhanced knowledge and skills to changed teaching practice. Conditions linked to increased knowledge and skills for teachers were content of academic subject matter, meaningful analysis of teaching and learning, integration of professional experiences, alignment with standards and assessments, and collegial communication. Second, changed teaching practices were greatly influenced through teachers' past professional experiences, alignment with other reform efforts, collective

participation, connection with standards and assessments, professional interactions, and opportunities for active learning.

Indirect results of changed teaching practices were impacted through the form of activity. Reform professional development affected changed classroom practice greater than traditional professional development. The positive effects of reform activities worked indirectly through other high quality design aspects such as better outcomes due to longer duration. High quality professional development and improved classroom practices fostered change through increased knowledge and skills. Changed teaching practice included activities centered on structural features of duration and intensity, collective participation, and the core features of content, active learning, and program coherence (Garet et al., 2001).

Newmann et al. (2000), studied aspects of comprehensive professional development over 2 years and found student achievement factors influenced classroom instruction through the impact of school aptitudes. Nine traditionally low achieving (50% or more students scored below minimum state/district testing standards for reading and/or math; in six schools 80% of students scored below testing standards), high-poverty (31% student mobility average) elementary schools were selected through a national search. Each school had shown significant gains in student achievement over the previous 3 to 5 years and had received substantial professional development assistance from one or more external agencies. Schools attributed progress to continual school-wide professional development and participation in site-based management. The extent of student achievement was not measurable due to changed achievement data sources and

lack of alignment. Different approaches to professional development and various kinds of assistance from district, state, and independent sources were represented.

Newmann et al. (2000) ascertained professional development suited to the individual school affected student outcomes in the fullest way, and referred to it as school capacity. Capacity was defined as having the potential of carrying out a function and could be characterized as high or low. School capacity was "...the collective power of the full staff to improve student achievement..." (p. 261) and involved the five factors of professional community, program coherence, technical resources, principal leadership, and teachers' knowledge, skills, and disposition.

Each aspect of school capacity was recognized through literature as contributing to increased student achievement. Professional community was influenced by school size while emphasizing importance of social resources, clear shared learning goals for student learning, and hiring policies attracting teachers with similar educational philosophies. A culture of staff collaboration, shared responsibility to achieve goals, professional inquiry, instructional methods analysis, student assessment analysis, and opportunities for teachers to influence school activities and policies illustrated professional communities. Program coherence reflected integrated organizational goals focused on increasing student achievement through coordinated teacher and student learning. Integration of creativity, curriculum standards, and program mandates were encouraged. A consistent instructional philosophy was continued for a substantial period to reinforce learning. Technical resources consisted of high quality curriculum supporting improved academic standards and assessments, texts, instructional materials, computers, high quality technology, science experiment equipment, an assortment of quality children's literature,

professional workspace, and current building facilities. Principal leadership had the ability to guide professional development in either a comprehensive, or a negative way based on the outcome of building capacity to raise student achievement. Teachers' knowledge, skills, and dispositions reflected professional competence in individualizing instruction and assessment, enriching instructional strategies, and designing curriculum while expecting all students to achieve to a high degree.

Newmann et al. (2000) approached the different features of school capacity as interactive. Examples provided greater understanding:

> Teachers with a sound knowledge of subject matter may be more likely to select high-quality instructional materials, but high-quality materials may also help to improve teachers' subject matter knowledge. A faculty with a strong professional community might be more likely to integrate curriculum across grade levels to increase program coherence, but it is also possible that adoption of a coherent curriculum framework could stimulate increased collaboration and consensus and thereby enhance professional community. (p. 264)

Newmann et al. (2000) concluded professional development must go beyond individual teachers to include the improvement of organizational resources to increase school-wide student achievement. Comprehensive professional development must address all five factors of school capacity and individualize programming to meet school needs. The empirical evidence indicated three levels of significant findings. Strong significant relationships were found between professional development, a school's initial level of capacity, and principal leadership. Moderate significant relationships were

established with per teacher funding. Weak relationships were found with external technical assistance due to inconsistent implementations of research-based curriculums, and district or state policy. Policy support was found to help or obstruct schools in working with professional development to strengthen school capacity. The determining factor was an understanding of current school context. Newmann et al. suggested those who fund and craft policies for professional development programs "...should try to advance all dimensions of school capacity and to minimize ways in which professional development and other policies can undermine dimensions of capacity" (p. 293-294).

Based on significant positive results of these and other studies and reviews, a broad approach describing educational practices related to outcomes of increased student achievement is presented. Individual NSDC staff development standards and constructs outline discussion of empirical results. Standards include educational practices associated with the contexts of learning communities, leadership, and resources; processes of data-driven, evaluation, research-based, designs and strategies, learning, and collaboration skills; and contents of equity, quality teaching, and family involvement (http://www.nsdc.org). Collectively, NSDC staff development standards define actions school district leadership, school-building principals, and teachers can take to increase student achievement.

Context Standards

Learning communities. The learning communities standard involves groups of educators who meet several times each week or month to engage in dialog, work on goals, and participate in team planning aligned with school and district strategic goals. A comprehensive team approach utilizes resources to affect achievement of all students

(http://www.nsdc.org). Three studies found changed teaching practices or increased student achievement through the professional assembly of learning communities.

Stronger learning communities were created through collegial alliances formed during professional development activities. Garet et al. (2001) concluded teachers were able to change teaching practices when five qualities were present. Teachers were involved in professional development that structured time for reflection and meaningful analysis of teaching and learning. Opportunities were created to build professional experiences within the group. Teachers experienced an overall consistent presentation aligned with other reform efforts. Teachers engaged in professional dialog through collaboration of peers from the same school, subject, or grade level. Activities such as study groups, taskforces, networking, and mentoring served to support changes in teaching practice.

Newmann et al. (2000) concluded professional development tailored to individual school capacity affected outcomes in the greatest manner. Learning communities were defined by collective participation of educators observing the professional community and program coherence aspects of school capacity. Professional communities involved teacher influence within a culture of staff collaboration, clearly stated shared learning goals for the school, and explicit student outcomes. Hiring policies seeking new teachers who shared educational philosophies increased capacity of the school to function as a learning community. Program coherence increased staff and student learning by focusing on the school mission through a coordinated effort by including a coherent instructional philosophy sustained over time. Johnston et al. (1998) called for a cultural alignment of

all educational entities in support of thoughtful intellectual communities of inquiry for adults as well as children in order to transform education.

Leadership. The leadership standard recognizes all organizational positions contribute to professional development for continuous educational improvements and achievement. Professional development is supported through school structure, continuous instructional improvement, impartial allocation of resources, community resources, proficient use of electronic tools, and alignment of incentive systems with knowledge, skills, and student learning (http://www.nsdc.org). Seven studies found increased student achievement or changed teaching practices related to school leadership.

Shared leadership characterized by a decentralized organizational structure created institutional support for change by promoting collaborative inquiry, trusting environments, shared decision making, communities of learners, and less coercion during interactions to impact educators' professional work environments (Johnston et al., 1998).

The quality of professional development activities was increased through attention to strategies associated with realization of program goals. Desimone, Porter, Birman, Garet, and Yoon (2002) conducted an analysis of data from computer-assisted telephone interviews (n = 363, 88% response rate) of the nation-wide probability sample of school district professional development coordinators in charge of Eisenhower Professional Development Program funding. Dependent variables included student achievement-related features of professional development literature reviews.

Desimone et al. (2002) found high quality district level professional development programs for teachers gave more opportunities for active learning and professional dialog to teachers who served diverse students and included the following. Activities were

aligned with standards and assessments. Small school districts joined together to co-fund activities for greater buying power and ability to collaborate across programs. Professional development programs focused on sustained continuous instructional improvement involving strategic planning of goals, objectives, and benchmarks to establish indicators of improvement. Needs assessments of teachers were conducted and activities evaluated based on teacher and student outcomes. School communication included teachers in the continuous improvement process. Involvement of teachers in district level professional development planning increased relevancy of activities and the likelihood many teachers would participate. Finally, programs provided a system for feedback. These strategies for implementation were found to predict the core and structural features (Garet et al., 2001) of professional development activities.

When individual school context was understood, highest priority curricula and instructional needs were identified reflecting the district strategic plan. Goals were then incorporated into the school's professional development program. School activities contributed to student achievement when all aspects of school potential to achieve goals were addressed. Leadership during the design stage of a professional development program was important to fit specific capacity needs of an individual school. When school capacity was addressed, principal leadership exerted a powerful association in channeling professional development in a comprehensive way. Principals' actions leading to comprehensive professional development included consistent focus on school-wide initiatives, maintaining open communication, building trust, increasing collaboration, funding the program, seeking outside expertise to assist with accomplishment of school goals, and encouraging high teacher expectations for student

achievement. Principal leadership also limited disruptive natures of mandates that opposed school goals. Principal professional development included understanding the main elements of professional development and how it could improve, ignore, or reduce school capacity (Newmann et al., 2000).

Leadership influenced student achievement when the continuous instructional improvement process drove educational improvement. Pritchard and Marshall (2002) concluded the following from school districts with high capacity and high student achievement. Professional development was part of a multiyear strategic plan for continuous improvement. Student achievement increased across all grade levels over time by utilizing professional development toward an integrated system of beliefs outlined through a comprehensive strategic plan to advance the district. Continuous improvement was embraced through district-wide professional development and integrated curricula development. All professional development activities were linked to district goals and objectives. Administrators involved in planning for and participating in professional development activities contributed to excellence and continuity throughout the district. Priorities were based first on district strategic plans driven by a shared focus for all professionals, and second on individual selection. Pritchard and Marshall discovered only school districts using a district vision to unify professional development increased student achievement. Professional discussion arising from common understandings, conducted over many formal and informal training sessions created the foundation for achievement. High achieving school districts offered general instruction for all teachers. Expectations of full participation allowed a frame of reference for all educators to engage in professional dialog on district-wide or school-wide topics.

Cohen (2000) established student achievement was greater when teachers' professional development focused on increasing knowledge of student curricula, classroom methodologies led to increased learning, and student assessments were analyzed. Offering professional development over a period of time to increase implementation of new procedures increased student achievement (Cohen, 2000; Pritchard & Marshall, 2002).

Principal leadership affected student achievement by shaping the learning climate of a school. Hallinger et al. (1996) studied elementary principals' (n = 87) influence on reading achievement through principal and teacher questionnaires and student test scores to explore school variables of student SES, parental involvement, principal gender, teaching experience, and principal instructional leadership on reading achievement. Combinations of factors significantly had a positive effect on student achievement. The degree of instructional leadership, a clear school mission, students' opportunity to learn, and teachers' expectations for student achievement was significant to the $p = .05$ level. Other significant direct effects were parental involvement, SES, and gender. Results indicated greater active instructional leadership and higher teacher expectations for student learning occurred due to increased parental involvement in schools that had high SES. Female elementary principals were found ($p \leq .10$) to be more active in curricula and instructional leadership than males. Principal leadership did not hold a significant direct effect on reading achievement. These factors contributed to the conclusion that principals had an indirect effect on student achievement through adaptation of leadership actions shaping a school's learning climate within the context of school community.

Resources. The resources standard supports long-term investments for quality teaching to impact student learning. NSDC advocates 10% of a district budget secured to provide professional development within the school day, 30% of a technology budget earmarked for technology training, and 25% of the workweek dedicated to professional development activities. Professional development budgeting can include substitute time, mentor support, in-building coaches, external consultants, and facilitators. To promote transfer of teacher learning into student learning NSDC suggested school district incentive systems aligned with intended professional development results rather than simple seat time (http://www.nsdc.org). Five empirical studies found increased student achievement, changed teaching practice, and high quality professional development programming when elements of the resources standard were present.

Professional development funding was a protected line item in budgets of school districts and schools experiencing high student achievement. Professional development activities were funded and largely addressed during the workday. Examples included district (Wednesday early-release) or school (common planning time arranged) scheduling formats allowing teachers to focus on professional development during contract hours. High achieving districts spent up to 20% of total district budgets on professional development (Pritchard & Marshall, 2002). School-based coordinators (Newmann et al., 2000), central office trainers, and curriculum consultants were utilized to mentor teachers toward growth and improvement without evaluation. Newly hired teachers were offered cooperative teaching partners for five consecutive days, at the beginning of the first year, and 3 years of continued mentoring with an experienced teacher for observations and feedback. Curriculum consultants met regularly as a group

and also with networks of curriculum experts including instructional specialists, department chairs, and principals.

Teacher-led professional development at school sites was a priority in high achieving districts in terms of time and budget. Groups of teachers attended conferences and built on experiences through partnerships, peer sharing, and professional conversations while supported by common planning time, technology communication, and defrayed conference expenses. Expertise aligned with school and district goals was shared with other teachers at the site (Pritchard & Marshall, 2002).

Funding decisions based on high quality programming related to student achievement utilized resources to the greatest degree. Garet et al. (2001) found districts' funding decisions were between in-services for fewer teachers or investment of sufficient resources so more teachers could benefit. The percent of total district funds allotted for professional development varied from district to district.

Creative ways to bolster resources included cooperative funding and seeking outside professional sources for professional development. District co-funding helped more than one school district or department foster cost-effectiveness. Multiple sources of financing allowed smaller districts to gain the same resource power as larger districts in order to support continuity in professional development activities connecting focus across disciplines for many teachers. The co-funding strategy promoted alignment with standards and assessments, continuous improvement commitment, a greater capacity for integration of state and district reforms, effective collaboration of participants and programs, stronger infrastructures for planning and delivery, networks within the community, and integration of programs across districts to increase ability to achieve

goals (Desimone et al., 2002). Seeking outside professional sources enhanced availability of professional development offerings. Accessing professional organizations through membership and attendance included state and national conferences. Attaining state and federal funding increased the amount of adequate professional development resources (Cohen, 2000).

Newmann et al. (2000) found a positive relationship between funds expended on teacher professional development and implementation of comprehensive professional development. In addition to employing school-based coordinators, high quality professional development included funds earmarked for release time for teachers, fees for outside experts, travel expenses, conference fees, materials, and equipment. A suggested targeted cost per teacher each year was $1,300. Newmann et al. recognized "...how funds are used can be more important than the actual level..." (p. 286) of expenditure.

Process Standards

Data-driven. The data-driven standard is focused on obtaining disaggregated data from a variety of student testing sources to guide professional development activities, ensure equitable treatment of all students, and sustain continuous improvement efforts. Data are used in formative and summative ways for teacher, student, and organizational growth analysis. Training in data collection, analysis, planning, and evaluation is important for teachers and administrators (http://www.nsdc.org). Growth in student achievement occurred in four studies through use of the data-driven standard.

States experienced increased student achievement when local school-based measures were accessed, multiple measures of performance were consulted, pre-and-post test scores were checked, participation in schools was used to appraise trends, and

additional supports were offered to low performing students and schools (Darling-Hammond, 2003). The goal was not to raise test scores on state-mandated tests. Such data was utilized as one gauge, while the main purpose of professional development continued to concentrate on curricula and instruction.

Educators involved in professional development initiatives were able to utilize data and techniques in the classroom to achieve student learning goals when professional development was driven by district strategic plans and building action plans. High achieving school districts included professional development during the strategic planning phase. In this way, construction of the professional development plan was in alignment with the goal of continuously improving teaching and learning. Continuous improvement was defined through an assessment of district needs to create professional development priorities. The needs assessment involved consultation of multiple sources including state test scores and all levels of teachers and administrators within the school district to measure professional development projects against the shared district vision (Pritchard & Marshall, 2002). Teachers also conducted needs assessments within classrooms and schools, established indicators, and conducted evaluations aligned with standards and assessments (Desimone et al., 2002) on the articulated process leading to student achievement goals. Lessons incorporating multiple levels of abstraction and higher levels of thinking personalized to skill abilities of all students (Wenglinsky, 2002).

Evaluation. The evaluation standard warrants assessment of the professional development program and utilizes knowledge gained from data to make decisions concerning participants' needs, attainment level of new knowledge and skills, nature of classroom implementation, and changes in student learning. Educators must have

knowledge of evaluation functions and skills to create an informed audience in the use and interpretation of data (http://www.nsdc.org). Three studies found increased student achievement or high quality professional development related to evaluation. A review identified balanced accountability systems through evaluation processes.

The development of an evaluation plan during the design stage of a professional development program was central to creating a comprehensive course of action. By charting the expected outcomes, knowledge of unexpected results was possible. In this way, both effects were measurable (National Research Council, 1996). A continuous evaluation process included sustained short-term evaluation and long-term follow up to determine strengths, weaknesses, and inconsistencies in content; teaching methodologies; or geographic distribution. Evaluations of teacher and student outcome data promoted a wide variety of decision-making purposes (Darling-Hammond, 2003; Desimone et al., 2002). When different methods of evaluations were used simultaneously, Rude and Brewer (2003) referred to it as balanced accountability systems.

Rude and Brewer (2003) presented four models of professional development evaluation to be used during different stages of professional development initiatives. The four models included the logic model of planned change, strategic planning via balanced accountability systems, quality performance and results measures, and quantitative data measures. Professional development outcomes, student learning, and accountability were linked to the use of evaluation. The logic model of planned change included collecting relevant information by comprehensibly defining issues, context, and program outcomes targeted through short, medium, and long-term timeframes. Identifying associations between program resources, activities, outputs, number of customers reached, and

unplanned external factors assisted with planning. The final step in the logic model involved verifying the plan with stakeholders. Strategic planning via balanced accountability systems targeted inclusive educational opportunities for all students by considering equal access to initiatives, high standards of learning, student learning outcomes, balance between input and process, and accountability of the complete system. Examples included research-based staff training, shared decision making focused on student outcomes, student-centered beliefs encompassing the community, and data-based evaluation. Quality performance and results measures identified desired results, strategies to produce results, indicators of accomplishments throughout the program, and measures of performance such as cost/benefit analyses, return on investments, and customer outcomes. Examples included measuring student attendance, student behavioral referrals, student attitude surveys, proficiency demonstration of instructional strategies, parent and community participation, systemic learning for school improvement, continuous program evaluation, and rubrics of outcome measures. Effective quantitative data measures were summarized by Rude and Brewer as, "... time and effort required to collect quantitative data must be justified by the value to improving the professional development system and ensuring the knowledge and skills gained by participants are benefiting the learning and results demonstrated by students" (p. 6). Examples included incident reports, office referrals, disciplinary actions, and surveys targeting staff, students, and parents. Through the use of professional development systems, attention to all phases of change can be committed to by educators and presented as a structure for accountability driven by equality for students.

Darling-Hammond's (2003) study of states engaged in professional development for transition to a standards-based system found increased student achievement when the following professional standards for appropriate uses of data were in place. Placement and graduation decisions were based on district and teacher measures of performance. Single test scores were not used as the only source of information for decisions related to students, teachers, or schools. Multiple measures of learning over time and participation in school events were used to evaluate school trends rather than grade level averages. Assessment data was used to recognize schools in need of supports rather than sanctions. Darling-Hammond encouraged states to utilize these guidelines when evaluations or "mid-course corrections" (p. 7) of programs were performed.

Research-based. The research-based standard utilizes professional development that prepares educators to be knowledgeable consumers of research who base decisions on findings, clarify contradictions through action research or pilot studies, and apply information to decisions to improve learning of all students. Educators understand differences between research and traits present in scientifically rigorous methodologies (http://www.nsdc.org). Three studies found increased student achievement, high quality professional development, or sustained practice by utilizing the research-based standard.

Districts supported high quality professional development through alignment with standards and assessments, district co-funding, continuous improvement efforts, teacher involvement in district level planning, systemic feedback loops with involved professionals (Desimone et al., 2002), and by using assessment data to update curricular reform (Darling-Hammond, 2003).

Understanding research and theory behind change initiatives increased long-term use in the classroom. Klingner, Vaughn, Hughes, and Arguelles (1999) studied sustained and modified long-term practices of teachers who were involved in an intensive 1 year professional development program for reading instructional practices. Professional development focused on strategies recognized as promoting gains in reading for students with wide-ranging abilities including partner reading, collaborative strategic reading, and making words. Three years later, teachers were asked if the instructional methods were still in use, how practices were personalized, and what factors affected continued use. Klingner et al. found teachers were more apt to sustain instructional methods learned through professional development if they experienced the following. A full understanding of associated theories, practices, and how children learn. Administration supported the initiative with consistent instructional leadership and low principal turnover. Learned techniques were implemented at moderate levels during the professional development period while support was offered. Collegial support networks were formed in the school. Teachers observed benefits gained by students in the classroom.

Designs and strategies. The designs and strategies standard focuses how professional development activities make use of a variety of adult learning strategies such as training, coaching, study groups, and action research; many times in tandem with each other to meet goals. Individual teacher learning is supported through technology and major change initiatives offer a variety of follow-up activities (http://www.nsdc.org). Five studies found increased student achievement and changed teaching practice when attention was given to the design and strategies standard.

During the design phase of professional development activities, Newmann et al. (2000), advocated following the school mission. Adherence to a consistent instructional philosophy guided the design of professional development activities to affect achievement. Primary factors to consider included articulated shared learning goals for the school, clear student outcomes, content focused teaching, associated curricular materials and assessments, continued professional development assistance, a culture of staff collaboration, comprehensive technical resources, and teacher influence on school policies and activities.

Wenglinsky (2002) studied the link between teacher quality, teacher professional development, classroom practices, and student background with student academic performance from quantitative data received from teachers and 7,146 eighth grade students on the 1996 National Assessment of Educational Progress in Mathematics test. Significant results of higher student achievement existed among teachers certified in their subject area and with those who received substantial amounts of professional development in how to teach students with diverse needs. Wenglinsky found the more hands-on professional development teachers received, the more likely hands-on activities were used in the classroom. As teachers received professional development in working with students with special needs, the less likely they were to engage in lower-order learning activities with all students in their classrooms. Being actively engaged in professional development activities significantly influenced teachers' classroom instructional practices and increased student achievement.

Student achievement was influenced by a flexible design format that provided variation according to the purpose of the outcome (Pritchard & Marshall, 2002).

Changed teaching practice in the classroom occurred when professional development involved active learning with whole group participation in ways students were likely to be taught, used a depth of content that was aligned with standards and assessments, and was supported with follow-up activities (Garet et al., 2001).

Huffman et al. (2003) researched relationships between types of professional development, teachers' instructional practices, and student achievement in math and science. The National Science Foundation, as an independent evaluation of state reform efforts to coordinate long-term professional development workshops, funded the study. Voluntary teacher participation in science and mathematics professional development occurred during one academic school year. Survey data was provided by 94 science teachers and 104 mathematics teachers from 46 districts throughout the state. Student achievement was measured by eighth grade math and science test scores on the state content standards assessment system. The types of professional development under review included immersion, curriculum implementation, curriculum development, examining practice, and collaborative work. Immersion referred to hands-on experience with a scientist or mathematician. Curriculum implementation referred to teachers using and refining instructional materials in the classroom. Curriculum development enlisted teachers to help create new instructional materials to meet student needs. Examining practice included case discussion, classroom scenarios, or investigating real classroom instruction. Collaborative work used study groups, peer coaching, mentoring, classroom observation, and feedback.

Study results indicated examining practice and curriculum development significantly related to use of standards-based instructional practices. Curriculum

development for mathematics teachers also significantly related to student achievement. Huffman et al. suggested individual teacher professional development characterized by voluntary participation may not be comprehensive enough and focus could turn to school-wide reform to more fully impact the complete professional community.

Learning. The learning standard focuses on professional development activities providing deep exploration of topics, learning used in student classrooms, teachers' opportunities to practice and receive feedback on teaching methods, and feedback information on the complete professional development program. Professional development offers opportunities for all learning styles, plans for choice, provides active learning techniques inspiring reflection, respects individual emotions associated with the change process, and accesses electronic forms of learning (http://www.nsdc.org). Five studies found increased student achievement, changed teaching practice, or high quality programming when qualities of the learning standard were present.

Comprehensive professional development programs supported learning processes of teachers and students. Professional development increased student achievement when teaching methods focused on learning, teachers' knowledge of student curricula and assessments increased, appropriate classroom techniques were modeled, and curricula aligned with assessments. Teachers who benefited in the greatest manner from learning opportunities combined new knowledge and procedures into current classroom instruction while decreasing dependence on other methods (Cohen, 2000; Klingner et al., 1999). Professional development resulting in changed teaching practices in the classroom was specific to the content, aligned with standards and assessments, provided depth of exposure, longer duration of program support, involved teachers in active

learning, utilized professional experience, integrated other reform efforts, promoted whole-group participation, and fostered communication through study groups, task forces, and mentoring (Garet et al., 2001). Outside professional development sources affecting knowledge, skills, and disposition of teachers, individually or in combination, included national conferences, local facilitators, school colleagues, mentoring, content specific training, team meetings, and training for integrating technology into curriculum (Newmann et al., 2000). High quality professional development identified through continuous improvement efforts utilized creative funding methods, teacher involvement with district planning, opportunities for teachers to give feedback, and alignment with standards and assessments (Desimone et al., 2002).

Collaboration skills. The collaboration skills standard improves meaningful teamwork and offers intrapersonal support needed for creative problem solving in education. Professional development prepares educators to be skillful members of various groups, increases breadth of teacher involvement, enhances skills associated with conflict identification and management, and utilizes technology to collaborate (http://www.nsdc.org). Three studies supported collaboration within professional development programs to increase student achievement and provide change in classroom teaching practice.

Collaboration was built through a professional community of educators who set direction for learning goals and student outcomes while being involved in the complete professional development process from planning to feedback (Desimone et al., 2002). Relationships were enhanced through professional development activities supporting common school and student learning goals, focused on teachers' knowledge and skills,

and increased teachers' positive feelings due to participation in a professional community. Collaboration promoted a community of educators through grade level team common planning time, colleague observation, and hiring policies aimed toward teachers who desired collaborative environments. Support was provided through professional development that used technology for increased communication (Newmann et al., 2000). Collaboration included whole-group activities of professionals from the same school, subject, or grade level sharing in active learning opportunities to advance discussions of meaningful analyses of teaching and learning. Structures of professional development promoting skills in collaboration included study groups, taskforces, networking, and mentoring (Garet et al., 2001).

Content Standards

Equity. The equity standard is addressed through professional development conveying respect for all students, families, and cultural traditions. Safe learning environments support high achievement for all students and are characterized by mutual respect. Teachers are supported in individualizing instruction and assessments to match learning styles, interests, and developmental needs of students (http://www.nsdc.org). In three research studies, increased student achievement resulted from teachers who integrated the equity standard into daily circumstances.

Wenglinsky (2002) found classroom practices and teacher characteristics had just as much influence on student learning as students themselves. Wenglinsky described the active teacher as one who created lessons operating at multiple levels of abstraction, incorporated higher level thinking skills matched to the abilities of students, and encouraged all students to do quality work regardless of personal history. Active teachers

made use of authentic assessments, individualized instruction, and employed collaborative learning to improve academic performance of all students. Wenglinsky stated "...ongoing authentic assessments such as portfolios and projects are not sufficient; they need to be supplemented with tests that occur at a distinct point in time" (p. 23) helping all students achieve their highest ability levels. Schools employing large numbers of active teachers created value-added learning by inspiring students to higher academic achievement. Teachers, who had attended professional development programs targeting how to teach diverse learners, had greater numbers of students who significantly outperformed students of teachers who had not experienced the training. Wenglinsky concluded, "Through their teachers, then, schools can be the key mechanism for helping students meet high standards" (p. 24).

Wharton-McDonald et al. (1998) observed nine first grade classrooms through qualitative methods during literacy instruction to determine beliefs, practices, and characteristics teachers possessed leading to high levels of student achievement in reading and writing with observable high engagement for all students in learning activities. From the three highest performing teachers' beliefs and practices, the following instructional qualities surfaced from data. High performing teachers possessed a distinct awareness of purpose linking goals of learning with classroom practices. Beliefs of a balanced approach to skills instruction and whole language promoted use of flexible student groupings to teach high quality reading and writing experiences through integrated curricular units. Integration of mini-lessons throughout the larger instructional context were planned providing multiple chances for students to learn reading and writing in all content areas, practice skills individually and in groups, and use authentic real-

world literacy examples. Integration of reading and writing occurred all day in every subject. Teachers guided the writing process for students through webbing for organization. A high intensity of vocabulary, grammar, and punctuation focused targeted learning strategies. Participation in objective-based conferences for meaningful revisions and editing helped students' target personal learning.

Wharton-McDonald et al. (1998) found high performing teachers demonstrated high academic expectations for all students based on individual levels of maturation. Scaffolding or extensive diagnosis of students' instructional needs were addressed in ways that prompted students to draw out meaning for themselves in groups or individually that strengthened understanding of reading and writing concepts. Encouragement of student self-regulation involved teaching students to be aware of personal learning processes, understanding strategies to help solve difficulties, recognizing behaviors needed to do quality work, and monitoring use of time. Masterful classroom management included preventing students' misbehavior in positive ways before it happened, managing time and activities, supporting student interactions, coordinating adult resources, modeling organizational skills, and creating predictable patterns of activities and expectations in the classroom.

Integrating multiculturalism in the classroom helped all students achieve in greater ways by embracing diversity through "culturally responsive instruction" (p. 404). Lesson strategies and daily procedures included bilingual education, motivating the unmotivated, and bringing all students into the continuum of classroom reading structures (Farstrup & Samuels, 2002).

Quality teaching. The quality teaching standard is supported through professional development opportunities providing teachers with deep understandings of their content, expanding teaching technique repertoire, and supporting skills in classroom assessment to monitor gains in student learning. Teachers are provided time to collaborate on original and creative ways to attain student outcomes and data for decision-making purposes (http://www.nsdc.org). The quality teaching standard is outlined through nine empirical studies showing increased student achievement and changed teaching practices.

Darling-Hammond (2000) examined data from four sources to determine ways teacher qualifications, student characteristics, and other school variables related to student achievement nationwide. Highly qualified teachers (full teaching credentials and major in teaching field) were associated with increased student achievement. Indicators of quality teachers included a depth of content expertise, skillful ability to teach diverse learners, ability to diagnose learners' needs, access to a wide range of teaching strategies to enhance student learning, teaching experience, and certification status. Darling-Hammond stated, "Like other studies cited earlier, this research indicates that the effects of well-prepared teachers on student achievement can be stronger than the influences of student background factors, such as poverty, language background, and minority status" (p. 38). High teaching standards and enforcement at the state level, teacher education accreditation (Darling-Hammond, 2000), and district hiring standards were policies that could influence high quality teaching (Darling-Hammond, 2000; Newmann et al., 2000). Two other significant findings of this study are discussed in chapter 5.

Teachers interacting with students directly influenced learning and achievement. Through qualitative research methods, Jinkins (2001) observed three primary teachers,

from the same school, involved in rigorous professional development training in literacy instruction. The teaching/learning cycle teaching method was used over 12 weeks to present content to students. Exit data for each student was compared to baseline samples. Results showed student learning was accelerated when teachers utilized the assessment-evaluation-plan-teach model, applied it on a daily basis, reflected on individual student outcomes, based decisions on student learning, and personalized instruction accordingly. Reading gains for four of the nine students was 1 year's growth over 12 weeks. Three students showed one half year's growth in 12 weeks. Two students exited within the same reading level they began, showing 2 months growth. One student who had 2 months growth increased reading skills from 87% accuracy (instructional level is 95% accuracy) to 100% accuracy. The other student who experienced 2 months growth read with accuracy ranging between 75% and 89% (frustration level is 90% accuracy). The teacher of these two students had not accurately computed baseline data and taught students at a reading level that was too difficult. As a result, reading materials used for instruction were not aligned with students' reading ability therefore lessons were not developmentally appropriate. Writing samples indicated all students moved from one stage of writing characteristics, emergent or early, to the next stage of writing characteristics, early or fluent.

Jinkins (2001) explored critical knowledge and skills teachers utilized through the teaching/learning cycle and found, "Links between the assessment evaluations, diagnostic statements, lesson plan elements, observation notes, post-instructional reflection notes, and new demonstrations of student progress were reviewed [by teachers] to determine a logical flow between identified student need, instructional decisions, and growth" (p.

274). The cycle focused instruction for students based on individual academic readiness level, available instructional materials, and varieties of teaching approaches supporting instructional decision making and practices. Instructional methods included specific feedback to students related to teaching points and students' effort in task completion. Students were held responsible for one teaching point at a time in reading and writing rather than a wide range of errors. With each lesson, students voiced how current learning in reading and writing fit into what they already knew. In doing so, students accepted greater responsibility for personal academic growth and higher motivation to do well was fostered. Consistency of feedback occurred throughout the variety of classroom organizations including whole group, small group, and one-on-one instruction.

Jinkins (2001) clarified relationships described in this study may not be considered causal. Although teachers may have had a greater understanding of a teaching practice or strategy through participation in professional development, links required for constructive applications may have been incomplete. Continuous feedback, engagement in the process or strategy, and regular use of the teaching/learning cycle promoted change in teaching practices increasing student inspiration and achievement by building on incremental student strengths and creating empowered learners.

Increased student achievement was found when professional development programming included materials matched to state and local student learning standards with associated assessments (Cohen, 2000; Desimone et al., 2002; Garet et al., 2001). Excellence in teaching was shaped by the school mission of increasing student achievement within a consistent instructional philosophy by using content focused teaching and assessment, relevant curriculum materials, support for classroom

implementation, and long-term programming (Newmann et al., 2000). High quality focused on connections made with other reform efforts, drew from past professional experiences (Garet et al., 2001), and created an articulated professional development program to increase knowledge, skills, and outlooks of teachers (Newmann et al., 2000).

High quality professional development activities increased student achievement by fostering excellence in teaching through alignment of materials for teachers, supporting teachers throughout the implementation period, and integrating activities into the school day. Positive school culture was reinforced by recognizing professional development was an expected job responsibility (Pritchard & Marshall, 2002). Instructional approaches modeled during professional development activities for teachers led to support of student learning in the classroom. Teachers who blended new procedures into current teaching repertoires while being supported by professional development initiatives were able to build associations over time between student curricula, teaching methods on learning, student assessments, and knowledge of curricula to increase student achievement (Cohen, 2000). Professional development activities incorporating a depth of student content knowledge, greater length of programming, teachers active in hands-on learning, increasing meaningful analysis of teaching and learning, and integrating teacher learning into the daily life of the school affected changed classroom teaching (Garet et al., 2001).

General classroom teaching techniques supported by empirical studies show increased student achievement. Classroom atmospheres incorporating a wide assortment of literature genres in varying reading levels correlated with first grade reading ability. Reading ability in the early grades was a strong predictor of 11^{th} grade verbal abilities,

comprehension, and general knowledge (Cunningham & Stanovich, 1997). Another example, Marzano et al. (2001) conducted a meta-analysis of research addressing K-12 classroom instructional strategies for increased student achievement. Instructional strategies identified as possessing strong effects on student achievement concerning all subject areas and all grade levels included the following practices. Identifying content similarities and differences improved students' ability to understand and use the knowledge. Summarizing and note taking allowed students to analyze for greater content comprehension. Reinforcing effort and providing recognition to students increased internal motivation. Homework and adequate skills practice supported an articulated purpose and outcomes of extended knowledge. Creation of visual models of content increased understanding through use of pattern organizers, physical models, pictures, and physical movement. Flexible cooperative learning groups promoted positive interdependence, increased group processing, reinforced appropriate social skills, provided positive personal complements and interactions, increased individual accountability, and offered greater opportunities for group accountability. Formation of specific and flexible learning objectives and providing timely criterion-based feedback increased students' understanding of concepts. Generating and testing hypotheses through inductive and deductive reasoning methods provided a format for greater analyses. Questions for analysis, cues to prompt learning, and advanced organizers linked past learning to new information. Marzano et al. advocated use of effective staff development practices focused on the nine instructional strategies to increase student achievement.

Farstrup and Samuels (Eds.), (2002) defined quality teaching through practices involved in teaching and learning reading skills proven by scientific research to increase student achievement. Teaching practices increasing reading achievements included social construction, early intervention, reading structures, reading strategies, multicultural classroom atmospheres, and parents-as-partners. Socially constructing understanding with students in a holistic integrated classroom atmosphere increased successful reading habits through development of associations. Early effective literacy interventions providing a balanced developmentally appropriate reading curriculum with flexible student grouping, sound instructional practices, and tracking student growth helped youngsters learn to read. Reading structures in the classroom such as literature discussion groups, teacher read-alouds, sustained silent reading, shared reading, guided reading, and guided discussion helped all students increase reading skills. Programmatic reading strategies of phonics instruction, phonemic awareness, word consciousness, reading fluency, reading comprehension, learning disability intervention, integrating new technologies, attention to text difficulty, and appropriate assessments assisted students' individual growth. Actively structuring a multicultural classroom and including parents-as-partners also increased achievement.

Family involvement. The family involvement standard seeks to support student learning through alliances with families and community partnerships. Teachers understand individual challenges of families, enlist parental help in tutoring children at home, and provide appropriate volunteer opportunities at school. Administrators create community consensus in mission and goals, and use technology to communicate with parents and the public (http://www.nsdc.org). Research from two studies indicated

increased student achievement with family involvement. One study found greater principal instructional leadership and teacher expectations for learning when parents and community were enlisted in partnership with teachers and schools.

Student achievement increased when parents were involved with schooling as literacy partners, highly involved with the school community, and trained for participation. Parents and teachers who worked together as literacy partners to create a community of learners connected literacy in the home and at school for the benefit of children (Farstrup & Samuels, 2002). Parental involvement had a positive effect on increasing principals' involvement with building-wide instructional leadership and teachers' expectations for student learning. Hallinger et al. (1996) discovered that principals were perceived by teachers to be active instructional leaders in schools where parents were greatly involved with the school community and education of their children. A positive direct effect was found for greater teacher expectations of learning for students in high SES schools where parents influenced teachers through optimal involvement.

Faires et al. (2000) studied eight first graders who read below grade level to determine if trained parental involvement affected learning. Parents of the four experimental group students received training in components of the Reading Recovery model. Once trained, parents implemented home literacy lessons based on a teacher-developed books-in-bags strategy. Daily instructional materials were shared with experimental group parents three times each week during the 5-week experiment. Control group students did not have access to the trained parental assistance. Results indicated significant growth of experimental group students over control group students. Parental training and teacher support were factors diminishing empirical differences of

parental literacy level and SES. Faires et al. found it was just as difficult for two parent mid-income families to structure tutor time at home, as it was for single parent low-income families. Reading levels of tutored students increased 75% to 100%, compared to 33% for those students not tutored by parents.

The empirical evidence supporting each NSDC staff development standard has been established. Next, research identifying barriers between professional development and student achievement is presented.

Barriers between Professional Development and Student Achievement

A major criticism of professional development has been, teachers do not engage in personal professional learning or make changes in teaching practices to create differences in student achievement (Cohen, 2000). Empirical studies ascertained barriers to professional development initiatives preventing increased student achievement. Three literature themes emerged including organizational structures, program obstacles, and a high-stakes approach to standards testing.

Organizational Structures

Organizational structures responsible for blocking change initiatives or limiting achievement originated from policies and practices at the state and local levels. Comer's (2001) theory suggested the process of educational policy creation has been fragmented due to a lack of communication between professionals specializing in learning and those who design policy such as elected legislators, business owners, state departments, and city councils. Common actions during the prioritizing phase of policy creation have rarely considered child development factors of growth, how learning was affected, best

practices research, or the routine of consulting specialists. Four studies illustrated obstacles to achievement resulting from structures of the organization.

Johnston et al. (1998) found obstacles to using collaborative inquiry and student-centered teaching techniques in classrooms stemmed primarily from centralized district administration cultures and organizational practices. In centralized districts, teachers had difficulty transforming teaching techniques in the classroom because school change occurred within a centralized context of the state administration system. The state administration system emphasized behaviorist views of learning grounded in mistrust, rewards, and punishments. As a result, accountability in centralized districts was reduced by public pressure to continue traditional methods of teaching with emphasis on external controls such as high-stakes testing and highly detailed district strategic plans rather than loosely detailed guides.

Blocks to change in centralized districts were found by Johnston et al. (1998) to result from policies and practices characterized by the following. Lower federal and state aid contributed to inadequate supplies of classroom reading ability-level books. Teaching practices focused on finding right answers rather than on child-centered thoughtful reflection. Students were given little choice in content selection while teachers controlled reading materials and competency levels needed to advance. Instruction was based on whole classes reading the same titles even though abilities of children were far-reaching. New lessons were based on the basal approach for all students. Greater accountability pressure resulted in greater means of classroom control rather than on student-centered teaching techniques encouraging self-reflection. Professional development was not supported during the school day to help teachers change traditional teaching practices.

Professional conversations and disagreements were too risky and not pursued in formal ways. Change was expected by administration through teachers' own initiative and personal time. Teachers' schedules throughout the school were not coordinated resulting in fragmented literacy blocks. Districts structured through centralized administration were also characterized by high district and building level administrator turnover, standardized test data manipulation, high-stakes testing without professional development or resource support, philosophy the lone expert teacher had a competitive edge, and relationships typified through negative administrator and teacher viewpoints.

Inflexible policies and practices contributed to failed and partial implementation of professional development programs. Useem, Christman, Gold, and Simon (1997) studied results of nine professional development initiatives sponsored by the Philadelphia Education Fund and Philadelphia School District to understand why partial implementation was experienced at schools. Organizational structures responsible for blocking change initiatives stemmed from adherence to well-established, ingrained policies and practices lowering social trust. Inhibited social capital in schools limited the realization of proposed changes. Inflexible policies and practices prompted frequent turnover, lack of teacher support from administration, dismantled faculty teams, teacher transfers, lack of common planning time to work collaboratively, and individual teacher training or partial staff trainings. Inflexible leadership practices contributed to blocking applications of change proposals.

Newmann et al. (2000) research suggested school capacity could be limited or promoted by policies initiated at the site, school district, state, or through reform projects. At the school site, Newmann et al. found, "But in many instances, this assistance

[externally developed programs based on credible research and development] failed to help the school because school leaders did not press for schoolwide implementation and follow-up" (p. 292).

Wenglinsky (2002) results showed an interrelationship between teacher quality and class size that affected district policy. Negative correlations between teacher quality and professional development were found in districts with a greater number of small class sizes. Consequently, the lower the class sizes were district-wide, the fewer qualified teachers were employed. Wenglinsky concluded districts chose to spend resources on hiring more teachers with low qualifications to staff low class size ratios, rather than investing in improved teacher quality through selection processes and by providing greater in-service training programs.

Program Obstacles

Program obstacles to professional development programs included reasons why changed teaching practices did not increase student achievement, misalignment of the professional development initiative with intended outcomes, and factors limiting sustained use of instructional practices. Supovitz's (2001) synthesis of data found changed teaching practices might not render gains in student achievement due to the following reasons. Poor alignment between student learning content and assessment form may not increase achievement. Student learning content of what was taught did not match the content of what was tested. Inadequate time for students to learn content knowledge limited achievement. State and district policy inhibited teaching practices promoting increased student achievement. Teaching techniques used in the classroom may not have been practices that changed student achievement.

Fragmentation of professional development initiatives with intended outcomes did not raise student achievement. Cohen (2000) found planned goals of professional development activities were not realized when alignment with curricula and teaching methods on learning were absent. Short-term professional development activities misaligned from school curricula, did not change instructional practices in the classroom, improve teaching and learning, or increase student achievement. Newmann et al. (2000) ascertained three factors led to fragmented accomplishment of school goals and reduced staff and student learning. Uncoordinated professional development programs for teacher and student learning with district and school goals. Limited numbers of staff or students targeted for professional development initiatives. Termination of the professional development learning after only a brief introductory period.

Factors limiting the sustained use of instructional practices included external pressures and internal motivations of teachers. External pressures of inadequate time for implementation, preparing students for high-stakes assessments, lack of instructional strategy reinforcement over time, competing practices introduced by district professional development, and university interns not trained in the strategy were restrictive. Internal motivations limiting implementation of teaching strategies included judgment the instructional strategy was more appropriate for a different age group, low understanding of instructional practice during the initial professional development period, isolation from other practitioners, teaching style preferences conflicted with the nature of instructional practice, lack of commitment, or boredom (Klingner et al., 1999).

High-Stakes Approach to Standards Testing

Research surrounding high-stakes testing found improper consequences connected with standardized test scores. High-stakes approaches to standardized testing mandated student testing without providing necessary resources to improve the quality of teaching, curricula, resource allocation, or educational system. High-stakes testing does not promote an all-embracing approach due to lack of characteristics associated with improved learning (Darling-Hammond, 2003).

A high-stakes testing atmosphere labels schools according to test scores and gives high scoring schools rewards such as cash bonuses and low scoring schools sanctions. High-stakes for schools occurs when the principal fails to show academic progress resulting in state sanctions to "...intervene in or take over the administration of a school" (Perreault, 2000, p. 3). High-stakes concerning students takes place when a single test score is used to retain, promote, accept into programs, or determine diploma issuance (Goertz & Duffy, 2003). Some states initiated sanctions against low performing schools without providing sufficient resources or educator training, while other states retained students or denied graduation based on a single state assessment (Darling-Hammond, 2003). In states where high-stakes testing policies are in place, a general increase in student learning has been marked by an increase in state assessment results, but has not been conclusively determined through independent measures such as the SAT, American College Testing, Advanced Placement courses and exams, or the National Assessment of Educational Progress test (Amrein & Berliner, 2003).

Empirical studies of high-stakes testing environments resulted in decreased performance on multiple levels for teachers and students in three areas including

increased failure for educationally at-risk students, preparation for state standards tests, and external authoritarian controls.

Increased failure for educationally at-risk students. Accountability based on high-stakes designs limited educational success for specific student groups. High-stakes testing atmospheres resulted in greater occurrence of failure for educationally at-risk students such as minority, low-income, and those who possessed special needs. Students experienced decreased motivation resulting in failed tests, grade retention, and/or failure to graduate (Amrein & Berliner, 2003; Darling-Hammond, 2003). In areas with high-stakes testing, more students opted to leave high school and take the General Educational Development (GED) credential early (Amrein & Berliner, 2003).

Schools with high numbers of students who dropped out or reclassified into special education experienced sharp increases in state test scores. High-stakes testing was associated with higher proportions of African American, Latino, and at-risk students dropping out of school (Darling-Hammond, 2003). Perreault's (2000) data entailed, "Teachers reported instances of students being placed in different special education categories so they would not be required to take state exams" (p. 3).

Pitts and Reeves (1999) studied 176 Kentucky school districts' composite mean accountability scores. Accountability score data from 1992-1996, encompassed 4^{th}, 8^{th}, and 12^{th} grades and included the following components. Reading, mathematics, science, social studies, arts and humanities, practical living, and writing were cognitive data. Non-cognitive data included attendance, retention, dropout, and transition to adult life. Rural-urban location, median household income, percentage of students on free or reduced lunch, teen birth rate, independent versus county school district, per-student

spending, and enrollment were variables considered. The 1990 Kentucky Education Reform Act created a high-stakes state student assessment used to grant monetary rewards for student improvement and sanctions against districts for declined student performance. Results indicated student achievement across 176 school districts, represented by accountability scores, and were influenced by two factors. First, a strong negative relationship was found with the percentage of free and reduced lunch recipients (composite R = -.906, 4th grade R = -.668, 8th grade R = -.915, 12th grade R = -.819). Second, a positive relationship was found with rural locale. These results grew in importance as students aged and increased at higher-grade levels.

Preparation for state standards tests. Preparation for state standards tests has limited student achievement through excessive format practice, curriculum narrowing, reduced time, and not improving overall quality of schools. Excessive format practice was found to limit students' ability to be flexible when addressing questions. Teaching test performance tasks rather than an integrated program of study fragmented school curricula. The resulting curriculum narrowing reduced use of higher-level thinking processes. Student understanding, comprehension, and enjoyment were not pursued under these circumstances; rather performance orientation to the classroom emphasized external motivations and structured procedures (Farstrup & Samuels, 2002).

Significant pressures from state testing programs to meet criteria prompted administrators to suggest and teachers to implement a narrowed curricula to teach only test items (Darling-Hammond, 2003) in the same format of the test by reducing introduction and increasing review of material during 6 weeks prior to the exam (Perreault, 2000). Time devoted to preparing students for high-stakes assessments

resulted in lack of implementation of student-achievement related professional development initiatives (Klingner et al., 1999). Professional development centered on high-stakes tests impacted test taking, but did not lead to an increased quality of schooling (Youngs, 2001).

External authoritarian controls. Perreault (2000) qualitative research studied effects of state testing on teachers' classrooms. Eight focus groups were conducted with teachers from schools experiencing either high levels or low levels of student achievement. Data was analyzed for themes related to encounters with state-mandated testing. Themes associated with external authoritarian controls included continual pressure, concerns with state testing program design, principal actions, and self-perceptions. Continual pressure for students to do well on state tests included year long planning beginning with the state test, awareness of being observed, recognition whole child education may be compromised, and attempts to avoid strain. Teachers felt support for humanitarian places in schools was limited by administration, however was attainable through own initiatives within isolation of personal classrooms. State testing program concerns centered on technical aspects of test construction and publication of results.

Principal actions at high scoring and low scoring schools were seen as efforts to strengthen test performance by assuming the state role of mandate-enforcer. Principals at low scoring schools reinforced classroom methods limiting variation in teaching techniques and promoted embedding skills. In high scoring schools, principals advocated enrichment activities and did not apply pressure concerning the state testing program, as long as assessment results remained high. Self-perceptions included teachers as either supporters, who needed more time, or vocal opponents of the movement. Teachers who

supported state testing understood logical reasoning behind accountability. Teachers who opposed state testing recognized the issue as affecting professionalism.

Perreault (2000) concluded to reduce limiting factors of external authoritarian controls, principals must be supported in fostering a more humanitarian and spiritual type of school reform. The call for meaningful continued reflection on the extensive nature of public education in order to reduce limiting factors and promote a resistance to dominating national forces was made. Perreault suggested principal university training courses and practicum work include a broad contextual analysis of public education objectives while examining state requirements.

Results of high-stakes testing policies prompted increased teacher transfers, inability to attract and maintain qualified teachers, unethical test data manipulation, and decreased teacher autonomy. Decreased teacher autonomy increased negative points of view regarding professionalism and lowered morale resulting in fewer options for children (Darling-Hammond, 2003). Johnston et al. (1998) felt pressures from state mandated tests prevented teachers from abandoning controlling methods in the classroom and suggested the "tests themselves are active agents in resisting change" (p. 86).

Literature Review Conclusion

Educational success of students is one goal of society. Processes to accomplish this end are guided by federal and state legislation; and educational practices school districts, school buildings, and classrooms implement. Attention to empirical literature describing practices shown to increase achievement and those known to decrease achievement for teachers and students can provide a path to educational accountability.

Contributing researchers to the professional development literature found direct results of greater student achievement, supportive environments for student achievement, or environments known to create obstructions to achievement. Empirical results indicated continuous professional learning for educators framed by NSDC staff development standards was vital for increased student learning. The goal of increased student achievement was possible through professional development programs encompassing contributions from central office administrators, building principals, teachers, parents, and the community. Barriers to student achievement were found within the structure of organizations and educational practices.

The overwhelming empirical support for increased student achievement when educational practices, framed by the 12 NSDC staff development standards, are used merits a separate analysis. This study measures relationships between implementation of NSDC staff development standards and student achievement. By analyzing variables representing school achievement, school demographics, and student achievement, observations of relationships can be made between staff development practices and student achievement.

CHAPTER 3: METHODS

The purpose of chapter 3 is to provide an explanation of research design and supply reference material for verification of results or replication of the study. The design of research was initiated to study Colorado elementary schools' professional development practices with minor distraction to daily learning while gaining information to infer theoretical population trends. Content of this chapter encompasses comparative and survey research, population external validity, measurement validity, data collection, and data analysis. Comparative and survey research presents research questions, variables, and hypothesis testing. Population external validity describes sampling and representation of the accessible populations. Measurement validity addresses instrumentation validity and reliability for the survey and assessment. Data collection describes the circumstances of gathering information from participants. Data analysis presents data preparation, descriptive statistics, and inferential statistics.

Comparative and Survey Research

Comparative research is designed to determine differences in preexisting conditions of samples. Since all variables under consideration in this research occurred previously, the study was conducted in retrospect and classified as a retrospective comparative study. "Ex post facto" or after-the-fact research analyzes educational processes without researcher intervention. In this study, retrospective comparative methods allowed inferences describing relationships between applied uses of NSDC staff development standards, SES, hours of professional development within the school day

each month, and third grade proficient and advanced reading achievement. The NSDC staff development standards reflect educational practices known to increase student achievement. However, inferring actual cause-and-effect relationships were limited due to the possibility of another variable, unidentified by the study as being the true impetus for differences (Gay & Airasian, 2000).

A survey was used to assign numeric values to attitudes or opinions of a general population by studying a population sample. From sample results, generalizations and inferences were made about the population as a whole. The survey technique was selected because a large sample representing statewide data was needed to provide information on professional development and student achievement trends (Creswell, 2003). The research questions are:

Research Questions

1. What are characteristics of the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% data sets as described through descriptive statistics of measures of central tendency, measures of variability, and properties of the distribution in regard to:
    a. NSDC staff development standards of learning communities, leadership, resources, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, equity, quality teaching, and family involvement individually; constructs of context, process, and content; and collective use?

b. Hours of professional development within the school day each month?

c. Percentages of third grade students scoring in the unsatisfactory, partially proficient, proficient, advanced, proficient and advanced, and not scored categories on the third grade 2004 reading CSAP assessment?

d. Percent of free and reduced lunch?

e. Additional information about the professional development program?

2. Are there differences between groups identified by the highest and lowest scoring 10%; and highest and lowest scoring 25% in reading achievement measured by the proficient and advanced variable on the 2004 third grade reading CSAP assessment in regard to:

   a. NSDC staff development standards of learning communities, leadership, resources, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, equity, quality teaching, and family involvement individually; constructs of context, process, and content; and collective use?

   b. Hours of professional development within the school day each month?

   c. Percent of free and reduced lunch?

3. Are there associations between the variables of context, process, content, hours of professional development within the school day each month, and

percent of free and reduced lunch with proficient and advanced reading achievement in regard to the five data sets identified by:

a. The returned sample?

b. The highest scoring 10% of public elementary schools?

c. The lowest scoring 10% of public elementary schools?

d. The highest scoring 25% of public elementary schools?

e. The lowest scoring 25% of public elementary schools?

4. Can collective use, hours of professional development within the school day each month, or percent of free and reduced lunch predict proficient and advanced reading achievement individually or in combination for the returned sample?

Variables. The CDE website provided public domain data for this research. Data posted on the 2004 third grade reading assessment results homepage included names and addresses of selected schools for mailing purposes and seven additional variables of school demographics and student achievement. School demographics included the variable of fall 2003 percent of free and reduced lunch, representing SES for research questions (1d) and (2c). The variables associated with percent of students scoring unsatisfactory, partially proficient, proficient, advanced, proficient and advanced, and not scored referred to student achievement in research question (1c).

The variables associated with research questions (1a), (1b), (1e), (2a), and (2b) referred to school achievement. Each participant provided data associated with these research question by identifying the level of implementation of NSDC staff development standards in the form of never, seldom, sometimes, frequently, or always of his or her

school regarding learning communities, leadership, resources, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, equity, quality teaching, and family involvement. Two additional questions asked the participant to state number of professional development hours within the school day each month (1b) and (2b), and provide open-ended professional development program information (1e). Research questions (3) and (4) provided information on associations and predictive ability of school achievement and school demographics with student achievement.

Hypothesis Testing

The data were analyzed by testing null hypotheses to allow a more conservative statistical testing than directional hypotheses. Rejection of a null hypothesis was greater conclusive support to generalize outcomes to a broader population. Testing the hypotheses in null form provided a stronger case that allowed discussion of the degree the sample experienced results (Gliner & Morgan, 2000).

Null hypothesis for research question two: There are no significant differences between Colorado's public elementary schools identified by the highest scoring and lowest scoring 10%, or highest scoring and lowest scoring 25% in reading achievement measured by the proficient and advanced variable on the 2004 third grade reading CSAP assessment concerning the mean NSDC staff development standards individually; constructs of context, process, or content; collective use; hours of professional development within the school day each month; or percent of free and reduced lunch of the school community. This question also included confidence intervals and effect sizes to reduce possible misinterpretation of a singular analysis of the hypothesis in null form (Gliner & Morgan, 2000).

Null hypothesis for research question three: There are no significant associations between context, process, content, or percent of free and reduced lunch variables with the proficient and advanced variable in the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, or lowest scoring 25% of schools data sets.

Null hypothesis for research question four: There are no variables (collective use, hours of professional development within the school day each month, percent of free and reduced lunch) that predict proficient and advanced reading achievement individually or in combination for the returned surveys data set.

Population External Validity

External validity is the degree research results can be generalized to groups and locations outside the study. Population external validity refers to the degree the sample represented the accessible and theoretical populations. Sampling method and response rate determine validity of the sample. First, theoretical and accessible populations are defined. Next, sampling procedures are explained followed by one-sample *t* test statistics comparing means of the selected sample to accessible population. Response rate is discussed in chapter 4.

The theoretical population included all public elementary schools in the United States. The accessible population included all 948 public elementary schools in Colorado. The percent of free and reduced lunch variable was based on all 948 elementary schools. Statistics for the 2004 third grade reading CSAP proficient and advanced variable were based on the 856 schools providing numerical data.

Sampling Procedures

A randomized sample of the accessible population provided the best structure of inferential research to generalize results to other public elementary schools in the United States. For a total population of 950, Krejcie and Morgan (as referenced in Gay & Airasian, 2000) suggested 274 representatives be sampled to reduce the probability results reflected sampling error and increase the probability results reflected the total population. A Random Table of Numbers (p. 606-609, Gay & Airasian, 2000) was consulted to produce the 274 sample schools. Selection of sample schools was intended to be non-biased by being obtained from the CDE list of elementary schools reflecting numerical assessment data for third grade reading. To increase the number of returned surveys, non-responding sites were contacted by postcard 3 weeks after the requested return date.

One-sample *t* tests were completed to compare means between the selected sample and accessible population with the variables of unsatisfactory, partially proficient, proficient, advanced, proficient and advanced, not scored, and percent of free and reduced lunch. Table 1 identifies mean statistics for the selected sample (n = 273) and accessible population (n = 856 for student achievement; n = 948 for percent of free and reduced lunch), standard deviations, and *p* values indicating significance of difference. The non-significant results of one-sample *t* tests supported the selected sample represented the accessible population.

Table 1

Mean Comparisons of the Selected Sample to the Accessible Population

Variable	Selected Sample *M*	Accessible Population *M*	*SD*	*p*
% Unsatisfactory[a]	8.60	7.90[b]	8.59	.183
% Partially Proficient[a]	18.19	17.60[b]	10.09	.340
% Proficient[a]	64.27	65.07[b]	13.78	.334
% Advanced[a]	7.57	8.12[b]	6.06	.136
% Proficient & Advanced[a]	71.84	73.19[b]	17.08	.190
% Not Scored[a]	1.37	1.29[b]	3.07	.672
% FRL	38.79	37.75[c]	27.55	.535

Note. Degrees of freedom = 272. %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004. [b]n = 856. [c]n = 948.

p = two-tailed.

Measurement Validity

Instrumentation for this research included the NSDC Standards Assessment Inventory (NSDC SAI) survey including two additional questions referred to as the School/District Professional Development Program Characteristics questionnaire, and Colorado Student Assessment Program (CSAP). The NSDC SAI explains test development and content validity, instrument reliability, criterion-related validity, and construct validity. The two additional questions were supported through empirical research outlined in chapter 2. The section on CSAP illustrates test development and content validity, instrument reliability, criterion-related validity, and reducing bias in CSAP for the 2004 third grade reading assessment.

National Staff Development Council Standards Assessment Inventory

Recently, NSDC contracted with Southwest Educational Development Laboratory (SEDL) to develop a valid and reliable survey instrument aligned with NSDC staff development standards. The instrument was designed for teachers and other faculty members to measure the extent a school's professional development program integrated the 12 NSDC staff development standards. The NSDC SAI incorporated 60 questions corresponding to five questions for each individual staff development standard (see appendix A, approval to use NSDC SAI). Responses involved a 5-point scale ranging from 0 (*never*) to 4 (*always*). When used with an Innovation Configuration by Roy and Hord, (2003) (as cited in SEDL, 2004) a system for examining and aligning professional development programs with NSDC staff development standards exists. Based on results of pilot studies, reliability and validity tests were completed by December 2003 to establish the following psychometric properties of the instrument.

Test development and content validity. Item construction for the instrument began with 30 questions per standard. After review, the first draft included 10 items selected for each standard. Four experts, on the NSDC staff development standards, assured clarity of item phrasing, accuracy in standard representation, and feedback for instrument refinement. Next, a focus group of teachers gave feedback on each item, leading to instrument modification. Review and refinement occurred after each pilot test resulting in the final 60-item assessment.

Three separate pilot studies were completed with a total of 60 schools and hundreds of educators participating. Schools were selected for samples to represent high, medium, and low implementation of NSDC staff development standards. Pilot schools responded to a seven-point scale that was later revised to a five-point scale. In addition to individuals from participating schools responding to NSDC SAI, experts also rated each school's implementation level. Comparisons of experts' responses were made with participants' responses to determine instrument clarity and relevance to standard characteristics. SEDL test developers sought feedback and triangulated in this way after each pilot study. By following this procedure, the instrument displayed good content validity.

Instrument reliability. Consistency of the instrument for measuring NSDC staff development standards implementation was completed on an overall scale and for each subscale. The overall instrument reliability was constant and high, measuring a Cronbach's alpha reliability coefficient of .98 across the three pilot studies. Subscale reliability was measured for every standard across each pilot study. The Cronbach's alpha reliability coefficient ranged from .71 to .92 indicating good to strong groupings of

items within all standards and for differences between each standard. Consistency in measurement was determined throughout the pilot studies (SEDL, 2004).

Gliner and Morgan (2000) cautioned researchers on using Cronbach's alpha as the only measure establishing inter-item reliability. To determine only one concept was factored a second indicator of reliability must be used. Gliner and Morgan asserted high overall item correlations may indicate more than one concept contributed to the calculation.

Criterion-related validity. Criterion-related validity relates scores to predetermined descriptors. Only fully completed surveys were used for this analysis. Participants' analyses were compared to the external measure criterion given by expert raters. The participants' ratings of their school's professional development program concerning implementation of NSDC staff development standards were similar to the experts' program ratings. Discriminant function analyses determined statistical differences between high and low groups after each pilot study. Criterion-related validity was evident.

Construct validity. Construct validity is the extent a test measures what it was designed to measure. Findings of pilot studies suggested the 12-factor model contained overlap within instrument subscales. Results of the principal components analysis and varimax rotation procedures indicated between five and seven areas were represented by NSDC SAI. SEDL suggested further examination of the number of standards with attention to wording; and consolidation of standards may be warranted (SEDL, 2004).

The NSDC SAI was created for educators to self-assess and evaluate the professional development program of their school, discuss and interpret survey results,

and develop an action plan based on responses and discussion. By analyzing individual standards, and constructs of context, process, and content, educators could direct future professional development efforts in a focused manner. The use of NSDC SAI in this study was broadened to include a statewide sample of participants.

School/District Professional Development Program Characteristics Questionnaire

Two additional questions reflected significant findings of empirical literature reviewed in chapter 2 and not addressed by NSDC SAI (see appendix B). Participants were asked to provide further information about the professional development programs of their school and district. The first question asked how many hours were devoted to professional development each month within the school day. Suggestions to consider included common and team planning time, building-goal focused professional development, district-goal focused professional development, and individual professional development days related to the district strategic plan (Garet et al., 2001; Newmann et al., 2000; Pritchard & Marshall, 2002). The second question was open-ended, allowing information to be provided concerning unique qualities of individual professional development programs.

Colorado Student Assessment Program

The third grade CSAP reading assessment measures standard one, comprehension, and administration occurs in two 45-minute testing periods. The test is given during a March testing window and results posted in early May each year. Data provides one form of information for teachers, in consultation with parents, to create individual literacy plans for students who tested below grade level benchmarks.

Colorado Department of Education published longitudinal data concerning CSAP for each grade level. Academic achievement of third grade students on the reading assessment has continually climbed since CSAP testing began in 1998. Percentages of third grade students who performed in proficient and advanced categories for spring 1998 was 66%, 1999 was 67%, 2000 was 69%, 2001 and 2002 was 72%, and 2003 was 74%. Scores for all minority groups, Title I, Spanish Lectura version, and students with Individual Educational Plans improved over time. CTB/McGraw-Hill (2004) reported the following:

Test development and content validity. The 2004 CSAP assessment was developed to assure content validity, quality, and appropriateness of each test question aligned with the Colorado Model Content Standards. The first source of test items came from CTB/McGraw-Hill's pool of earlier test questions. Revisions were completed for greater relevancy with standards. Further questions were developed to assure complete association between standards and the assessment. The 2004 third grade reading assessment used test questions from past CSAP reading tests to maintain equality of test difficulty from year to year for horizontal alignment. Vertical alignment of the third grade reading test occurred with other grade levels as well.

Instrument reliability. The Cronbach's alpha reliability coefficient for third grade reading exceeded .85 indicating strong internal consistency. Score reliability was conducted by using the item response theory pattern scoring procedures. Greater information was utilized over the total test, content standard, and sub-content area levels. Repeated test administrations would result in relatively stable scores given comparable testing conditions.

Criterion-related validity. Test item analysis occurred for multiple-choice and constructed-response questions. The product-moment correlation was used for the item-to-total score computations. Omitted responses were few, and treated as incorrect providing consistency with scale scores. Statistical analysis determined possible differences in responses for identified groups including Hispanics, African Americans, males, and females. Differential item functioning analyses found one third grade reading test item exhibited significance in difference.

Reducing bias in CSAP. Establishing a bias-free assessment was highly valued by CDE staff and CTB/McGraw-Hill. To reduce the possibility of CSAP measuring skills or knowledge differently for various groups, CDE followed four procedures. Special consideration to content validity assured alignment with the Colorado Model Content Standards. Published guidelines by McGraw-Hill such as the 1983 Guidelines for Bias-Free Publishing, and 1993 Reflecting Diversity: Multicultural Guidelines for Educational Publishing Professionals by Macmillan/McGraw-Hill were consulted. Educational professionals and community members representing population subgroups read each test question and reviewed for language appropriateness, content material, and representation of the public. Differential item functioning statistical analysis was conducted for African Americans, Hispanics, males, and females (CTB/McGraw-Hill, 2004).

Data Collection

The principal of selected elementary schools received a letter of introduction (see appendix C) and teacher packet containing an introductory letter (see appendix D), brief of NSDC staff development standards, NSDC SAI, two additional questions, and stamped envelope addressed to Colorado State University. The principal was asked to

give the teacher information packet to a volunteer classroom teacher. Confidentiality was maintained by the principal not revealing the participant's name to the research team. Anonymity was maintained by the teacher withholding self-identifying information on the survey and other correspondence materials.

The introductory teacher letter explained the time commitment and information about NSDC SAI. Teachers were asked to withhold self-identifying information and maintain the materials' numbering system for confidentiality. Every question was requested to be answered, to obtain a full picture of educational practices provided by the school and school district. Participation in the study was voluntary and each participant was provided with contact information for the Director of Regulatory Compliance, in case he or she may have questions concerning rights of a volunteer. There were no known risks, benefits, or compensation for participants associated with the research. Research records were secured by the School of Education, Colorado State University for 3 years in locked storage for auditing purposes. There were no known reasons to exclude a returned survey from data analysis.

During the first week of November 2004, a random sample was selected from CDE third grade assessment website. After the sample was selected, the postal record for one elementary school was not available. Upon investigation, this school was listed as not found and no information was available. A total of 273 survey packets were mailed to elementary schools throughout Colorado.

After survey materials were sent, a number of principals/participants contacted the research team to explain the school had been open less than 5 years or there was not a teacher with 5 or more years experience in the building. An addendum was approved by

the Regulatory Compliance Administrator at Colorado State University. The phrase, "or has the most teaching experience", was added. A post card was sent as a reminder to non-responding schools after a 3 week timeframe (see appendix E).

Data Analysis

After the random sample was selected, each line of data was organized into a computerized statistical program for the social sciences. The numbering system of the statistical program corresponded to the same numbered survey. Data analysis is discussed through data preparation, descriptive statistics, and inferential statistics.

Data Preparation

Each question of NSDC SAI was phrased in a positive manner corresponding with 4 (*always*) being the highest response level. There were no NSDC SAI questions phrased in a negative manner corresponding to 0 (*never*) as the desired response. To prepare the survey data for statistical analysis, responses from the 60 NSDC SAI questions were reduced by finding means and establishing composite variables. Five questions on NSDC SAI corresponded with each of the 12 staff development standards. Mean statistics for each standard were established. Composite variables associated with each construct were created by drawing from all NSDC SAI questions corresponding with context, process, and content (see appendix F). Next, responses from questions 1 through 60 were reduced to form a composite variable associated with collective use of NSDC staff development standards. Finally, the returned sample was expanded to prepare the highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools data sets according to the proficient and advanced variable as listed on the CDE website.

Descriptive Statistics

Research question 1 was explored through measures of central tendency including mean, measures of variability including range and standard deviation, and normal curve including distribution skewness concerning each variable associated with NSDC staff development standards, hours of professional development within the school day each month, percent of free and reduced lunch, and percent of students scoring in proficiency categories of 2004 third grade reading CSAP (Gay & Airasian, 2000). All data from the additional professional development information question was included in appendix G.

Research question 3 used descriptive statistics of the Pearson product moment correlation and Spearman rho nonparametric to determine if there were relationships between the constructs of context, process, content, and percent of free and reduced lunch with reading achievement for each data set. Linear and quadratic regression relationships were verified by scatterplot graphs with outliers considered. Numerical values for r were interpreted such that $r = .1$ was small or smaller than typical; $r = .3$ was medium or typical; $r = .5$ was large or larger than typical; and $r = .7$ was much larger than typical (Morgan, Leech, Gloeckner, & Barrett, 2004).

Inferential Statistics

Research question 2 required variables identifying highest scoring and lowest scoring 10% and 25% of schools based on the proficient and advanced variable. The independent samples t test statistic was selected to determine differences in means based on met assumptions. The nonparametric Mann-Whitney U test was selected when assumptions were not met. Comparison analyses determined statistical differences between high scoring and low scoring groups for percent of free and reduced lunch; hours

of professional development within the school day each month; and individual, construct, or collective use of NSDC staff development standards. Research question 4 used simple linear regression to create a prediction equation and simultaneous multiple regression analysis to establish significant contributions of variables in predicting reading achievement. The following analyses were in place for reference.

Tests of significance. To reject null hypotheses and determine results for research questions 2 and 4 were significantly greater than chance, tests of significance to the probability level of 5 out of 100 times were considered ($p \leq .05$). If the probability level was less than .05, rejection of a null hypothesis was possible. Statistical significance was also the probability of rejecting a null hypothesis when it was actually true, or a Type I error.

Confidence intervals. A 95% confidence interval was used representing a range of numbers including the mean difference of the population 95% of the time. If upper and lower interval boundaries had the same (-) or (+) sign, results were statistically significant. If zero was found within the upper and lower confidence interval boundary the null hypothesis could be true. Given a statistically significant interval, the range of numbers recognized practical importance. A small range of numbers between upper and lower boundaries had greater practical importance than a large range.

Effect size. The magnitude of difference between the independent and dependent variables was calculated. Effect sizes for statistically significant variable(s) were computed by determining differences between the means of two data sets and dividing by an estimate of the pooled standard deviation. The strength of effect for the difference question was determined such that $d = .2$ was small or smaller than typical, $d = .5$ was

medium or typical, $d = .8$ was large or larger than typical, and $d = \geq 1.0$ was much larger than typical. If needed, strength of effect for the multiple regression question, such that $R = .14$ was small or smaller than typical, $R = .36$ was medium or typical, $R = .51$ was large or larger than typical, and $R = .70+$ was much larger than typical (Morgan, et al., 2004).

CHAPTER 4: FINDINGS

This research was designed to explore relationships between professional development practices of Colorado elementary schools, socioeconomic status (SES), and student reading achievement. Assessments used were the National Staff Development Council Standards Assessment Inventory (NSDC SAI), two additional questions, and the Colorado Student Assessment Program (CSAP) reading test administered to all third grade students during the spring 2004 testing period.

Sixty-nine surveys were returned, resulting in a 25.27% response rate. One-sample *t* tests were completed to compare means between the returned sample and accessible population with the variables of unsatisfactory, partially proficient, proficient, advanced, proficient and advanced, not scored, and percent of free and reduced lunch. Table 2 displays results. Six of seven compared means of the returned sample indicated no significant difference from the accessible population in Colorado. The only variable producing a significant result was percent not scored ($p < .05$) including a mean difference of - .49, and 95% confidence level the mean difference fell within the range of - 0.87 to - 0.10. Effect size of percent not scored was considered smaller than typical, $d =$ - .2. The significant finding indicated statistically fewer students refused the state assessment in the returned sample than accessible population. These findings supported the returned sample represented the accessible population of schools in Colorado.

Table 2

Mean Comparisons of the Returned Sample to the Accessible Population

Variable	Returned Sample *M*	Accessible Population *M*	*SD*	*p*
% Unsatisfactory[a]	7.37	7.90[b]	7.21	.546
% Partially Proficient[a]	16.68	17.60[b]	9.77	.439
% Proficient[a]	66.83	65.07[b]	12.29	.237
% Advanced[a]	8.30	8.12[b]	6.54	.817
% Proficient & Advanced[a]	75.14	73.19[b]	15.49	.300
% Not Scored[a]	.81	1.29[b]	1.59	.014*
% FRL	36.25	37.75[c]	26.38	.639

Note. Degrees of freedom = 68. %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004. [b]n = 856. [c]n = 948.

*$p < .05$, two-tailed.

Chapter 4 presents statistical results of the four research questions. First, characteristics of the sample are discussed through descriptive statistics for the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools data sets. Second, differences in educational practices and SES are discussed by comparing the highest scoring and lowest scoring 10% of schools and the highest scoring and lowest scoring 25% of schools based on the proficient and advanced variable of the 2004 third grade reading CSAP assessment. Third, associations between educational practices and SES with reading achievement are presented for the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools data sets. Fourth, regression analyses attempted to determine if reading achievement could be predicted by educational practices, SES, or through combinations of variables.

Characteristics of the Sample

Mean statistics for NSDC staff development standards and construct variables represent presence of standard implementation in schools such that values of < 1.00 = never-to-seldom, 1.00 to 1.99 = seldom-to-sometimes, 2.00 to 2.99 = sometimes-to-frequently, and 3.00 to 4.00 = frequently-to-always. Skewness of the distribution was determined by values less than (+) or (-) one equaled the normal curve, and values greater than (+) or (-) one equaled a skewed distribution (Morgan, et al., 2004).

Returned Sample

Descriptive statistics for the 69 returned surveys from the random sample provided the following information as seen in Table 3. The statistics of staff development standards, constructs, and collective use variables were present in schools

spanning from never-to-seldom (0.40) to always (4.00). Leadership and equity were the only two staff development standards or constructs to be present in the returned sample data set within the frequently-to-always range. There were no constructs with means within the frequently-to-always range. The mean range was 1.02 between the highest mean of 3.37 and lowest mean of 2.35. All staff development standard variables held a normal distribution of scores. Mean rank order of the returned sample staff development standards are listed in Table 9 for comparison with other data sets.

The variable of hours of professional development each month held a range of 109 hours including the minimum of 1 hour and maximum of 110 hours. For descriptive statistics in Table 3, the response of 110 was considered an outlier value, making 50 the maximum statistic. Removing 110 from the data provided a more accurate mean statistic of 11.74 for the variable. This is discussed further in chapter 5. The hours of professional development variable held a skewed distribution of 1.71. The percent of free and reduced lunch variable distribution was normal with statistics ranging from 1.2 to 94.8, mean of 36.25.

Table 3

Returned Sample

Variable	Range		*M*	*SD*	*Skew*
	Minimum	Maximum			
Learning Communities	.80	3.60	2.45	.67	- .38
Leadership	1.80	4.00	3.37	.56	- .93
Resources	1.20	3.80	2.74	.53	- .33
Data-driven	1.20	4.00	2.92	.60	- .38
Evaluation	0.40	3.80	2.35	.69	- .56
Research-based	1.20	4.00	2.95	.58	- .39
Designs & Strategies	1.20	4.00	2.93	.61	- .72
Learning	1.40	4.00	2.79	.54	.05
Collaboration Skills	0.60	4.00	2.91	.69	- .68
Equity	2.00	4.00	3.35	.46	- .87
Quality Teaching	1.60	3.80	2.91	.54	- .45
Family Involvement	1.20	4.00	2.61	.66	- .30
Context	1.40	3.73	2.86	.51	- .52
Process	1.07	3.77	2.81	.51	- .77
Content	1.73	3.73	2.96	.47	- .61

Table 3

Returned Sample (continued).

Variable	Range		*M*	*SD*	*Skew*
	Minimum	Maximum			
Collective Use	1.32	3.72	2.86	.48	- .75
Hours PD/Month	1.00	50.00	11.74	8.91	1.71
% Unsatisfactory[a]	0.00	29.00	7.37	7.21	1.20
% Partially Proficient[a]	1.00	41.00	16.68	9.77	.52
% Proficient[a]	32.00	91.00	66.83	12.29	- .68
% Advanced[a]	0.00	32.00	8.30	6.54	1.28
% Proficient & Advanced[a]	33.00	98.00	75.14	15.49	- .76
% Not Scored[a]	0.00	7.00	.81	1.59	2.38
% FRL	1.20	94.80	36.25	26.38	.28

Note. n = 69. *Skew* = Skewness; Hours of PD/Month = hours of professional development within the school day each month; %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004.

The 2004 reading CSAP variables represented the percent of third graders in each school scoring in the categories of unsatisfactory, partially proficient, proficient, advanced, and the variable of proficient and advanced. The unsatisfactory category held a skewed distribution ranging from a minimum statistic of zero to maximum statistic of 29, mean of 7.37. The partially proficient category distribution was normal, ranging from a minimum statistic of one to maximum statistic of 41, mean of 16.68. The proficient category was normally distributed ranging from a minimum statistic of 32 to maximum statistic of 91, mean of 66.83. The advanced category held a skewed distribution ranging from a minimum statistic of zero to maximum statistic of 32, mean of 8.30. The proficient and advanced variable was normally distributed ranging from a minimum statistic of 33 to maximum statistic of 98, mean of 75.14.

Additional professional development information. Question 62 of the survey asked participants to provide additional professional development information that differed from the previous 61 questions. Thirty-two surveys were returned with comments. Quotes of participants have been reported within an outline of five themes related to student achievement. Table 4 presents examples of responses within the five themes while appendix G provides the complete data set.

Table 4

Additional Professional Development Practices within Student Achievement Themes

Theme	Comments
Supportive Leadership	Leadership team uses teacher input to help decide prof. dev. outcomes for institutes (classes) before and after school and in-service days. Our principal participates in all institutes and attends district prof. dev. Six attended Tointon Institute four day leadership prof. dev. planning for our school last June. Groups have attended with our principal before.
PDPP	District class six times a year for teachers at various levels to study/learn/share/coaching/observing together. Action plans are initiated by the teacher with a focus. Dialog focuses on teacher's wants, needs, and questions. Cluster time is built into our schedules. We are moving to research-based programs and teaching strategies.
Individual School Site	A very effective component of our successful prof. dev. program is that of vertical and horizontal planning with other teachers in our building. Classes are held monthly and staffs are receiving graduate credit. Teachers meet in content study teams to become "experts" at a specific content. Along with assigned grade level planning, many grade levels work together during their own planning time.

Table 4

Additional Professional Development Practices within Student Achievement Themes (continued).

Theme	Comments
Teachers	District coaches assist one full day a week. Our feeder area is also participating in CELL training five days a year, to further develop best practices in teaching all areas of literacy. Time with instructional coaches to look at student achievement and share strategies.
Elimination of Barriers	Some prof. dev. topics and issues are dictated to us by the administration building meaning topics are not always agreed on, relevant, or helpful. We have limited time and resources for prof. dev. in rural Colorado. We have started so many programs in the last six years, but don't perfect one, or get rid of any on our plates. High turn-over of curriculum staff has created much of our problem.

Note. Prof. dev. = professional development; PDPP = Professional Development Program Processes; Individual School Site = Individualized School Site Professional Development; Teachers = Professional Development for Teachers; Elimination of Barriers = Elimination of Barriers to Achievement. All comments are quotes from participants.

Highest Scoring 10% of Schools

Table 5 presents descriptive data for the highest scoring 10% of schools (n = 7) for the proficient and advanced variable. The statistics of staff development standards, constructs, and collective use were present within schools spanning from never-to-seldom (0.60) to always (4.00). Four individual staff development standards, including equity, leadership, quality teaching, and family involvement, as well as the construct of content were present in schools in the frequently-to-always range. The mean range was 1.23 between the highest mean of 3.45 and lowest mean of 2.22. All staff development standards and constructs were normally distributed. Mean rank order of staff development standards for the highest scoring 10% of schools are listed in Table 9 for comparison with other data sets.

The hours of professional development each month variable held a positive skewed distribution ranging from 2 to 23.5 hours, mean of 8.71. The proficient and advanced variable held a skewed distribution ranging from a minimum statistic of 95 to maximum statistic of 98, mean of 96.08. The percent of free and reduced lunch variable held a positive skew (2.49) ranging from a minimum of 2.3 to maximum of 73.9, mean of 17.00.

Table 5

Highest Scoring 10% of Schools

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Learning Communities	1.80	3.20	2.51	.52	.34
Leadership	2.20	4.00	3.25	.65	- .72
Resources	2.20	3.60	2.97	.52	- .49
Data-driven	2.40	3.40	2.97	.37	- .14
Evaluation	0.60	3.40	2.22	.93	- .70
Research-based	2.40	3.40	2.82	.39	.28
Designs & Strategies	2.20	3.40	2.85	.42	- .23
Learning	2.00	3.50	2.78	.55	- .25
Collaboration Skills	2.00	3.80	2.94	.78	.06
Equity	3.00	3.80	3.45	.25	- .74
Quality Teaching	2.00	3.60	3.05	.60	- .92
Family Involvement	2.00	4.00	3.00	.63	.00
Context	2.20	3.53	2.91	.49	.09
Process	2.10	3.48	2.76	.48	.24
Content	2.67	3.67	3.17	.38	- .15

Table 5

Highest Scoring 10% of Schools (continued).

Variable	Range		*M*	*SD*	*Skew*
	Minimum	Maximum			
Collective Use	2.37	3.51	2.90	.45	.26
Hours PD/Month	2.00	23.50	8.71	7.39	1.59
% Unsatisfactory[a]	0.00	2.00	.62	.78	.40
% Partially Proficient[a]	1.00	5.00	2.94	1.05	- .29
% Proficient[a]	66.00	91.00	77.38	7.68	.35
% Advanced[a]	5.00	32.00	18.70	8.31	- .11
% Proficient & Advanced[a]	95.00	98.00	96.08	.91	1.46
% Not Scored[a]	0.00	1.00	.35	.61	1.33
% FRL	2.30	73.90	17.00	25.43	2.49

Note. n = 7. *Skew* = Skewness; Hours of PD/Month = hours of professional development within the school day each month; %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004.

Lowest Scoring 10% of Schools

Table 6 presents descriptive data for the lowest scoring 10% of schools (n = 7) for the proficient and advanced variable. The statistics of staff development standards, constructs, and collective use were present within schools spanning from seldom-to-sometimes (1.40) to always (4.00). Seven individual staff development standards including equity, leadership, designs and strategies, research-based, learning, quality teaching, and collaboration skills, as well as the process construct were present within the frequently-to-always range. The mean range was .86 between the highest mean of 3.31 and lowest mean of 2.45. All staff development standards and constructs were normally distributed. Mean rank order of the lowest scoring 10% of schools staff development standards are listed in Table 9 for comparison with other data sets.

The hours of professional development each month variable was normally distributed ranging from 3 to 20 hours, mean of 10.41. The proficient and advanced variable was normally distributed ranging from a minimum statistic of 33 to maximum statistic of 52, mean of 43.25. The percent of free and reduced lunch variable was normally distributed ranging from a minimum of 43.2 to maximum of 94.8, mean of 73.10.

Table 6

Lowest Scoring 10% of Schools

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Learning Communities	1.80	3.60	2.65	.78	- .06
Leadership	2.40	4.00	3.28	.68	- .19
Resources	2.00	3.80	2.99	.60	- .41
Data-driven	2.20	3.80	2.91	.63	.24
Evaluation	1.40	3.40	2.56	.78	- .50
Research-based	2.20	3.80	3.22	.61	- .61
Designs & Strategies	2.50	3.80	3.24	.53	- .28
Learning	2.00	4.00	3.20	.74	- .58
Collaboration Skills	1.40	4.00	3.00	.92	- .92
Equity	2.20	4.00	3.31	.62	- 1.03
Quality Teaching	2.00	3.80	3.02	.74	- .32
Family Involvement	1.40	3.60	2.45	.69	.28
Context	2.13	3.73	2.97	.66	- .19
Process	2.13	3.77	3.02	.62	- .36
Content	2.00	3.60	2.93	.61	- .34

Table 6

Lowest Scoring 10% of Schools (continued).

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Collective Use	2.10	3.72	2.98	.62	- .35
Hours PD/Month	3.00	20.00	10.41	5.95	.64
% Unsatisfactory[a]	9.00	29.00	21.19	6.91	- .93
% Partially Proficient [a]	27.00	41.00	35.21	4.65	- .79
% Proficient[a]	32.00	49.00	41.41	6.90	- .51
% Advanced[a]	0.00	4.00	1.84	1.71	.41
% Proficient & Advanced[a]	33.00	52.00	43.25	8.28	- .22
% Not Scored[a]	0.00	2.00	.35	.92	2.64
% FRL	43.20	94.80	73.10	19.24	- .50

Note. n = 7. *Skew* = Skewness; Hours of PD/Month = hours of professional development within the school day each month; %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004.

Highest Scoring 25% of Schools

Table 7 presents descriptive data for the highest scoring 25% of schools (n = 18) for the proficient and advanced variable. The statistics of staff development standards, constructs, and collective use were present within schools spanning from seldom-to-sometimes (0.60) to always (4.00). Five individual staff development standards including leadership, equity, quality teaching, designs and strategies, and data-driven means were within the frequently-to-always range. The mean statistic of the content construct was also present within the frequently-to-always range. The mean range was .97 between the highest mean of 3.43 and lowest mean of 2.46. Equity was the only staff development standard holding a negative skew of (-1.31). All other staff development standards and construct variables were normally distributed. Mean rank order of the highest scoring 25% of schools staff development standards are listed in Table 9 for comparison with other data sets.

The hours of professional development each month variable was normally distributed ranging from 2 to 24 hours, mean of 10.31. The survey identifying 110 hours of professional development each month was part of this subset and not included in descriptive statistics. The proficient and advanced variable was normally distributed ranging from a minimum statistic of 87 to maximum statistic of 98, mean of 92.4. The percent of free and reduced lunch variable was positively skewed ranging from a minimum of 1.2 to maximum of 73.9, mean of 14.0.

Table 7

Highest Scoring 25% of Schools

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Learning Communities	1.60	3.60	2.62	.58	.07
Leadership	2.20	4.00	3.43	.56	- .99
Resources	2.00	3.60	2.84	.49	- .26
Data-driven	2.00	4.00	3.01	.54	- .24
Evaluation	0.60	3.80	2.46	.76	- .50
Research-based	2.00	3.60	2.84	.45	- .44
Designs & Strategies	2.00	3.80	3.02	.45	- .67
Learning	1.80	3.50	2.86	.50	- .93
Collaboration Skills	2.00	4.00	2.97	.59	.10
Equity	2.20	4.00	3.43	.44	- 1.31
Quality Teaching	2.00	3.60	3.04	.52	- .86
Family Involvement	2.00	4.00	2.84	.63	.18
Context	2.00	3.67	2.96	.44	- .56
Process	1.93	3.48	2.86	.45	- .42
Content	2.07	3.73	3.11	.40	- .64

Table 7

Highest Scoring 25% of Schools (continued).

Variable	Range		*M*	*SD*	*Skew*
	Minimum	Maximum			
Collective Use	1.98	3.58	2.95	.41	- .65
Hours PD/Month	2.00	24.00	10.31	7.42	.92
% Unsatisfactory[a]	0.00	6.00	1.61	1.68	.87
% Partially Proficient[a]	1.00	10.00	5.72	2.78	.15
% Proficient[a]	66.00	91.00	78.25	7.29	.15
% Advanced[a]	0.00	32.00	14.14	8.46	.17
% Proficient & Advanced[a]	87.00	98.00	92.40	3.64	- .19
% Not Scored[a]	0.00	2.00	0.26	.64	2.44
% FRL	1.20	73.90	14.06	19.25	2.17

Note. n = 18. *Skew* = Skewness; Hours of PD/Month = hours of professional development within the school day each month; %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004.

Lowest Scoring 25% of Schools

Table 8 presents descriptive data for the lowest scoring 25% of schools (n = 18) for the proficient and advanced variable. The statistics of staff development standards, constructs, and collective use were present within schools spanning from seldom-to-sometimes (1.20) to always (4.00). Two standards including leadership and equity held mean values within the frequently-to-always range. There were no constructs with means in the frequently-to-always range. The mean range was .93 between the highest mean of 3.33 and lowest mean of 2.40. All staff development standards and constructs were normally distributed. Mean rank order of the lowest scoring 25% of schools staff development standards are listed in Table 9 for comparison with other data sets.

The hours of professional development each month variable held a positive skew ranging from 3 to 50 hours, mean of 12.23. The proficient and advanced variable was normally distributed ranging from a minimum statistic of 33 to maximum statistic of 67, mean of 54.81. The percent of free and reduced lunch variable was normally distributed ranging from a minimum of 7.6 to a maximum of 94.8, mean of 61.44.

Table 8

Lowest Scoring 25% of Schools

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Learning Communities	1.40	3.60	2.37	.68	.63
Leadership	2.40	4.00	3.33	.54	- .41
Resources	2.00	3.80	2.79	.47	.47
Data-driven	1.80	3.80	2.85	.59	.14
Evaluation	1.40	3.40	2.40	.60	- .12
Research-based	2.00	3.80	2.97	.58	- .14
Designs & Strategies	2.00	3.80	2.93	.54	- .06
Learning	2.00	4.00	2.91	.60	.13
Collaboration Skills	1.40	4.00	2.84	.73	- .21
Equity	2.20	4.00	3.26	.47	- .45
Quality Teaching	2.00	3.80	2.94	.53	.12
Family Involvement	1.20	3.60	2.51	.75	- .15
Context	2.13	3.73	2.83	.50	.42
Process	1.97	3.77	2.81	.48	.19
Content	2.00	3.60	2.90	.48	- .26

Table 8

Lowest Scoring 25% of Schools (continued).

	Range				
Variable	Minimum	Maximum	*M*	*SD*	*Skew*
Collective Use	2.07	3.72	2.84	.47	.11
Hours PD/Month	3.00	50.00	12.23	11.20	2.65
% Unsatisfactory[a]	9.00	29.00	16.59	6.23	.58
% Partially Proficient[a]	17.00	41.00	27.63	7.56	.25
% Proficient[a]	32.00	62.00	51.40	9.57	- .88
% Advanced[a]	0.00	8.00	3.41	2.62	.48
% Proficient & Advanced[a]	33.00	67.00	54.81	11.10	- .89
% Not Scored[a]	0.00	3.00	.97	1.27	.88
% FRL	7.60	94.80	61.44	21.35	- .71

Note. n = 18. *Skew* = Skewness; Hours of PD/Month = hours of professional development within the school day each month; %FRL = Fall 2003 percent free and reduced lunch.

[a]Spring 2004.

Rank Order of Staff Development Standards

Mean rank order of staff development standards are listed in Table 9. The table marks the rank of variables in descending order for the data sets of returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools.

Analysis of means greater than 2.999 for individual staff development standards indicated differences between the five data sets. The lowest scoring 10% of schools displayed seven standards including equity (M = 3.314), leadership (M = 3.285), designs and strategies (M = 3.242), research-based (M = 3.228), learning (M = 3.200), quality teaching (M = 3.028), and collaboration skills (M = 3.000) representing all three constructs including context (leadership), process (designs and strategies, research-based, learning, collaboration skills), and content (equity, quality teaching) present in the frequently-to-always range. The highest scoring 25% of schools showed five standards including leadership (M = 3.433), equity (M = 3.433), quality teaching (M = 3.044), designs and strategies (M = 3.022), and data-driven (M = 3.011) representing the constructs of context (leadership), process (designs and strategies, data-driven), and content (equity, quality teaching) present in the frequently-to-always range. The highest scoring 10% of schools displayed four standards including equity (M = 3.457), leadership (M = 3.257), quality teaching (M = 3.057), and family involvement (3.000) representing the constructs of context (leadership) and content (equity, quality teaching, family involvement) present in the frequently-to-always range. The returned sample showed two standards including leadership (M = 3.376) and equity (M = 3.350) representing the constructs of context (leadership) and content (equity) present in the frequently-to-always

Table 9

Rank Order of Staff Development Standards of Each Data Set

Rank	Returned Sample	Highest 10%	Lowest 10%	Highest 25%	Lowest 25%
1.	Leadership	Equity	Equity	Leadership	Leadership
	3.376	3.457	3.314	3.433	3.333
2.	Equity	Leadership	Leadership	Equity	Equity
	3.350	3.257	3.285	3.433	3.266
3.	Research-b	Qual Teach	Designs&S	Qual Teach	Research-b
	2.952	3.057	3.242	3.044	2.972
4.	Designs&S	Family Inv	Research-b	Designs&S	Qual Teach
	2.933	3.000	3.228	3.022	2.944
5.	Data-driven	Resources	Learning	Data-driven	Designs&S
	2.929	2.971	3.200	3.011	2.938
6.	Coll Skills	Data-driven	Qual Teach	Coll Skills	Learning
	2.918	2.971	3.028	2.977	2.911
7.	Qual Teach	Coll Skills	Coll Skills	Learning	Data-driven
	2.913	2.942	3.000	2.861	2.855
8.	Learning	Designs&S	Resources	Family Inv	Coll Skills
	2.797	2.857	2.992	2.844	2.844
9.	Resources	Research-b	Data-driven	Resources	Resources
	2.749	2.828	2.914	2.844	2.797

Table 9

Rank Order of Staff Development Standards of Each Data Set (continued).

Rank	Returned Sample	Highest 10%	Lowest 10%	Highest 25%	Lowest 25%
10.	Family Inv	Learning	Learn Com	Research-b	Family Inv
	2.617	2.785	2.657	2.844	2.511
11.	Learn Com	Learn Com	Evaluation	Learn Com	Evaluation
	2.453	2.514	2.564	2.622	2.408
12.	Evaluation	Evaluation	Family Inv	Evaluation	Learn Com
	2.350	2.228	2.457	2.466	2.377

Note. Research-b = Research-based; Qual Teach = Quality Teaching; Designs&S = Designs and Strategies; Coll Skills = Collaboration Skills; Family Inv = Family Involvement; Learn Com = Learning Communities.

range. The lowest scoring 25% of schools showed two standards including leadership (M = 3.333) and equity (M = 3.266) representing the constructs of context (leadership) and content (equity) present in the frequently-to-always range. These distinctions are noteworthy because the lowest scoring 10% of schools experienced more professional development standards (7) in the frequently-to-always range representing all constructs, while the highest scoring 10% of schools experienced fewer professional development standards (4) in the frequently-to-always range, without representation of the process construct.

Highest ranking means across all data sets included the leadership and equity standards. For the returned sample, highest scoring 25%, and lowest scoring 25% data sets, the leadership standard had the greatest mean of staff development standards followed by the equity standard. For the highest scoring and lowest scoring 10% of schools, the equity standard had the greatest mean, followed by the leadership standard.

Low ranking means across all data sets included the learning communities and evaluation standards. The learning communities standard ranked 10th for the lowest scoring 10% of schools, 11th for the returned sample, highest scoring 10%, and highest scoring 25% of schools, and 12th for the lowest scoring 25% of schools data sets. The evaluation standard ranked 11th for the lowest scoring 10% and 25% of schools, and 12th for the returned sample, highest scoring 10%, and highest scoring 25% of schools data sets.

The family involvement standard experienced different rankings among data sets including the highest scoring 10% (4th), highest scoring 25% (8th), lowest scoring 25% (10th), and lowest scoring 10% (12th) of schools. Overall, the returned sample held family

involvement tenth among the 12 standards. The data set with the lowest ranking family involvement standard held the lowest student achievement.

Mean number of hours of professional development within the school day each month showed a downward trend from the returned sample (13.20 hours/month), lowest scoring 25% (12.23 hours/month), lowest scoring 10% (10.41 hours/month), highest scoring 25% (10.31 hours/month), and ending with the highest scoring 10% (8.71 hours/month) concerning student achievement. The means indicated a greater amount of professional development time during the school day for the returned sample and lowest scoring data sets.

Rank Order of Staff Development Constructs and Collective Use

Mean rank order of staff development standard constructs and collective use are listed in Table 10. The table marks rank of variables presented in descending order for the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools data sets.

Construct means were similar for four data sets ranking content (equity, quality teaching, family involvement) highest, followed by context, and process last. The only data set deviating from this pattern was the lowest scoring 10% of schools that focused on process (data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills), followed by context, and content last.

The highest scoring 10% and 25% of schools data sets focused the greatest application on the construct of content and least application with process. The lowest scoring 10% of schools incorporated each construct to a greater extent than the lowest scoring 25% of schools.

Table 10

Rank Order of Staff Development Constructs and Collective Use of Each Data Set

Rank	Returned Sample	Highest 10%	Lowest 10%	Highest 25%	Lowest 25%
1.	Content	Content	Process	Content	Content
	2.961	3.178	3.021	3.110	2.907
2.	Collect Use	Context	Collect Use	Context	Collect Use
	2.862	2.914	2.988	2.966	2.845
3.	Context	Collect Use	Context	Collect Use	Context
	2.860	2.906	2.976	2.950	2.835
4.	Process	Process	Content	Process	Process
	2.813	2.769	2.933	2.863	2.819

Note. Collect Use = Collective Use.

Differences in Educational Practices and Socioeconomic Status

This section discusses comparisons of achievement subgroups for educational practices and SES. Highest scoring and lowest scoring 10% comparisons determined differences at opposite ends of the returned sample distribution. Highest scoring and lowest scoring 25% comparisons considered differences in quartiles with half of the returned sample. The nonparametric Mann-Whitney *U* Test was performed for the variables of percent free and reduced lunch, hours of professional development within the school day each month, and equity standard for each subgroup comparison. Independent samples *t* tests were performed for all other variables.

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools

Hours of professional development each month (1.59) and percent of free and reduced lunch (2.49) variables held skewed distributions for the highest scoring 10% of schools. A skewed distribution was evident for the equity standard (-1.03) in the lowest scoring 10% of schools data set. The nonparametric Mann-Whitney *U* Test was performed. A statistically significant difference between rankings was found with the percent of free and reduced lunch variable ($p < .01$). The null hypothesis for differences between the highest scoring 10% and lowest scoring 10% of schools for the percent of free and reduced lunch variable was rejected.

Independent samples *t* tests were completed to compare means for the variables of learning communities, leadership, resourced, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, quality teaching, family involvement, context, process, content, and collective use. None of the Levene's *F* values were significant, therefore equal variances were assumed.

Variables representing use of NSDC staff development standards held no statistical significance between the highest scoring and lowest scoring 10% of schools. This reflects similarity of professional development programs between the two data sets. The null hypotheses for educational practices represented by the 12 NSDC staff development standards individually; three constructs; collective use; and hours of professional development within the school day each month variables were accepted. Appendix H identifies comparison results of all variables for the highest scoring and lowest scoring 10% of schools.

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools

Skewed distributions were evident for the equity standard (-1.31) and percent of free and reduced lunch (2.17) variables in the highest scoring 25% of schools data set. Hours of professional development within the school day each month (2.65) variable held a skewed distribution for the lowest scoring 25% of schools. The nonparametric Mann-Whitney *U* Test was performed. A statistically significant difference between rankings was found with the percent of free and reduced lunch variable ($p < .001$). The null hypothesis for differences between highest scoring and lowest scoring 25% of schools for the percent of free and reduced lunch variable was rejected.

Independent samples *t* tests were completed to compare means for the variables of learning communities, leadership, resourced, data-driven, evaluation, research-based, designs and strategies, learning, collaboration skills, quality teaching, family involvement, context, process, content, and collective use. None of the Levene's *F* values were significant, therefore equal variances were assumed.

Variables representing use of NSDC staff development standards held no statistical significance between the highest scoring and lowest scoring 25% of schools. This reflects similarity of professional development programs between the two data sets. The null hypotheses for educational practices represented by the 12 NSDC staff development standards individually; three constructs; collective use; and hours of professional development within the school day each month variables were accepted. Appendix I identifies comparison results of all variables for the highest scoring and lowest scoring 25% of schools.

Associations between Educational Practices and SES with Reading Achievement

The purpose of this research question was to identify associations of staff development standards use and SES with reading achievement for each data set. If one or more construct variables showed a greater emphasis of correlation with student achievement, application contrasts could be determined.

To initiate analysis of data, scatterplots were created for each data set with outliers considered to correlate the proficient and advanced variable with all other variables including percent of free and reduced lunch, context, process, content, and hours of professional development within the school day each month. Regression lines were positioned on each scatterplot to determine linear or quadratic relationships. A linear regression line was the best fit for the correlation of returned sample data set regarding content and process variables with the proficient and advanced variable. Pearson product moment correlations were used for these two linear relationships. Quadratic regression lines were identified as highest r^2 value for all other correlations

meriting the Spearman rho nonparametric correlation. Table 11 identifies correlation coefficients and correlations for variables considered in each data set.

Two statistically significant correlations were found. First, the returned sample held one statistically significant correlation between percent of free and reduced lunch and proficient and advanced variables, Spearman rho r (67) = - .682, $p <$ .001. A negative relationship of r (- .682) was considered larger to much larger than typical, and showed the greater percent of free and reduced lunch recipients at a school, the lower the proficient and advanced statistic. The null hypothesis for association between percent of free and reduced lunch and proficient and advanced variables was rejected for the returned sample.

Second, the lowest scoring 25% of schools data set held the other statistically significant correlation between percent of free and reduced lunch and proficient and advanced variables, Spearman rho r (16) = - .616, $p <$ .01. A negative relationship of r (- .616) was considered larger to much larger than typical, and showed the greater percent of free and reduced lunch recipients at a school, the lower the proficient and advanced statistic. The null hypothesis for the association between percent of free and reduced lunch and proficient and advanced variables for the lowest scoring 25% of schools was rejected.

The highest scoring 10%, highest scoring 25%, and the lowest scoring 10% of schools data sets did not have statistical significance between percent of free and reduced lunch and proficient and advanced variables. The null hypotheses for association between percent of free and reduced lunch and proficient and advanced variables were accepted for these data sets.

The null hypotheses for associations between staff development standard constructs and hours of professional development within the school day each month variables with the proficient and advanced variable were accepted for the returned sample, highest scoring 10%, lowest scoring 10%, highest scoring 25%, and lowest scoring 25% of schools data sets.

Table 11

Spearman Correlations of SES, Constructs, and Hours of Professional Development with Third Grade Proficient and Advanced Reading Achievement

Data Set	%FRL	Context	Process	Content	Hours
Returned Sample (n = 69)	- .682***	.078	- .051[a]	.112[a]	- .108[b]
Highest Scoring 10% (n = 7)	- .571	.270	.357	.357	.071
Lowest Scoring 10% (n = 7)	- .429	.357	.357	.090	.371
Highest Scoring 25% (n = 18)	.079	- .033	- .078	.149	- .253[b]
Lowest Scoring 25% (n = 18)	- .616**	- .199	- .267	- .070	- .036

Note. %FRL = Fall 2003 percent free and reduced lunch; Hours = hours of professional development within the school day each month.

[a] Pearson r. [b] Outlier included.

**$p < .01$, two-tailed. *** $p < .001$, two-tailed.

Predictions of Reading Achievement

An assumption of this statistical analysis included the collective use variable held the same unit of measure as the 5-point scale value increased or decreased. The hours of professional development within the school day each month variable was skewed (1.71) and not considered for this question.

Simple linear regression determined if staff development standards use and percent of free and reduced lunch recipients predicted reading achievement individually. First, linear regression showed no statistical significance $F(1, 67) = .005, p = .945$ for collective use predicting reading achievement. The null hypothesis was accepted for the collective use variable.

Second, linear regression for percent of free and reduced lunch variable found a statistically significant $F(1, 67) = 66.60, p < .001$ contribution in predicting reading achievement. The prediction equation was (90.171 + -.415 x percent of free and reduced lunch); unstandardized coefficient β constant 90.171 + unstandardized coefficient β -.415 multiplied by the percent of free and reduced lunch of the school. Adjusted $R^2 = .491$ indicated 49% of variance in reading achievement could be predicted by the percent of free and reduced lunch variable. The standardized beta coefficient indicated a much larger than typical negative effect, $\beta = - .706$ for percent of free and reduced lunch to predict third grade reading achievement. The null hypothesis was rejected for the percent of free and reduced lunch variable.

CHAPTER 5: DISCUSSION

Chapter 5 synthesizes the findings of research and explores future possibilities through the sections entitled review of research components, socioeconomic status and achievement, educational practices and achievement, future research, implications for policy development and practice, and conclusion. Review of research components summarizes the study by discussing the ability to generalize to a greater population, inferred outcomes, and results. Socioeconomic status and achievement explores similar empirical results of poverty relating to low achievement and includes a sample of empirically-based factors to increase achievement. Educational practices and achievement discusses observations of descriptive statistics of this study in conjunction with literature. Ideas for exploration are addressed in future research. Next, implications for professional development policy at national, state, and local levels are presented. The conclusion summarizes chapter 5.

Review of Research Components

The NSDC staff development standards describe professional development to improve educational processes theoretical and empirical literature show related to student achievement. The NSDC SAI was created as a self-assessment tool for a complete school faculty to rate level of implementation, initiate discussion, and ultimately develop professional development plans and programs for individual sites. By interpreting educational practice through the framework of NSDC staff development standards, a common vocabulary, definition, and understanding of principles guide expectations.

Although this research used the NSDC SAI beyond the scope of an individual site, professional development analysis at district and state levels can also be served by NSDC staff development standards and assessment inventory.

Ability to Generalize to a Greater Population

There were no statistical differences between the selected sample (n = 273) and accessible population with percent of free and reduced lunch (n = 948) or achievement variables (n = 856). There were no statistical differences between the returned sample (n = 69) and accessible population concerning percent of free and reduced lunch (n = 948) or achievement variables (n = 856) of unsatisfactory, partially proficient, proficient, advanced, or proficient and advanced. Significance of percent not scored ($p < .05$) indicated fewer students refused the third grade CSAP reading assessment in the returned sample than the accessible population.

The 25.27% return rate may be considered a shortcoming of the investigation to generalize staff development standards use to greater populations. Strength of the research is the returned sample was reflective of Colorado's accessible population.

Inferred Outcomes

The review of literature and significance of the study section in chapter 1 inferred six outcomes supported by NCLB legislation. First, professional development programs utilizing all NSDC staff development standards to a high degree, embedded in the school environment, would affect teachers' knowledge and skills to result in greater student achievement as outlined in chapter 2. Second, SES would not significantly alter achievement if educational practices reflected by the staff development standards were in place to a high degree (Faires et al., 2000; Newmann et al., 2000; Wenglinsky, 2002).

Third, additional time dedicated to professional development practices within the school day would result in greater student achievement (Cohen, 2000; Garet et al., 2001; Newmann et al., 2000; Pritchard & Marshall, 2002). Fourth, eliminating barriers to achievement would increase success for educators and students (Cohen, 2000; Darling-Hammond, 2003; Farstrup & Samuels, 2002; Jinkins, 2001; Johnston et al., 1998; Klingner et al., 1999; Newmann et al., 2000; Pitts & Reeves, 1999; Supovitz, 2001; Useem et al., 1997). Next, lack of embedded achievement-related educational practices in a public school building would result in low student achievement. Last, best practices of professional development programming would integrate statistically significant findings of the highest achieving schools in Colorado and applications from literature known to increase student achievement.

Results

This study quantitatively measured educational professional development practices of elementary schools across Colorado and described relationships and differences with SES and student achievement. Results of this study indicated elementary schools across Colorado practiced NSDC staff development standards with statistical similarity. Educational practices known to increase student achievement were embedded in school cultures regardless of achievement outcomes. Due to this result, no correlations with achievement or ability to predict achievement were found with staff development standard constructs or collective use variables. Descriptive and inferential statistic results are discussed with associated literature in the section entitled educational practices and achievement.

Differences between the highest scoring and lowest scoring 10% of schools ($p <$ .01) and highest scoring and lowest scoring 25% of schools ($p < .001$) indicated percent of free and reduced lunch variable as the only statistically significant difference between data sets. None of the individual staff development standards, constructs, collective use, or hours of professional development indicated significant differences between data sets.

Association results indicated much larger than typical negative correlations between the percent of free and reduced lunch variable and third grade proficient and advanced reading achievement for the returned sample (Spearman rho r (67) = - .682, $p <$ .001), and lowest scoring 25% of schools (Spearman rho r (16) = - .616, $p < .01$) data sets. Negative relationships showed the greater percent of free and reduced lunch recipients at a school, the lower the proficient and advanced statistic. The highest scoring 25% of schools did not experience a significant correlation between percent of free and reduced lunch and reading achievement.

Student achievement in this study was predicted through linear regression analysis indicating 49% of variance was determined by the percent of free and reduced lunch variable to predict third grade proficient and advanced reading achievement, F (1, 67) = 66.60, $p < .001$. Linear prediction equation, 90.171 + -.415 x percent of free and reduced lunch; much larger than typical negative effect, β = - .706. Collective use of the NSDC staff development standards did not predict third grade reading achievement.

Analyses of findings of this study are explored in the next two sections offering discourse on school demographics and professional development practices in relation to student achievement in Colorado.

Socioeconomic Status and Achievement

Over the past 40 years, findings of low SES associating with and predicting low student achievement has been shown to exist in our country from governmental studies conducted during the 1960's (Coleman et al., 1966) to current-day studies (Darling-Hammond, 2000; Okpala, Okpala, & Smith, 2001; Pitts & Reeves, 1999; Sutton & Soderstrom, 1999). Darling-Hammond (2000) found social disadvantage increased the likelihood of experiencing teachers without full certification or degrees in teaching area, and low achievement. Students of low SES status were more likely to be taught by teachers who did not teach within a degreed subject area, hold full teaching credentials, or hold certification. Poverty, ability to speak English, and minority status of students was negatively associated with student achievement and teacher qualifications.

School demographics of low SES, race/minority, low attendance, high mobility, and high school dropout rates were significant predictors of low achievement in Illinois (Sutton & Soderstrom, 1999). Poor families move 50% more frequently than families who are not poor. Mobility was found to contribute to low achievement in reading and math and below grade-level achievement when two or more moves were experienced before third grade. The statistics of being older than peers in sixth grade were doubled if three moves were experienced before third grade in comparison to students who had not moved before third grade (Heinlein & Shinn, 2000).

This research found the percent of free and reduced lunch variable was significantly different among high scoring and low scoring schools, inversely associated with reading achievement in the returned sample and lowest scoring 25% data sets, and a significant inverse predictor of reading achievement. In this study, general information

about embedded professional development practices in the school environment indicated, for the lowest scoring 10% of schools, low SES (or another unmeasured variable) outweighed greater application of staff development standards in comparison to higher scoring schools.

Not all schools were limited by or free of poverty concerns regarding the percentage of students qualifying for free and reduced lunch. The highest scoring 10% of schools included one school with 73.9% of students qualifying for free and reduced lunch. The lowest scoring 25% of schools included one school with 7.6% of students qualifying for free and reduced lunch. No association (Spearman rho $r = .079$) existed between the percent of free and reduced lunch recipients and reading achievement in the highest scoring 25% of schools data set. Newmann et al. (2000) researched low SES schools with high student achievement and adequate funding from outside sources to study professional development practices.

The findings of this study conflicted with other research about quality professional development programs having greater impact on student achievement than poverty (Faires et al., 2000; Wenglinsky, 2002). Possible explanations for discrepancies with the literature review could be the structure of studies measuring professional development efforts and student achievement. A focused program of study was initiated and growth measured in contrast to those who had not participated in the professional development program. In Faires et al., one group of parents were provided professional development and student gains measured. Wenglinsky measured effects of the active teacher on student achievement after professional development training. This study found professional development practices were in place across Colorado to an equally

high degree with no significant professional development differences among achievement groups.

Studies focusing on closing achievement gaps for specific groups of students have developed strategies for schools to reduce disparities in achievement. A sample of factors to increase achievement of SES students follows. Shannon and Bylsma (2002) studied race/ethnicity and SES in the state of Washington to suggest modifying beliefs and attitudes of parents, students, and teachers; increasing cultural responsiveness; providing greater opportunities for learning; supporting effective instruction; and increasing family and community involvement. The following four studies exemplify school-controlled predictors of success in low SES schools with high student achievement. Sutton and Soderstrom (1999) found best predictors of high student achievement were teacher salary, expenditure, and pupil-teacher ratios for grades 3 and 10 for reading and mathematics scores. Tajalli and Opheim (2004) found teacher characteristics affected achievement across elementary, middle, and high school levels. Process variables controlled by educators to increase achievement for low SES students included bilingual education in elementary schools and not in high schools, instructional leadership at the elementary level, increased teachers' salary at middle school, and greater teachers' experience for middle and high schools. Page (2002) found elementary classrooms that incorporated technology experienced higher mathematics achievement, levels of self-esteem, and student-centered environments for low SES children. Parental training and teacher support were factors that diminished differences in parental literacy level and SES of the home in relation to student achievement (Faires et al., 2000).

In reviewing CSAP test development procedures from the CSAP Technical Report 2004, the phrases, socioeconomic status or percent of students on free and reduced lunch were not identifiers of subgroup representation. To have accurate information on test development procedures I telephoned CDE. Elizabeth Celva, EdD, Director of the Unit of Student Assessment, described methods promoted by the U.S. Department of Education, and used by CDE, to reduce test bias. The first premise included students on free and reduced lunch can be taught and understanding measured with test questions properly aligned with the Colorado Model Content Standards. Plain language for each test item was pursued to be culturally inclusive for all. Questions were adjusted for special needs including vision, hearing, and mild to moderate classifications. Question phrasing reflected ability levels ranging from the unsatisfactory to advanced categories. Finally, poverty is being addressed by analyzing trends with mobility and absenteeism (personal communication, July 5, 2005).

Educational Practices and Achievement

This section addresses findings associated with hours of professional development within the school day each month and staff development standards.

Hours of Professional Development

No statistical differences were found between achievement groups (10%, 25%) for the hours of professional development within the school day each month variable. Hours of professional development did not correlate with student achievement in any of the five data sets. This finding differs from the literature review of studies indicating duration of in-depth professional development increased student achievement (Cohen, 2000; Garet et al., 2001; Newmann et al., 2000; Pritchard & Marshall, 2002).

Descriptive statistics for the returned sample (M = 11.74, outlier removed), lowest scoring 25% (M = 12.23), lowest scoring 10% (M = 10.41), highest scoring 25% (M = 10.31, outlier removed), and highest scoring 10% (M = 8.71) indicated an inverse trend with student achievement. The mean statistics indicated more time was experienced with professional development during the school day for the returned sample and lowest scoring data sets. Based on these results, one cannot assume the fewest hours of professional development earn highest student achievement. Unmeasured factors or statistical significance of another variable outweighed the influence of professional development time.

The range of responses to question 61 showed teachers across Colorado had different understandings of professional development. The maximum statistic was 110 hours of professional development each month, equating to five and one half hours of professional development each day (5 days per week for 4 weeks). Interpretation of professional development by this teacher seemed to represent every opportunity interacting with colleagues was an opportunity for professional growth. The minimum statistic was 1 hour of professional development each month. Interpretation of professional development by this teacher represented a specific time for professional learning set aside each month, or 1 day per school year reserved for professional development. Different interpretations of professional development, parameters of planning time availability, or district professional development scheduling may have contributed to varied responses.

Staff Development Standards

Use of NSDC staff development standards was statistically similar between high scoring and low scoring schools. This finding clarified no correlation with student achievement or ability to predict student achievement based on educational practices in elementary schools across Colorado. This section addresses observations of descriptive and inferential statistics pertaining to collective use, standards constructs, individual standards, leadership and equity standards, learning communities and evaluation standards, and family involvement standard.

Collective use. In this study, individual staff development standards, constructs, and collective use variables indicated no significant differences of educational practices between highest and lowest achieving schools (10% or 25%). The high level of student-achievement-related educational practices in all elementary schools did not reflect a correlation or ability to predict third grade reading achievement. These findings indicated staff development standard variables were present equally as much within all achievement groups of schools.

Statistical results for differences between achievement groups and correlations with achievement in this research were contrary to reviewed empirical literature. Each study discussed in the literature review identified factors contributing to or hindering student achievement in relation to professional development practices. This research suggested teachers in schools of all achievement levels exhibited statistically similar educational practices.

This study was completed at one point in time concerning professional development practices of elementary schools and achievement results of one state content

standards test in Colorado. Statistical student achievement data consistent with longevity studies was not provided. Longevity studies have shown increased student achievement through qualities of staff development standards use over a period of 3 to 5 years (Cunningham & Stanovich, 1997) and as the grade level increased in school districts (Pritchard & Marshall, 2002).

Standards constructs. Statistically, no differences were found for the constructs of content, process, or context between high scoring and low scoring data sets. Constructs of staff development standards did not correlate with reading achievement in any of the five data sets.

Trends observed through descriptive statistics included the following. Four data sets including returned sample, highest scoring 10%, highest scoring 25%, and lowest scoring 25% ranked the content construct (equity, quality teaching, and family involvement) as the greatest rating of application, followed by the constructs of context and process. The highest scoring 10% and highest scoring 25% data sets experienced greatest application in the frequently-to-always range for the content construct. All other constructs, except process in the lowest scoring 10% of schools, were practiced in the sometimes-to-frequently range for all data sets. This reflected the literature review stating teachers' knowledge of content (Cohen, 2000; Darling-Hammond, 2000; Farstrup & Samuels, 2002; Newmann et al., 2000) and professional development providing teachers with focused and in-depth knowledge of curricula (Cohen, 2000; Darling-Hammond, 2000; Garet et al., 2001) increased student learning and achievement. Studies finding direct increases of student achievement through efforts defined by the content construct included Cohen (2000), Darling-Hammond (2000), Faires et al. (2000),

Farstrup & Samuels (2002), Garet et al. (2001), Hallinger et al. (1996), Jinkins (2001), Marzano et al. (2001), Newmann et al. (2000), Pritchard & Marshall (2002), Wenglinsky (2002), and Wharton-McDonald et al. (1998).

The lowest scoring 10% of schools experienced the greatest application for the process construct (data-driven, evaluation, research-based, designs and strategies, learning, and collaboration skills), followed by the constructs of context and content. In the lowest scoring 10% and 25% of schools, all three constructs ranged from 2.93 to 3.02 meaning similar focus was given to each.

Individual standards. The lowest 10% of schools experienced seven professional development standards in the frequently-to-always range representing all constructs, while the highest 10% of schools experienced four professional development standards in the frequently-to-always range, without representation of the process construct. Comparison of descriptive statistics reflected greater professional development programming for the lowest scoring 10% of schools. Additional professional development time, more staff development variable means of 3.00 or above, and higher means for collective use, context, and process were held than the highest scoring 10% of schools data set. In this study, the higher mean percent of free and reduced lunch for the lowest 10% of schools, ranked significantly different ($p < .01$) than the highest 10% of schools, outweighing expanded efforts of professional development programs. There may be other variables related to low achievement influencing results and not measured by this study.

Leadership and equity standards. The leadership and equity standards ranked highest among all data sets. Participants in all subgroups felt leadership and equity were embedded practices in the school environment more than any other staff development standards. For the returned sample, highest scoring 25%, and lowest scoring 25% data sets, the leadership standard held greatest mean statistics followed by the equity standard. For the highest scoring and lowest scoring 10% of schools, the equity standard had greatest mean statistics followed by the leadership standard. Schools across Colorado valued leadership and practiced equity for students in the frequently-to-always range. The literature review identified seven studies supporting leadership (Cohen, 2000; Desimone et al., 2002; Garet et al., 2001; Hallinger et al., 1996; Johnston et al., 1998; Newmann et al., 2000; Pritchard & Marshall, 2002) and three studies identifying equity (Farstrup & Samuels, 2002; Wenglinsky, 2002; Wharton-McDonald et al., 1998) for increased achievement.

Learning communities and evaluation standards. The learning communities and evaluation standards ranked lowest among all data sets. Participants in all subgroups felt learning communities and evaluation were embedded practices in school environments to lesser degrees than any other staff development standards. The learning communities standard ranked 10^{th} for the lowest scoring 10% of schools; 11^{th} for the returned sample, highest scoring 10%, and highest scoring 25% of schools; and 12^{th} for the lowest scoring 25% of schools data sets. Learning communities standard means ranged from 2.37 to 2.78 indicating practice in the sometimes-to-frequently range. Three studies found learning communities supported achievement (Garet et al., 2001; Johnston et al., 1998; Newmann et al., 2000).

The evaluation standard ranked 11th for the lowest scoring 10% and 25% of schools; and 12th for the returned sample, highest scoring 10%, and highest scoring 25% of schools data sets. Evaluation standard means ranged from 2.22 to 2.56 indicating practice in the sometimes-to-frequently range. These ratings could be due to the nature of evaluating professional development programming. Evaluation occurs occasionally throughout the school year and possibly once at the end of a program. Three studies and a review supported evaluation for increasing achievement (Darling-Hammond, 2003; Desimone et al., 2002; National Research Council, 1996; Rude & Brewer, 2003).

Family involvement standard. The family involvement standard received different rankings among data sets including the highest scoring 10% (4th, $M = 3.00$), highest scoring 25% (8th, $M = 2.844$), lowest scoring 25% and returned sample (10th $M = 2.52$, $M = 2.61$), and lowest scoring 10% (12th $M = 2.45$) of schools. Although rankings and means indicated a parallel trend with achievement, independent sample *t* tests confirmed no significant differences of professional development practices between high scoring and low scoring schools concerning the family involvement standard.

Research has shown student achievement increased when parents were meaningfully involved and trained to assist their children with learning (Faires et al., 2000; Farstrup & Samuels, 2002), and in high SES schools, parents influenced teachers to have greater expectations of learning by being involved in the school community (Hallinger et al., 1996). Scheduling study time at home was just as difficult for two parent mid-income families as single parent low-income families (Faires et al., 2000).

Results of this study and topics for future research present the multifaceted domain of education. The following section looks at areas for future research.

Future Research

This section addresses future research through topics associated with poverty; Colorado funding for education; minority; dropout rates; family involvement; circumstances of professional development programming; effects of high-stakes testing for students, schools, and school districts on achievement; reducing factors limiting student achievement; and expanded research in Colorado and other states.

In Colorado, the predictive nature of poverty related to low student achievement. Understanding issues facing education to counteract social repercussions of poverty can build on research beyond the professional development literature. Funding produced high achievement regardless of race, SES, or teacher quality. Without adequate funding, poverty was the strongest predictor of low-test performance (Ellinger & Wright, 1995). Per-pupil expenditures held a positive relationship with fourth grade reading achievement and no relationship with math achievement. Factors of per-pupil disbursements (teacher salaries, professional development, class size, and others) were recognized as supporting achievement of elementary-aged students (Darling-Hammond, 2000). During the 1999 school year, Colorado spent $580.00 fewer dollars per child in high poverty districts than in low poverty districts, resulting in $14,500 fewer dollars per classroom of 25 students (http://www.cde.state.co.us/cdeadult/download/pdf/EdWatch AchGapSummariesCo).

Effects of poverty involved language barriers, dissimilar parental support, different value systems of culture, different value systems of SES, and varied living conditions. Recognizing all schools have unique needs, students, and communities promotes understanding how to counteract these differences (Touchton & Acker-Hocevar, 2001). During 1999, Colorado spent $550.00 fewer dollars per child in high

minority districts compared to low minority districts, resulting in $13,750 fewer dollars per classroom of 25 students (http://www.cde.state.co.us/cdeadult/download/pdf/Ed WatchAchGapSummariesCo).

Nationwide, students in the lowest quartile of family income dropped out of school at greater rates than other income quartiles. In 1998, 46.3% of students in the lowest quartile of family income dropped out of school; in 2000, 44.8%; and in 2001, 41.7% dropped out of school (http://www.nces.ed.gov/programs/digest/). Total percent of students dropping out of Colorado public schools has decreased each year, 3.5% in 1997-98, 3.3% in 1998-99, 3.0% in 1999-2000, and 2.9% in 2000-2001. Colorado's graduation rates have improved from 80.5% in 2001, to 81.8% in 2002, and 83.6% in 2003 (http://www.cde.state.co.us). Demographics on the percent of Colorado dropouts in the lowest family income quartiles were not found. The statistics concerning funding, dropout rates, and graduation rates present inconsistencies that could be understood in a fuller way with greater study. Future research in these areas to understand links between funding, poverty, minority, and dropout rates when teacher staff development and educational practices are statistically similar is merited.

Statistically, this study found professional development practices represented by the family involvement standard were not different between low scoring and high scoring elementary schools. Demographics of the sample indicated the family involvement standard rank and mean statistics paralleled student achievement. Family involvement standard ranking and mean statistics were low in the lowest achieving data sets and high in the highest achieving data sets. Future research could explore reasons or factors

creating differences in rank and means between low achieving and high achieving schools.

Differences in staff development construct use between the highest scoring 10% (content) and the lowest scoring 10% (process) of schools was present in this study. Future research could explore the nature of differences schools practice, expanding on questions to understand the process-content relationship. Questioning could include, "Can high achieving schools put greater emphasis on content due to less attention on raising test scores or greater professional development organizational support?" Possible topics may incorporate effects of high-stakes testing, factors related to SES, location of school, timeline of overall professional development strategic plan, available resources, district and building professional development support for teachers, or possible blocks to achievement. Low scoring schools indicated greater individual staff development standards practiced in the frequently-to-always range. Future research could explore relationships with student populations, professional development program strategic plan, and content focus.

High-stakes testing for students based on one test score decreased achievement of selected student groups. Promotion to fourth and eighth grades in Louisiana found poverty strongly associated with retention, and special education students on free and reduced lunch were retained at greatest rates (Yuan, Pernici, & Franklin, 2001). Colorado does not retain students based on one state assessment. Minimum competency requirements and CSAP testing for third, fourth, fifth, seventh, eighth, and tenth grades centers on improvement of instruction and program evaluation (http://www.nces.ed.gov/programs/digest/).

High-stakes penalties for schools and school districts are now part of the national educational environment, creating another factor to research. Publication dates for the student achievement-related professional development empirical literature ranged from 1996 to 2003. This implies and was stated in some cases, research was conducted years before publication. Therefore, results were evident before NCLB initiated numerous enforced penalties for not meeting AYP goals. Future research could investigate areas to clarify relationships with high-stakes testing. First, single group time-series designs of state standards testing for individual student proficiency levels on state standards tests (high-stakes environment) compared to proficiency levels of daily work (low-stakes environment). Second, levels of student preparation (programming, skill attainment) for early reading acquisition achievement could be explored in relation to state content learning standards and assessments, SES, parental professional development training, and urban-rural location. Third, analysis of student achievement on all state content tests with the variables of SES, professional development practices, dropout rates, and other factors affected by high-stakes testing could identify trends across data and clarify relationships over time. A 3-year period for demonstrating AYP may not be sufficient time based on empirical results of students who demonstrated proficiencies by fifth grade (Cunningham & Stanovich, 1997) or presented greater statistically significant achievement results as grade level increased within school districts (Pritchard & Marshall, 2002).

Tracking long-term achievement of students after the principal has been replaced in comparison to changed administrative or educational practices could identify success of imposed sanctions. Decreased student achievement and blocks to change initiatives

were found in authoritarian organizational structures leading to high levels of administrator and teacher turnover (Johnston et al., 1998; Useem et al., 1997), low levels of trust, dismantled faculty teams, and limited creation of social capital (Useem et al., 1997). Results of this study identified principal leadership as highly valued in all data sets. Current research directed toward high-stakes testing and student achievement is needed.

A focus on reducing factors limiting student achievement can be accomplished through qualitative and quantitative means. Qualitative studies could focus on individual school professional development programs to confirm and promote achievement-increasing strategies; and to identify and reduce factors associated with limiting achievement. Quantitative studies with teachers and administrators may focus on two areas. First, levels of implementation of NSDC staff development standards when elements of imposed sanctions are threatening work environments. Second, development of a valid and reliable survey to measure factors associated with limiting student and educator achievement could assist in identifying, isolating, and eliminating factors known to reduce achievement.

Future research could focus on expansion of research in Colorado to include additional content assessments such as mathematics, writing, or science; and additional grade levels to gain a fuller understanding of educational practice in relation to SES and achievement. This could include attention to schools focusing greatest effort on the content construct, resulting student achievement, and SES. This study could be used as baseline data to measure differences in future educational efforts or compare professional development practices of other states in similar studies.

Implications for Policy Development and Practice

For those involved in policy development and practice as policy, success of all students and educators must be the standard of measure. To affect student achievement, attention to student achievement-related empirical literature, NSDC staff development standards, and eliminating barriers between educational practices and student achievement represent a guiding framework. Policy issues based on educational practices aimed at increasing student achievement and decreasing blocks to achievement are addressed in this section from a federal and state legislation perspective and a district and building standpoint.

Federal and State Legislation

Federal and state legislation can promote achievement by modifying funding formulas for equity; eliminating discrepancies for all student groups; continuing professional development initiatives; promoting low-stakes testing procedures and modifying or eliminating legislative penalties; increased accountability based on standards of practice; and continuing research. Policy implementation at federal and state levels must reduce the predictive nature of poverty by modifying funding formulas in Colorado and across the nation to promote equity between high and low poverty school districts, and high and low minority school districts. Understanding effects of changing federal and state funding formulas in relationship to available local tax base, unique needs of individual schools, and student achievement can help increase equity between school districts and school buildings. Policy can be implemented to eliminate discrepancies for low SES students and other disaggregated groups including continued

funding concentrated on dropout prevention for all students, and increased assistance to strengthen valued contributions of families in areas of lowest family involvement.

Maintaining the all-time high levels of professional development funding can establish embedded daily professional development for a greater number of school districts. By allowing school districts latitude to structure professional development within the school day, funding for programming and scheduling is paramount to increase achievement-related practices. Furthering professional development in the best manner includes programming targeted to implementing NSDC staff development standards to affect student learning. A statewide professional development programming initiative, offered in rural and urban locations, can promote ways to integrate achievement-related cultural practices into school buildings.

On federal and state levels, eliminating factors known to cause significant differences in student achievement involves promotion of low-stakes standards testing and terminating legislative penalties. Federal and state mandates of low-stakes testing procedures would promote standards for implementation of state standards tests as outlined by the American Psychological Association, American Educational Research Association, National Council on Measurement in Education, and National Research Council thereby creating foundations of success for all students. Based on prior professional development research (Cunningham & Stanovich, 1997; Pritchard & Marshall, 2002) and the results of this study, elimination of high-stakes penalties for education nationwide are in line with empirical literature associated with increasing student achievement and reducing negative bias for disadvantaged students (Darling-Hammond, 2003). Therefore, elimination of sanctions associated with low achievement

when a predictor is low SES, funding discrepancies exist, and educational practices are statistically constant across Colorado are merited.

Modification or elimination of federal penalties can promote greater means of accountability. Recently, the Colorado state legislature addressed this in Senate Bill 05-050, An Act concerning Authorization of School Districts to Refuse to Comply with the Federal, "NCLB Act of 2001", effective July 1, 2005. The new section to the Colorado Revised Statutes 22-32-110.6, states a local school board may adopt a resolution to decline one or more federal funding sources allowing exemption from requirements of NCLB (http://www.state.co.us/gov_dir/leg_dir/olls/sl2005a/sl_139.htm).

An alternative to this Colorado NCLB modification could include addressing school achievement by measuring standards of educational practices observed in districts and school buildings. Outside experts could rate implementation of achievement-related educational practices and analyze adequacy of funding and programming to establish accountability based on school achievement factors. By measuring professional practices of educators in relation to accepted standards of practice, a full picture of school achievement is evident. Combined with an understanding of available programming, levels of funding, measures of poverty, and other research-based indicators related to student achievement, all schools can be held accountable for educational practices and achievement in an equitable manner. Finally, continued research on educational success leading to high achievement for all students and educators can help government support the founding philosophy of a high quality, free, and public education for all.

School District and Building Policy

School district and building policy interpretation and implementation can promote success by reflecting the results of this research and professional development empirical literature for increased student achievement. First, affirming a common professional development definition and program plan incorporating empirical evidence can promote accomplishment for all involved in education. Second, goals for professional development programming guided by student achievement related standards of practice and eliminating barriers within schools. Third, funding must influence scheduling to support educators working together, and provide support to classroom teachers for increased focus on knowledge and skills of NSDC staff development standards. Next, a focused school-wide program enlisting parents as meaningful assistants and community resources to increase children's academic success. Finally, attention to achievement trends of low SES students in each school building can create programming options through adequate school district funding.

Conclusion

Measuring standards of educational practice can provide an accurate description of educators' accomplishments to influence achievement for accountability. Reducing factors known to limit achievement is important for all students and educators. Initially, an end result of this research was to include programming considerations based on educational practices of high performing schools. This research indicated no statistical difference of educational practices between high achieving and low achieving elementary schools and identified low SES as significantly contributing to low achievement in Colorado.

Creating equitable federal funding solutions for districts and school buildings nationwide that have high concentrations of low SES, minority, and other factors related to low achievement can help establish educational equality for all. By addressing social issues surrounding poverty and achievement, federal legislation can create a nonbiased and equal beginning for all children. Isolating societal factors associated with low SES of families and funding program solutions can benefit children, families, education, and the country by providing better educational opportunities for a greater number of young children.

A call for future research and policy modification to promote equal opportunities for all students and educators was presented. Suggestions for future research included factors of poverty contributing to reduced achievement; funding programs known to create environments conducive to high achievement; equitable funding formulas; high-stakes testing and achievement; achievement related to federal sanctions and organizational development; family involvement; circumstances of professional development programming and emphasis; survey development identifying practices limiting achievement; and expansion of research in Colorado and other states.

Suggestions for policy implications were addressed through federal and state legislation and school district and building standpoints. Federal and state legislation policy concerns included modifying funding formulas; eliminating discrepancies of identified student groups; continuing professional development initiatives; promotion of low-stakes testing; elimination of sanctions associated with low achievement; and basing accountability measures on standards of practice. School district and building policy implications included affirming a common professional development definition and

program plan to implement standards of practice while eliminating barriers; funding supportive collaboration; increased family and community support; and increased programming options for low achieving or low SES students through adequate school district funding. Federal and state legislators working with educators, families, and communities can accomplish the attainable goal of increased achievement for all students.

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APPENDIX A

Approval to use the NSDC Standards Assessment Inventory

NATIONAL STAFF DEVELOPMENT COUNCIL

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June 18, 2004

Dawn Fertitta
1203 Aruba Dr
Ft. Collins, CO
80525

Dawn,

The National Staff Development Council is pleased to grant you permission to use the NSDC Standards Assessment Inventory in conjunction with your dissertation work at Colorado State University. This permission allows you to make as many copies of the self-assessment as necessary in order to do this work.

Since we have an ongoing interest in research related to the use of the NSDC standards, please send one copy of your completed dissertation to NSDC 's deputy executive director Stephanie Hirsh, 16306 Sunset Valley, Dallas, TX 75248.

Thank you for your interest in the Council's work and our very best wishes for a successful completion of your doctoral work.

Since Richardson
Joan Richardson
Joan Richardson

APPENDIX B

S/DPDPC Questionnaire

School/District Professional Development Program Characteristics

61. How many hours of professional development does your staff engage in each month? Please include time related to professional development within the school day such as: common/team planning time, building-goal focused professional development, district-goal focused professional development, and individual professional development days related to the district strategic plan.
Hours per month?_____

62. Please list and describe additional information about your professional development program that is different from the previous questions.

APPENDIX C

Letter to Principal

Colorado State University

School of Education
Fort Collins, Colorado 80523-1588

November 5, 2004

Dear Principal:

I would like to introduce myself as a Doctoral Candidate in the Educational Leadership and Human Resource Studies program at Colorado State University, working with Dr. Jean Lehmann. The systematic random sample of elementary schools drawn from the state department of education website focused my attention to your school. This is an invitation for one of the teachers in your school to participate in the dissertation research entitled; "An Analysis of Relationships between Educational Practices Framed by the NSDC Staff Development Standards and Third Grade Reading Achievement". Enclosed you will find the approval to do research letter from Colorado State University School of Education, the letter of agreement from NSDC to use the NSDC SAI for research purposes, and a teacher packet.

The purpose of this research is to examine relationships of educational practices framed by NSDC staff development standards, time spent on professional development, and school demographics to third grade reading achievement on the 2004 reading standards assessment.

Please introduce the study to a classroom teacher in your school who meets the following criteria: The volunteer classroom teacher participant (a) has taught in your public elementary school building for five or more years, (b) has participated in a variety of professional development opportunities offered within your school and school district, particularly within the last year, and (c) responds to the survey based upon understandings of the professional development program over the three years prior to the administration of the spring 2004 state standards reading test. When a teacher accepts the invitation, please ask him or her to complete the survey privately.

There are no known risks, benefits, or compensation associated with the research. If you have any questions or concerns regarding any aspect of the study please contact my advisor or me. Thank-you for your assistance.

Sincerely,

Jean Lehmann, PhD
Director of Graduate Programs, School of Education
Lehmann@cahs.colostate.edu
(970)-491-5169

Dawn M. Fertitta, MEd
Doctoral Candidate

APPENDIX D

Letter to Participant Classroom Teacher

Colorado State University

School of Education
Fort Collins, Colorado 80523-1588

November 5, 2004

Dear Participant Classroom Teacher:

Thank you for taking 20 to 25 minutes of your time to provide information about the educational practices found in your school building and school district by completing the one-time survey.

The purpose of this research is to examine relationships of educational practices framed by NSDC staff development standards, time spent on professional development, and school demographics to third grade reading achievement on the 2004 reading standards assessment.

Enclosed you will find the National Staff Development Council's (NSDC) Standards Assessment Inventory and two additional questions identified as the School/District Professional Development Program Characteristics (S/DPDPC) questionnaire. The purpose of this research is to gain more information about the professional development program at your elementary school and/or school district.

Your participation in the study is voluntary. By completing the survey materials and returning them to Colorado State University, you are consenting to participate in the research. Please do not provide any self-identifying information or remove the numbering system on the materials. Your anonymity to the research team is important to the integrity of the research. Survey data and school confidentiality will be maintained. There are no known risks, benefits, or compensation for the participants associated with the research.

Please answer each question in order to obtain a full picture of the educational practices your school and district provides. A summary of the NSDC staff development standards has been included for reference. Please mail the NSDC SAI survey directly to Colorado State University in the self-addressed stamped envelope within 5 working days.

If you have any questions concerning your rights as a volunteer in this research, please contact Celia Walker, Director of Regulatory Compliance, at (970)-491-1553. If you have any questions or concerns regarding any aspect of the study please contact Dr. Jean Lehmann, e-mail: Lehmann@cahs.colostate.edu; phone: (970)-491-5169 or Dawn M. Fertitta, e-mail: Fertitta@lamar.colostate.edu. Thank-you for your assistance.

Sincerely,

Jean Lehmann, PhD
Director of Graduate Programs, School of Education

Dawn M. Fertitta, MEd
Doctoral Candidate

APPENDIX E

Postcard to Participant

November 29, 2004

Dear Principal/Participant Teacher:

Four weeks ago you were sent an invitation to participate in the research study, "An Analysis of Relationships between Educational Practices Framed by the NSDC Staff Development Standards and Third Grade Reading Achievement" regarding the educational practices associated with the National Staff Development Council's staff development standards your school has implemented in recent years. Please take a moment (up to 25 minutes) to complete the survey. A large systematic random sample has been selected and confidentiality will be maintained. If you have any questions, please contact my advisor, Jean Lehmann at lehmann@cahs.colostate.edu or me at fertitta@lamar.colostate.edu.

Sincerely,

Dawn M. Fertitta, MEd
PhD Candidate

APPENDIX F

Data Preparation

CONTEXT

Learning Communities	Leadership	Resources
9. _____	1. _____	2. _____
29. _____	10. _____	11. _____
32. _____	18. _____	19. _____
34. _____	45. _____	35. _____
56. _____	48. _____	49. _____
Average Score: _____	Average Score: _____	Average Score: _____

PROCESS

Data-driven	Evaluation	Research-based
12. _____	3. _____	4. _____
26. _____	13. _____	14. _____
39. _____	20. _____	21. _____
46. _____	30. _____	36. _____
50. _____	51. _____	41. _____
Average Score: _____	Average Score: _____	Average Score: _____

Designs & Strategies	Learning	Collaboration Skills
15. _____	5. _____	6. _____
22. _____	16. _____	23. _____
38. _____	27. _____	28. _____
52. _____	42. _____	43. _____
57. _____	53. _____	58. _____
Average Score: _____	Average Score: _____	Average Score: _____

CONTENT

Equity	Quality Teaching	Family Involvement
24. _____	7. _____	8. _____
33. _____	17. _____	31. _____
37. _____	25. _____	40. _____
44. _____	54. _____	47. _____
59. _____	60. _____	55. _____
Average Score: _____	Average Score: _____	Average Score: _____

SEDL Evaluation Services

APPENDIX G

Additional Professional Development Information

Five Empirically-based Professional Development Themes

Supportive Leadership

Organizational structures

- "Leadership Team uses teacher input to help decide professional development outcomes for institutes (classes) before and after school and in-service days."

Consistent instructional leadership

- "Our principal participates in all institutes and attends district professional development."
- "Six attended Tointon Institute / four day leadership professional development planning for our school last June. Groups have attended with our principal before. This year our school is one of three title schools who have coordinated to provide time, approximately a half day per month, for staff to meet in mixed staff groups based on individual surveys last spring so we can study/talk/learn together. Our principal was a coordinator for developing this (Title Learning Communities)."

Low-stakes approach to standards testing

Administrator professional development

Professional Development Program Processes

Integrated professional development strategic plan

- "Other opportunities are also available besides typical after hours classes. 'TALK' (district class half day six times a year) for teachers at various levels to study/learn/share/coaching/observing together."
- "Just in Time math classes are offered three times a year (two hours each) to support district elementary math program plus all elementary teachers involved in a math day before school started."

Needs assessment

"As a Teacher Leader (Math) I coach/model and dialogue with more than half the teachers in my building. Action Plans are initiated by the teacher with a focus. Dialogue focuses on teacher's wants, needs, and questions."

Data-driven and research-based

- "We are moving to research-based programs and teaching strategies."
- "Topics for in-service: student achievement data, differentiation in classroom, technology, guided reading strategies, communication in math, advanced learner issues: quantitative approaches, nonverbal accommodations, verbal accommodations, leadership accommodations."
- "DIBELS testing, BEAR testing."
- "DIBELS assessment used with primary."

Resources

- "Sometimes, the students have off, and we have a whole day."
- "Cluster time is built into our schedules, 80 minutes every week for grade level teams."
- "Six hours of planning a month. One full day approximately every other month, 8:00 a.m. to 2:30 p.m."
- "All staff receives release time for the half day classes and substitutes are paid for by the school."

- "Reading First Grant, K-3, in-services throughout year, summer institutes one week first year, three days second year, two days third year."
- "We have three to four in-service days in addition to embedded staff development."
- "As a district, on year round we are only given two days for staff development (two whole days)."

High quality designs

- "Once per week we have technology training in a particular area. Principal provides $100.00 for tuition for classes, plus sub release time. Opportunities to observe at other schools."
- "Professional learning communities, building study groups, staff book club, community book club, district people coming in to building for one half day (with substitutes), year-round track-on days, large selection of district classes."

Systemic feedback and evaluation

- "They offer yoga, woodworking and classes that are fun but not always related to academics."

Individualized School Site Professional Development

School professional development plan

- "Each semester for the past two years 90%-100% of our certified staff participates in a 15 hour class that addresses topics such as curriculum, teaching strategies, research based programs, standards etc. These classes are held at our school before and after school hours."
- "Our staff development team meets monthly to set school goals (focus of study) and to prepare for facilitate vertical teams."
- "Since we are becoming a CORE Knowledge school, we will have at least two days during the year when school will be dismissed plus three or four additional workdays following the end of school. Two professional days a year."
- "Our school is working toward allowing opportunities for gifted and talented students."
- "Our elementary and middle school teachers are working together to make our school safe or comfortable for our students. Working from a weak English Language Learners program to a stronger ELL program. Need help to make our Special Education program more effective."
- "As well as school and district goals, we are also Reading First. So, of course we have state and federal goals – when we attend these professional development outside our building we run well over that average 14 hours."

Adequate learning materials

Building-wide collaboration

- "Classes are held monthly and staffs are receiving graduate credit. Paraprofessionals are receiving credit through the local community college."
- "Daily with individual staff or teams."
- "Along with assigned grade level planning, many grade levels work together during their own planning time."
- "A very effective component of our successful professional development program is that of vertical and horizontal planning with other teachers in our building."

Peer instructional support

- "Classroom teachers (3) are in training to be demo classrooms for literacy. Two are trained to be demo math teachers. I teach second grade math for 1 ¾ hours daily as I continue to build my own craft."
- "We are part of our district's TAP (teacher advancement program) which provides a master teacher and grade level mentors. The master mentors are responsible for the majority of our professional development opportunities. As grade levels, we meet three hours per week formally, one hour literacy, one hour math, and one hour team collaboration; two hours per month staff meeting."
- "We use TAP for the majority of our professional development. Master teachers take the main role in facilitating TAP."
-"Teachers meet in content study teams to become "experts" at a specific content."
- "We also have a PBS (Positive Behavior System) team that meets regularly to help support the school in the area of behavior."

Professional Development for Teachers

Instructional support

- "The literacy coach meets with individual teachers in a coaching situation about 50% of her day. So, depending on the teacher, they may receive more or less of her staff development time. The math coach is here one week out of the month for the same purpose."
- "Time with instructional coaches to look at student achievement and share strategies."
- "District Coaches assist one full day a week."
- "We have a staff coach/literacy teacher."

Instructional content

- "Need support in creating a solid curriculum to align with state standards."
- "Many teachers take advantage of online courses."
- "Several of us order professional books on-line (no bookstores near) and read independently as time permits (summer mostly). "

Instructional methods

- "This year our staff development is focused on ELL strategies and methodologies through Colorado university center."
- "Champs (classroom management), EIR Early Interventions in Reading (all staff) training, Read/Write Connection effective strategies whole district two days, Bully Proofing all school training with student training, Research Based Classroom Strategies that Work."
- "Our feeder area is also participating in CELL training – (California Early Literacy Learning) Project – five days a year, to further develop best practices in teaching all areas of literacy."

Parent training

Barriers to Achievement

Organizational structures

- "Professional development (programs) comes from the administrative office / not the building level. The principal has very little input."
- "It is often directed from the district with little account for experienced teachers, and teachers such as specialists (P.E., Music, Art) putting in seat-time. We have started so many programs in the last six years, but don't perfect one, or get rid of any on our plates. I see professional development as an introduction to a technique with little evaluating or reflecting on what we're doing. Our time is very limited. High turn-over of curriculum staff has created much of our problem. With each director comes a new way of doing things."
- "We have limited time and resources for professional development in rural Colorado. We realize its importance but must rely primarily on our new principal or inexpensive opportunities such as the CDE Odyssey courses. For the most part, professional development in our district means using one of our six personal/sick days, driving three hours to Denver, spending the night, and paying the registration all at our own expense."
- "Teachers are encouraged to visit other schools and attend workshops, but the collaboration within the school is limited with the exception of the Differentiated Learning Cadre we are doing together once a week (included in the above)."
- "Some professional development topics and issues are dictated to us by the administration building meaning topics are not always agreed on, relevant, or helpful. Oftentimes follow-up on professional development days is lacking, which negatively impacts student achievement. We have about one professional development day every ¾ months. Our staff pursues most professional development opportunities on their own, outside of the building."

Program obstacles

- "Professional development opportunities are provided by the school district, but it is up to the individual teacher to take advantage of them."
- "We rarely, if ever, have staff development within our school. Any that is done is initiated by staff, not administration."
- "Some money is available for personal choices for staff development."
- "Time is always an issue!! There are not enough hours in the day and the struggle is always between time for effective classroom planning and time for professional development, both of which compete for the time left over from pupil-contact hours. That is the incontrovertible reality!! We just need more minutes, not more 'creative uses/solutions'."
- within the school day "On your own time. We do this after school, before school, on our special times."

High-stakes testing environments

No Student Achievement empirical evidence

- "Pay for performance system based on individual evaluation, NWEA growth, and CSAP school-wide growth."

APPENDIX H

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools

Nonparametric Mann-Whitney *U* Test

Variable	*M* Rank	Sum of Ranks	N	*p*
% FRL			14	.006**
Highest	4.43	31.00	7	
Lowest	10.57	74.00	7	
Hours of PD/Month			13	.661
Highest	6.21	43.50	7	
Lowest	7.92	47.50	6	
Equity			14	.895
Highest	7.64	53.50	7	
Lowest	7.36	51.50	7	

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools (continued).

Independent Samples *t* Test					
Variable	*M*	*SD*	*t*	*df*	*p*
Learning Communities			.401	12	.695
Highest	2.51	.52			
Lowest	2.65	.78			
Leadership			.080	12	.937
Highest	3.25	.65			
Lowest	3.28	.68			
Resources			.071	12	.944
Highest	2.97	.52			
Lowest	2.99	.60			
Data-driven			- .206	12	.840
Highest	2.97	.37			
Lowest	2.91	.63			
Evaluation			.727	12	.481
Highest	2.22	.93			
Lowest	2.56	.78			
Research-based			1.452	12	.172
Highest	2.82	.39			
Lowest	3.22	.61			

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools (continued).

Independent Samples *t* Test					
Variable	*M*	*SD*	*t*	*df*	*p*
Designs & Strategies			1.490	12	.162
Highest	2.85	.42			
Lowest	3.24	.53			
Learning			1.176	12	.262
Highest	2.78	.55			
Lowest	3.20	.74			
Collaboration Skills			.125	12	.903
Highest	2.94	.78			
Lowest	3.00	.92			
Quality Teaching			- .079	12	.939
Highest	3.05	.60			
Lowest	3.02	.74			
Family Involvement			- 1.52	12	.154
Highest	3.00	.63			
Lowest	2.45	.69			

Comparisons of the Highest Scoring and Lowest Scoring 10% of Schools (continued).

Independent Samples *t* Test					
Variable	*M*	*SD*	*t*	*df*	*p*
Context			.197	12	.847
Highest	2.91	.49			
Lowest	2.97	.66			
Process			.846	12	.414
Highest	2.76	.48			
Lowest	3.02	.62			
Content			- .895	12	.389
Highest	3.17	.38			
Lowest	2.93	.61			
Collective Use			.279	12	.785
Highest	2.90	.45			
Lowest	2.98	.62			

Note. %FRL = Fall 2003 percent free and reduced lunch; Hours of PD/Month = hours of professional development each month.

**$p < .01$, two-tailed.

APPENDIX I

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools

Nonparametric Mann-Whitney *U* Test

Variable	*M* Rank	Sum of Ranks	N	*p*
% FRL			36	.000***
Highest	10.67	192.00	18	
Lowest	26.33	474.00	18	
Hours of PD/Month			33	.639
Highest	16.19	259.00	16	
Lowest	17.76	302.00	17	
Equity			36	.183
Highest	20.81	374.50	18	
Lowest	16.19	291.50	18	

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools

Independent Samples *t* Test

Variable	*M*	*SD*	*t*	*df*	*p*
Learning Communities			1.147	34	.259
Highest	2.62	.58			
Lowest	2.37	.68			
Leadership			.538	34	.594
Highest	3.43	.56			
Lowest	3.33	.54			
Resources			.294	34	.770
Highest	2.84	.49			
Lowest	2.79	.47			
Data-Driven			.815	34	.421
Highest	3.01	.54			
Lowest	2.85	.59			
Evaluation			.254	34	.801
Highest	2.46	.76			
Lowest	2.40	.60			
Research-Based			- .731	34	.470
Highest	2.84	.45			
Lowest	2.97	.58			

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools (continued).

Independent Samples *t* Test					
Variable	*M*	*SD*	*t*	*df*	*p*
Designs & Strategies			.494	34	.624
Highest	3.02	.45			
Lowest	2.93	.54			
Learning			- .271	34	.788
Highest	2.86	.50			
Lowest	2.91	.60			
Collaboration Skills			.599	34	.553
Highest	2.97	.59			
Lowest	2.84	.73			
Quality Teaching			.571	34	.572
Highest	3.04	.52			
Lowest	2.94	.53			
Family Involvement			1.434	34	.161
Highest	2.84	.63			
Lowest	2.51	.75			

Comparisons of the Highest Scoring and Lowest Scoring 25% of Schools (continued).

Independent Samples *t* Test					
Variable	*M*	*SD*	*t*	*df*	*p*
Context			.828	34	.414
Highest	2.96	.44			
Lowest	2.83	.50			
Process			.280	34	.781
Highest	2.86	.45			
Lowest	2.81	.48			
Content			1.349	34	.186
Highest	3.11	.40			
Lowest	2.90	.48			
Collective Use			.714	34	.480
Highest	2.95	.41			
Lowest	2.84	.47			

Note. %FRL = Fall 2003 percent free and reduced lunch; Hours of PD/Month = hours of professional development each month.

*** $p < .001$, two-tailed.