THE IMPACT OF QUALITY CORE CURRICULUM AND GEORGIA

PERFORMANCE STANDARDS ON STUDENT ACHIEVEMENT

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THE IMPACT OF QUALITY CORE CURRICULUM AND GEORGIA PERFORMANCE STANDARDS ON STUDENT ACHIEVEMENT

Jan Marie Thomas

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VITA

Jan Marie Thomas, daughter of Blanchard Lee and the late Mary Lee (Sellers) Thomas, was born on December 30, 1972, in Columbus, Georgia. She attended public school in Columbus, Georgia and graduated from Shaw High School in 1990. She attended the University of Georgia in Athens, Georgia for four years, where she graduated Cum Laude with a Bachelor of Science degree in Early Childhood Education in June, 1994. She received her Master of Science degree in Early Childhood Education in June, 1995. She also attended Columbus State University in Columbus, Georgia and completed a degree of Specialist in Educational Leadership and Supervision in June, 1998. She taught kindergarten at Mathews Elementary School in Midland, Georgia for four years. She also taught at Blanchard Elementary School in Columbus, Georgia for four years. At Blanchard she taught first grade for one year and second grade for three years. She was promoted at Blanchard Elementary School in September 2004, and is presently serving as the Assistant Principal. In Fall of 2002, she entered Graduate School at Auburn University as a doctoral student in the Early Childhood Education Program.

DISSERTATION ABSTRACT

THE IMPACT OF QUALITY CORE CURRICULUM AND GEORGIA PERFORMANCE STANDARDS ON STUDENT ACHIEVEMENT

Jan Marie Thomas

Doctor of Philosophy, May 10, 2008
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The state of Georgia is dedicated to leading the nation in improving student achievement (Cox, 2006). The key to making this vision a reality lies in providing a curriculum that will enhance the quality of education. According to Monson and Monson (1997), the curriculum is crucial for improving student learning because it defines what students are to learn, know, and understand in all content areas and at each grade level.

As required by the Quality Basic Education (QBE) Act of 1985, Georgia established a Quality Core Curriculum (QCC) that specifies what students are expected to know in each subject and grade (Mitzell, 1999). However, a Phi Delta Kappa audit of the state's curriculum concluded that the QCC did not meet national standards according to the No Child Left Behind (NCLB) Act which was signed on January 8, 2002 by President George Bush. Georgia replaced the QCC with performance standards (DuFour, 2004).

The new Georgia Performance Standards (GPS) replaced the QCC as the state's curriculum guidelines. The standards provided clear expectations for instruction and defined the level of student work that demonstrates achievement of the standards (Medrano, 2003). The standards also guided the teacher on how to assess the extent to which the student knows the material and can apply this information (Ravitch, 1996).

The purpose of this project was to examine the impact of the QCC and GPS on student achievement. A correlational research study was conducted to compare the relationship between final grades and Criterion-Referenced Competency Test (CRCT) and Iowa Test of Basic Skills (ITBS) scores of students who attended Blanchard Elementary School, in Columbus, Georgia, after they received instruction guided by the QCC during the 2004-2005 school term and GPS during the 2005-2006 school term. Pearson *r* correlation coefficients between grades and test scores were used to determine the degree of their relationships. Fisher 's *z*-tests were also used to compute the statistical significance of the difference between the correlation coefficients. Significant differences were found between the grades and CRCT scores in reading, language arts, and math for the QCC and GPS. These findings indicated that the correlation for grades and CRCT scores were higher with the new curricula. In contrast, no significant differences were found between grades and ITBS scores in reading, language arts, and math for both curricula. There were relationships between the grades and ITBS scores.

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I give honor to God and his son Jesus Christ, my personal savior, to whom I dedicate my life. The guidance of the Holy Spirit helped me to organize and write this dissertation. This study could not have been completed without the cooperation of the superintendent of Muscogee County School District, Dr. John A. Phillips, Jr., the county's research coordinator, Dr. Carol Bradshaw, and the principal of Blanchard Elementary School, Mrs. Rochelle Jones. Without their approval and support, I would not have been able to collect data. I would like to thank the faculty and staff of Blanchard Elementary School. Their regular inquiries and interest regarding the progress of this study served as incentive and motivation towards timely completion. I also want to thank the students at Blanchard for providing data to analyze.

I want to thank Dr. Edna Greene Brabham for directing my study, supporting my timeline, and providing me with the counsel necessary for completion. I would have given up on statistics had it not been for Dr. Gerald Halpin. I thank him for assisting me with my data and results. I also would like to thank Dr. Steven Silvern for broadening my understanding of how children think and learn.

This dissertation is dedicated to my father. He challenged me to go as far as I could go in Education. I appreciate all of those nights of studying and reading with my dad as a little girl. Finally, I would like to thank my close friends and family for their prayers. Their support helped me to accomplish the goal of receiving a doctoral degree.

Style manual used is *Publication Manual of the American Psychological Association*, 2001 (Fifth Edition).

Computer software used is *Microsoft Word for Windows* and *SPSS (Statistical Package for Social Sciences)* for Windows Release 12.0.

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I: INTRODUCTION

Background

One by one, states have worked over the last decade to set standards for all students. Presidential and congressional approval of the No Child Left Behind (NCLB) legislation in 2002 reinforced the theme behind the standards based reform movement which encompasses the premises that every child can learn. NCLB also includes high standards for all students across the board while closing the gap for those students historically left behind (Mayers, 2006). As President Bush said of the law, "It believes in setting high standards, it challenges the soft bigotry of low expectations, and its cornerstone is strong accountability measures" (McCombs, 2005, p. 2). This agenda has become Georgia's main strategy for raising student achievement, strengthening school effectiveness, and renewing the state's education system (Cox, 2006).

The state of Georgia is committed to providing educational opportunities that allow all students to achieve success. Its mission is to encourage children to discover the joy of learning in a positive, culturally diverse, and challenging environment while becoming inspired, creative learners. Its vision is for students to reach their fullest potential as individuals and citizens. The key to making this vision a reality lies in providing a curriculum that will specify what students are to know and how teachers can help them accomplish these learning goals (Cox, 2006).

Teachers in Georgia were required to follow a statewide basic curriculum developed by the Georgia Board of Education under the Quality Basic Education (QBE) Act of 1986. This uniformly sequenced core curriculum, known as the Quality Core Curriculum (QCC), was a set of standards, guidelines, and expectations for instruction. As a result of the QBE Act, the QCC was under constant revision and included teacher involvement in the standards building process. Georgia's QCC included content standards for courses in reading, language arts, mathematics, science, social studies, foreign languages, fine arts, health, physical education, technology/career education, agriculture, and English speakers of other languages (Mitzell, 1999).

In 2002, Phi Delta Kappa International conducted an audit of Georgia's QCC and found the curriculum lacked depth and rigor and failed to meet national standards according to the NCLB Act which was signed into law on January 8, 2002 by President George W. Bush. NCLB received an overwhelming endorsement from a vast range of political, business, and education leaders at the national, state, and local levels. The reforms called for in the NCLB Act were a catalyst for improving student achievement in Georgia and across the nation (Gonzalez, Hamilton & Stecher, 2003).

The NCLB Act was a revision of the Elementary and Secondary Education Act (ESEA), which was signed into law in 1965 and established a federal presence in America's public schools. One of the original purposes of the ESEA, which has been revised by Congress every six years, was to mitigate disparities in the quality of education for low-income students, primarily by providing supplemental federal dollars to states and school districts (Gonzalez, Hamilton & Stecher, 2003).

Accordingly, the NCLB legislation addressed a myriad of issues, from teacher quality and school safety to technology in schools, but the essence of the law was embodied in its provisions for improving the achievement of low-performing students, those who were being left behind. The NCLB Act required states to implement comprehensive plans for improving student achievement so that all students would achieve proficiency on state reading and mathematics assessments within the next twelve years regardless of economic background, English proficiency, disability, race, or ethnicity (Gonzalez, Hamilton & Stecher, 2003).

The NCLB Act ushered in the age of mandated federal and state accountability and required public schools to be responsible and answerable for student learning. The law called for increased accountability and improved performance. At the heart of accountability for improved achievement is the curriculum, which is the road map guaranteeing that every student is given instruction rooted in national standards and based on specified outcomes (Mayers, 2006). According to Swain and Pearson (2002), a standards-based curriculum would level the playing field for all students. The NCLB Act also significantly raised expectations for schools by requiring that all students meet or exceed state standards in reading and mathematics within twelve years after the law was enacted (Mayers, 2006).

Research conducted by Bob Eaker (2002) and Rick DuFour (2002) indicated that schools should be accountable for having a clear, viable curriculum that explains what the students will learn and how schools will respond when students do not learn. Georgia's

approach to complying with the requirements and regulations of the NCLB Act was to implement performance standards aimed at enhancing both instruction and assessment for students and accountability of teachers.

Due in part to the findings of Eaker and DuFour (2002), the Georgia Department of Education (GDOE) lead by the new State Superintendent of Schools, Kathy Cox, began a curriculum revision process. Phi Delta Kappa International was invited to conduct an independent review of the new performance standards to provide input on their quality and suggestions for improvement. Ultimately, the Georgia Department of Education expected the new standards-based curriculum, commonly referred to as the Georgia Performance Standards (GPS), to drive instruction, assessment, and formation of guidelines and result in improved student achievement (Cox, 2005).

In 2005, GPS replaced the QCC as the state's curriculum guidelines. The GPS provided clear expectations for instruction. They defined the level of student work that demonstrates achievement of the standards. The GPS also isolated and identified the skills students need to use knowledge, problem solve, reason, communicate, and make connections with other information. In addition, the standards served as a guide for the teacher on how to assess the extent to which the students know the material (Cox, 2006).

Purpose of the Study

The purpose of this study was to examine the impact of the Quality Core Curriculum and Georgia Professional Standards on student learning at Blanchard Elementary School in Columbus, Georgia. Correlational research was conducted to

investigate relationships between participants' grades and scores on the Criterion-Reference Competency Test and Iowa Test of Basic Skills Test in reading, language arts, and math. Pearson *r* correlations between grades and test scores and Fisher *z* transformations were used to determine which curriculum corresponds more closely to tests given by the Georgia Department of Education and grades given by teachers. A review of the related literature revealed that no study had previously examined these variables in combination with one another at the elementary school level.

Research Questions and Hypotheses

The study explored the following research questions:

1. What is the relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum? This research question was refined into the following hypotheses:

Null Hypothesis 1: There will be no relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum.

Alternative Hypothesis 1: There will be a relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum.

2. What is the relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards? This research question was refined into the following hypotheses:

Null Hypothesis 2: There will be no relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards.

Alternative Hypothesis 2: There will be a relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards.

3. Are there differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards? This research question was refined into the following hypotheses:

Null Hypothesis 3: There will be no differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards.

Alternative Hypothesis 3: There will be differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards.

4. What is the relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum? This research question was refined into the following hypotheses:

Null Hypothesis 4: There will be no relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum.

Alternative Hypothesis 4: There will be a relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum.

5. What is the relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Georgia Performance Standards? This research question was refined into the following hypotheses:

Null Hypothesis 5: There will be no relationship between grades and Iowa Test of Basic Skills Test Scores of students who received instruction based upon the Georgia Performance Standards.

Alternative Hypothesis 5: There will be a relationship between grades and Iowa Test of Basic Skills Test scores of students who received instruction based upon the Georgia Performance Standards.

6. Are there differences between relationships for grades and Iowa Test of Basic Skills Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards? This research question was refined into the following hypotheses:

Null Hypothesis 6: There will be no differences between relationships for grades and Iowa Test of Basic Skills Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with GPS.

Alternative Hypothesis 6: There will be differences between relationships for grades and Iowa Test of Basic Skills scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards.

Theoretical Framework

Further discussion is presented in the review of the literature; however, the following ideas framed the questions addressed in this study.

1. Educators have searched and continue to look for ways to influence and raise achievement of students in the state of Georgia and in our nation.

2. Years of research have linked standards-based curricula to higher student achievement.

3. Researchers have called for studies that specifically identify effective curricula that have a direct impact on student achievement.

4. Implementation of the Georgia Performance Standards should have a positive effect on students' grades and test scores.

5. The relationship between curriculum and student achievement has implications for educators seeking to design and implement the most productive and effective state curriculum.

Limitations

Limitations are the conditions beyond the control of the researcher that may place restrictions on the conclusions of the study and their applications to other situations. Limitations in this study included (a) the number of students in each grade level and (b) students who were missing grades or test scores were omitted from the study.

Delimitations

Delimitations are the boundaries beyond which the study is concerned. This study only involved the students at Blanchard Elementary School in Columbus, Georgia.

Definitions of Terms

Georgia' Quality Core Curriculum – Teachers in Georgia were required to follow a statewide basic curriculum developed by the Georgia Board of Education under the Quality Basic Education (QBE) Act of 1986. This uniformly sequenced core curriculum, known as the Quality Core Curriculum (QCC) was a set of standards, guidelines, and expectations for instruction. Georgia's Quality Core Curriculum included content standards for courses in language arts, mathematics, science, social studies, foreign languages, fine arts, health, physical education, technology/career education, agriculture, and English Speakers of Other Languages (ESOL).

Georgia Performance Standards – These more recently adopted standards were the state's curriculum went into effect in 2005 and were the guidelines for instruction at the time this study was conducted. The Georgia Performance Standards (GPS) were designed to help teachers, students, and parents know what topics must be covered and mastered for particular grades and subject areas. GPS go into much greater depth about

learning tasks and expected outcomes than the content standards used in the previous QCC objectives. The GPS incorporate content standards, which simply tell the teacher what students are expected to know (i.e., what concepts must be taught and mastered), and expand on assessment of each content standard by providing three additional items: suggested tasks, sample student work, and examples of teacher commentary on that work. GPS provide clear expectations for assessment, instruction, and student work. When the study was executed, the GPS included standards for English/language arts, mathematics, science, and social studies, and courses in foreign language and career, technical, and agricultural education were being aligned with these performance standards. Courses in health, physical education, and fine arts were to undergo alignment with the performance standards at a later date.

Phi Delta Kappa International – A professional association composed of educators at all levels. Phi Delta Kappa (PDK) International is committed to leadership, service, and research in education. Member chapters are active throughout the United States, Canada, and abroad. As an association, PDK works to promote quality education, with particular emphasis on publicly supported education, as essential to the development and maintenance of a democratic way of life. In addition, the organization supports educators in their work through publications, research, and professional development opportunities. PDK's Curriculum Management Center offers programs and services developed to comprehensively evaluate a curriculum system, focus resources, establish goals, and improve teaching and learning. Services include curriculum management audits, school reviews, and site-specific training.

Curriculum Management Audit – A curriculum management audit is an independent examination of the curriculum design and delivery system of a school or school district by a team from the PDK Curriculum Management Center. The audit team analyzes both the curriculum policy and the system in which the curriculum functions. The resulting report provides specific recommendations to improve those functions. The audit team uses documents, interviews, and site visits to determine the extent to which there is congruence among the written, taught, and tested curricula. PDK's auditors come from across the United States, Canada, and Europe and are employed as school district administrators, state departments of education personnel, university professors, and educational consultants.

Georgia Partnership for Excellence in Education - Founded in 1990 by the Georgia Chamber of Commerce and the Georgia Economic Developers Association, the partnership consists of business, education, community and government leaders who share a vision of improved education. Working to be Georgia's foremost change agent in education, the non-profit, non-partisan organization has taken the lead role in efforts to shape policy and reform education. The mission of the Georgia Partnership for Excellence in Education is to improve the academic achievement of Georgia's students through research, advocacy, and communication.

Georgia Criterion-Referenced Competency Test – This is a state-mandated achievement test for students in grades one through eight that assesses performance in subject areas of reading, English/language arts, and mathematics. Students in grades three and five are also required to take the test in science and social studies. The

Criterion-Referenced Competency Test measures how well a student has learned the knowledge and skills in the state's curriculum. It assesses student mastery of all standards for identified grade levels and content areas.

Iowa Test of Basic Skills – This is a nationally norm-referenced test administered annually to students in grades three, five, and eight. The purpose of the norm-referenced test (NRT) is to obtain information about how the performance of Georgia's students compares with that of students in a national sample, an external reference group. It assesses a student's level of achievement relative to other students. The results of an NRT are used for evaluation, decision-making, and instructional improvement. The ITBS assesses a student's level of achievement within four broad domains including reading, language arts, math and vocabulary.

Student Achievement – This term refers to a child's academic proficiency as measured by a school's performance on norm-referenced tests, criterion-referenced tests, grades, or other specified measurement criterion.

Grades - Letter grades or number grades are used to report the progress of students grades one through five. In Georgia, student achievement is reported to parents as a number grade for reading, language arts, mathematics, science and social studies. Assignment of the grade by the teacher is certification of the degree of mastery of the essential knowledge and skills. Letter grades correspond to a range of numerical scores. For instance, a letter grade of A ranges from 100 to 90. A letter grade of B ranges from 89 to 80. A letter grade of C ranges from 79 to 70. A letter grade of F indicates that the student received a grade below 70 and failed to master the essential knowledge and skills.

Organization of the Study

This study is organized into the following five chapters:

Chapter 1: This chapter provides an introduction to the research problem. It includes the purpose of the study, theoretical framework, limitations, delimitations, definition of terms, and an overview of organization of this research report.

Chapter 2: This chapter reviews the previous literature relating to the problem. More extensive discussions of Quality Core Curriculum, Georgia Performance Standards, curriculum and assessment, Georgia Criterion-Referenced Competency Tests, the Iowa Test of Basic Skills, and grades are included.

Chapter 3: This chapter describes the research design, methods, and procedures used in the study. Data relating to the participants in the study, instrumentation, data collection procedures, and data analysis are discussed.

Chapter 4: This chapter provides the results of the research using Pearson *r* correlations and Fisher *z* transformations.

Chapter 5: This chapter discusses conclusions and implications based on the results and provides recommendations for further study.

II: REVIEW OF LITERATURE

Introduction

This chapter presents a review of related literature and research for the Quality Core Curriculum (QCC) and Georgia Performance Standards (GPS). This discussion includes a historical perspective of the QCC as well as studies of its effectiveness. The GPS are also discussed in terms of the how the curriculum was developed and implemented in ways intended to positively affect student grades and test scores. The chapter also contains a review of related literature about curriculum and assessment, the Criterion-Referenced Competency Test, the Iowa Test of Basic Skills, and grades.

Quality Core Curriculum

Historical Overview

The mission of the Georgia Department of Education is to enable all Georgia students to develop the necessary knowledge and skills to become productive individuals and citizens. A major step toward the mission was the passage and implementation of the Quality Basic Education (QBE) Act. In 1985, members of the Georgia General Assembly unanimously passed Senate Bill 82, the Quality Basic Education Act. QBE required the Georgia Board of Education to develop a statewide basic curriculum, the QCC. Section 20-2-140 of the QBE Act mandated the State Board of Education to establish competencies that each student is expected to master prior to the completion of

public education. Based on those competencies, the board was to adopt a uniformly sequenced core curriculum from grades kindergarten through twelve. The legislators further went on to state that all local units of administration shall include this uniformly sequenced curriculum as a basis for their own curriculum (Mitzell, 1999).

In line with the mandates of the QBE Act, the Board of Education created the QCC task force to spearhead the development of this curriculum. The QCC task force along with the Georgia Department of Education personnel, local school personnel, and other citizens developed a draft for the QCC in 1986. The QCC draft was based on the Basic Curriculum Content for Georgia's Public Schools. This was a previously designed state curriculum created by educational leaders in all disciplines that was approved and distributed to all teachers serving Georgia schools in 1985. The QCC draft was circulated twice to local school systems for comments and recommendations in late 1987. After receiving feedback on the draft, the recommendations were reviewed by content committees and appropriate changes were made. The QCC went into effect in August of 1988 (Mitzell,1999).

Topics for courses of study required to be taught to each student were reading, language arts, math, science, social studies including federal and state governments (including county and municipal governments), history of the United States and of Georgia, health education including alcohol and drug abuse information related to operating a motor vehicle, AIDS, sex education, character education, and physical education. Beyond these specific topics of study, local school systems had a wide latitude in developing the courses needed to provide the state basic curriculum and any

enrichment courses that they may wish to provide with local funds. Benchmarks were minimal performance standards that were termed critical to successful performance in subsequent grade level courses. Moreover, the Criterion-Referenced Competency Test (CRCT) assessed student understanding of all standards for identified grade levels and content areas (Mizell, 1999).

At each grade level, the QCC identified a set of concepts to be mastered as well as a skills continuum (Hutchenson, 1989). On a quadrennial basis, a review of the adopted competencies was to take place by a task force "broadly representative of educational interest and the concerned public" (Journal of the Senate, 1985, p. 2420). The State Board of Education was assigned the duty of making the changes to the QCC it deemed necessary in the best interest of the State and its citizens. An evaluation of the extent to which the core curriculum was implemented was also part of the requirements in the QBE Act (Mizell, 1999).

The QBE Act called upon the Department of Education to revise and update the QCC periodically to keep pace with student competencies and rising expectations. In 1995, under this mandate of continuing improvement, Governor Zell Miller and State Superintendent of Schools Linda Schrenko appointed a work group called the Georgia School Improvement Panel to work on several school improvements (Mitzell, 1999).

The Georgia School Improvement Panel and its chairman, Dr. Craig Dowling, were determined to make the revision a project of teachers conducted by teachers. Believing that the only place to improve education is in the classroom, the Panel was committed to stay as connected with the classroom as possible. They requested that at

least half the writers be in-the-classroom teachers. The process of including classroom teachers resulted in a wide acceptance of the QCC revision. In preparation for the implementation of the revised QCC, workshops on recommended teaching strategies, curriculum alignment, and school level grade/department planning sessions were conducted. The panel members began in 1995 by consulting Georgia teachers about the QCC that was then in use across the state. About eight thousand teachers were surveyed, and over ninety-three percent indicated that they wanted the Panel to revise but not replace the QCC (Mizell, 1999).

Over one hundred and fifty educators, parents, and business leaders were selected from over 800 nominees from across the state to serve on writing teams that were carefully balanced by race, gender, position, and geography. For each objective, the writers asked: "Is this objective clear and concise?"... "Is it relevant?"... "Is it measurable?"... "What must students know and be able to do in this grade or course?" During the summer and fall of 1996, team members met for two weekend writing sessions. They consulted textbooks, national and state standards and curricula, as well as professional literature. A draft of the QCC went out for review to all Georgia school systems and various other organizations. It was available through Georgia public libraries and on the World Wide Web. The results from over fifteen thousand returned evaluations became the basis for a final revision. The revised QCC included content standards for all subjects K-8 and 9-12 courses in English/language arts, mathematics, science, social studies, foreign languages, fine arts, health, physical education, technology/career education, agriculture, and English Speakers of Other Languages (Mizell, 1999).

Reviews of the curriculum were positive. According to the Georgia Department of Education, the QCC was ranked among the highest in the nation. It was commended for the broad-based process completed to revise the curriculum and the related implementation training. The standards were praised for being clear and specific. Correlations made between the ITBS and the QCC were positive. Major revisions in the QCC included: standards for American Sign Language; standards for English Speakers of Other Languages; and revisions of additional mathematics and sciences courses. In the 1998 academic year, after major revision was undertaken, the revised QCC was implemented in all Georgia public schools (Mitzell, 1999).

Effectiveness Studies of Quality Core Curriculum

Since its formation, the QCC has been the subject of a variety of studies that examined only particular sections of the overall curriculum for its effectiveness. Goodwyn (1989), for example, analyzed the QCC guidelines for Foreign Languages to assess the minimal verb system that is required to attain the intended QCC proficiency objectives and to be congruent with language usage in Spanish context. He found evidence to support limiting the verb systems taught to present, imperfect, infinitive, and present participle. Mullis (1991) examined the degree of match among the objectives for the QCC, the textbooks recommended for use in kindergarten, and tests recommended for use in kindergarten. He found that items on the Georgia's Criterion-Referenced Test, the Georgia Kindergarten Assessment of Language skills and Number Understanding had a ninety-four percent match with the QCC. Georgia's norm-referenced test, the ITBS, was found to have a forty-four percent match with the QCC (Mullis, 1991).

Researchers who studied educational reform among the 50 states also reported on the QCC. State studies were numerous although their reporting is not in depth. From those studies, comparisons were made about Georgia's educational reforms and those in other states. Some studies have assessed the nature and qualities of the QCC objectives. Gandal (1996) reported that the QCC met the American Federation of Teachers' standard criteria in all the core subjects (English, mathematics, science, and social studies). Massell (1997) completed a study that focused on nine states' standards movements and included Georgia in the study. The QCC was again discussed in the content standards section of the study. According to Massell (1997), the QCC's continued focus on basic skills was not comprehensive enough to be effective as a statewide assessment, and several other studies described the QCC as focusing only on basic skills (Firestone & Bader, 1992; Marzano, 1997). A study by Firestone and Bader (1992) looked at the impact of the QCC relative to other state reforms. These researchers found that the QCC was perceived as being helpful in Georgia's rural districts with high numbers of low achieving students and school personnel who had limited experience developing curriculum. However, in more affluent suburban school districts, the QCC was perceived as constricting; forcing schools to develop intellectually, challenging courses to comply with QCC guidelines (Firestone and Bader, 1992).

Georgia Performance Standards

Historical Overview

In April 2004, Phi Delta Kappa International conducted a curriculum management audit of Georgia's QCC that was sponsored by the Georgia Partnership for Excellence in Education. The audit included a review of the scope of the proposed standards and their congruity with national standards. The audit also provided formative feedback for the improvement of these performance standards prior to their final approval. It was shown that the curriculum lacked depth and failed to meet national standards (Cox, 2005).

Due in part to these findings, the Georgia Department of Education (GDOE), lead by the new State Superintendent of Schools, Kathy Cox, proposed and began a curriculum revision process. Phi Delta Kappa (PDK) was invited to conduct the independent review of the new performance standards while they were in the process of being drafted. The PDK audit team provided input on the quality of the QCC objectives and suggested improvements that resulted in the development of the Georgia Performance Standards (GPS). Ultimately, the GDOE expected the new curriculum to drive instruction, assessment, and formation of guidelines resulting in improved student achievement. The GPS defined what students should know and be able to do as a result of their public education in the state of Georgia. These standards were adopted in June 2004 (Cox, 2005).

As required by the Quality Basic Education (QBE) Act of 1985, Georgia had to maintain a curriculum that specifies what students are expected to know in each subject and grade. Additionally, the state's standardized test, the Criterion-Referenced

Competency Test (CRCT) for grades 1-8 had to be aligned with that curriculum. The state's curriculum was a guideline for instruction that helps teachers, students, and parents know what topics must be covered and mastered for a particular course. The curriculum established the minimum standards, and did not prohibit systems, schools, or teachers from adding material to it. Some systems had curricula of their own, but they included everything that the state requires (Mitzell, 1999).

The GPS have driven both instruction and assessment in Georgia's schools, providing guidelines for teachers, students, and test makers. The statewide assessments were aligned with the GPS, taking the guesswork out of teaching and providing guidelines for schools, students, and test makers. Those standards were based on best practices that proved to be effective in high-performing states and nations, such as Michigan, Texas, North Carolina, and Japan (Medrano, 2003).

GPS went into much greater depth than the content standards used in the QCC. Each performance standard incorporated the content standard, which simply told the teacher what a student was expected to know (i.e., what concepts he or she is expected to master), but expanded upon it by providing three additional items: suggested tasks, sample student work, and teacher commentary (Medrano, 2003).

GPS provided clear expectations for assessment, instruction, and student work. They defined the level of work that demonstrates achievement of the standards, enabling a teacher to know how good is good enough. The standards isolated and identified skills needed to use content knowledge and skills to problem solve, reason, communicate, and make connections with other information. GPS also told the teacher how to assess the

extent to which the student knows the material or can manipulate and apply the information (Ravitch, 1996).

GPS had the potential to improve achievement because they clearly defined what is to be taught and what kind of performance is expected so administrators, teachers, and schools know what students must learn if they are to succeed. If the goals of teaching and learning are spelled out, students understand that their teachers are trying to help them meet externally defined standards, and parents know what is expected of their children in school (Trafton, Reys & Wasman, 2001).

GPS were also comprehensive. A primary concern in all curriculum reform was thoroughness with which knowledge, understandings, processes, and skills that constitute competency in a field are included. GPS also linked content with processes that students should learn and use such as: problem solving, reasoning and proof, communication, connections, and representation. Along with concepts and intellectual processes, a standards-based curriculum also paid attention to the development of useful skills. These skills were developed in the context of understanding, rather than in isolation. In standards-based curricula, the importance and interconnectedness of understanding and skills are recognized. A balanced approach to knowledge and skills can help students acquire the skills they need for solving problems and also establish a foundation for later study of more sophisticated skills (Steed, 1990).

GPS were coherent. Coherence refers to the presentation of content so that the core ideas of the subject are highlighted and cause students to see the subject matter as an integrated whole. For example, if students were to think mathematically and use

mathematics as a tool for solving problems, coherence was crucial for establishing connections among the mathematical concepts. A standards-based curriculum promoted coherence through an initial focus on big ideas followed by an emphasis on connections and links to related ideas and applications (Steed, 1990).

GPS developed important concepts at varying levels of depth as students mature. These important concepts were frequently introduced early in a student's school career and revisited continually throughout the grades, with the focus on developing deeper layers of sophistication. For example, in grades K-2 students gathered, organized, and represented data that interest them. In grades 3-5, students continued to organize and represent data and also focused on ways to characterize a set of data as a whole and to compare one set of data to another (Sawyer, 1943).

The increased sophistication in the way ideas are treated, together with the coherent development of ideas, helped students move toward deeper understandings. In-depth learning was more likely to occur when the curriculum concentrated on a few big ideas and their interconnections and when teachers designed instruction to engage students with these ideas. This approach was characteristic of many industrialized countries that have out-performed the United States. The additional time gained by in-depth attention to fewer ideas permitted students to delve more deeply into content and concepts. The result was greater student learning and less review and repetition from one year to the next (Bransford, 1999).

GPS engaged students physically and intellectually through problems and hands-on tasks. The emphasis was on intellectual engagement. Problems and tasks that raised

students' curiosity were posed. When a task was intriguing and posed a challenge, students were more likely to pursue a solution and explanation (Stigler & Hiebert, 1999).

Seymour Papert (1996) described young children's perception of intellectually engaging tasks as activities that were fun. Children found such tasks to be fun because of their complexity. The tasks also engaged them because the work was interesting and within their reach. Tackling a tough problem was a commonly sought practice, and by these experiences students developed strategies and a disposition to pursue the solutions to problems. A standards-based curriculum that emphasized student engagement requires a classroom environment that encouraged and nurtured exploration and risk-taking. Students sometimes worked in pairs or in small groups; at other times, they worked independently (Ball & Cohen, 1996).

Emphasizing both physical and mental engagement through interesting and challenging tasks was quite different from the way many curricula are organized. There was often the tendency to offer loosely related tasks that lack an internal structure and coherence. In the curriculum based on GPS, the use of contexts, problems, projects, and other tasks engaged students in connecting ideas that provided a platform for learning (Bransford, 1999).

GPS addressed a long-standing issue in school, the linking of concepts with their applications. While it has been common for traditional curricula to include a few application problems in exercise sets or even an entire lesson on a particular application, most instructional curricula had not substantively incorporated applications as part of their core. Most students failed to see the practical relevance or usefulness of the content

they learned. Every teacher has repeatedly heard students ask the question, "When are we ever going to have to use this?" In newer approaches to curriculum development, applications were being woven into instructional materials in powerful ways. No longer relegated primarily to exercises at the end of chapters, entire units were now often set in the context of applications. The connections between subjects and their applications were reflected in other ways. Rather than a few unrelated exercises included in the text as applying activities, applications often occurred as the subject of short units of work and frequently incorporated a variety of concepts and skills. Thus, the student experienced a curriculum in which all core subject areas emerged from multiple contexts. The intent was to help students learn more, understand that all subjects are useful, and realize that knowledge is not just an end in itself but a tool for solving problems. The use of applications to contextualize subject matter was an important characteristic of an effective standards-based curriculum. Identifying good applications that revealed the underlying concept without overshadowing it was a challenge. However, when designed well, such a curriculum could stimulate student interest and engagement in a task (Bransford, 1999).

Standards at the national, state, and local levels were necessary for equality of opportunity. GPS established the principle that all students should encounter the same educational opportunities and the same performance expectations, regardless of their economic status. An essential purpose of standards was to ensure that students in schools had access to equally challenging programs and courses of study (Bransford, 1999).

Content standards made it possible to coordinate the various parts of the educational system to promote maximal student learning. Teachers could use content standards to prepare their lessons. Textbook writers could use standards to inform teachers of what they needed to connect between text content and activities and what they were expected to teach. Testing experts could use them as the basis for tests that children would take to determine whether or how well they had met the standards. Seen this way, explicit content standards clearly became an organizing force for education, in which all the different pieces of the system were focused on the same goal of helping children learn at high levels of achievement.

Effectiveness Studies for the Standards-based Curriculum

The recent movement towards more effective and engaging standards-based curricula has generated numerous articles, chapters, and commentaries addressing the trends, necessity, and potential effects of performance standards on student achievement (Darling-Hammond, 2001; Dodd, 1996; Goodlad, 2002; Otis-Wilborn & Winn, 2000; Roth, 1996; Wigle & White, 1998). However, data-driven empirical studies recently developed on standards-based curricula are few in numbers (Otis-Wilorn Winn, 2000; Wigle & Whie, 1998). Wigle and White (1998) noted that a conceptual framework should be the foundation for a curriculum. They also noted that standards-based curricula must reflect the knowledge and skills essential for competent student performance. Roth (1996) and Darling-Hammond (2001) stated that standards-based curricula may be used to transform the scopes, sequences, and current content for instruction and the nature of knowledge acquisition.

The benefits of an effective and engaging standards-based curriculum had been noted by many educational philosophers and curriculum theorists for decades (Bruner, 1977; Dewey, 1924, 1933; Howey, 1996). A standards-based curriculum could be used to show how the subjects within the curriculum are connected, and it can be integrated from general standards and principles to specific practices and contents, from basic levels to complex advanced levels, and from one prerequisite course to another related course (Bruner, 1977). According to Howey (1996), the more coherent and comprehensive a curriculum is, the more effective it is. According to Wortham (1996), curriculum integration was often achieved through the design of integrated thematic units, through study of a topic, or by developmental and subject areas.

Carter and Mason (1997) reviewed empirical research on standards-based curricula between 1986 and 1996, and especially focused on the effects of an integrated curriculum on cognitive domains. The study by Carter and Mason (1997) provided important insights about curricula. They discovered four types of curriculum integration in their review of the literature: intradisciplinary, interdisciplinary, infused, and correlated. An intradisciplinary approach combined different strands of one subject or discipline into the same lesson; an interdisciplinary approach combined different subjects or disciplines into a single course or unit; an infused curriculum had specific technologies or teaching strategies (i.e., study skills, computer applications) added to course content; and a correlated curriculum refered to the linkage of concepts (i.e., a related concept in different subjects) from separate subjects or courses. Carter and Mason (1997) concluded that recent research comparing standards-based curricula and non-standards-based

curricula showed no differences in student learning, although some researchers assert that a standards-based curriculum provided an increase in student learning.

Research has also shown that there is considerable variation among states in how the elements of standards-based accountability are implemented. For instance, several national organizations reviewed existing state standards and reported wide variation in rigor and specificity of standards (Rothman, et al. 2002; Education Week, 2002; Finn & Petrilli, 2000). Difficulty of state assessments also varied—both in content and proficiency cut-scores (Kingbury et al, 2003; McCombs & Kirby, et al., 2004). These differences were likely to affect how standards were implemented in schools and their potential impact on student performance. For example, lack of specificity in published standards may have exacerbated the tendencies of many teachers to pay more attention to state tests than to standards (Stecher et al., 2000).

In order to determine the comparability of the QCC to the GPS, Riversides Publishing Content staff completed a qualitative analysis in the following content areas and grades: Reading grades 1-8; English/language arts grades 1-8; Science grades 6-7, and Math grades 1-8. Between August and September 2005, Riverside Test Development Specialists aligned over 10,000 secure and nonsecure QCC items to the newly implemented GPS for 2006 in reading grades 1-8, English/language arts grades 1-8, Science grade 6-7 (QCC Earth science items), and Math grade 6. Secure items included legacy items developed by Riverside and housed in the Riverside Content Management System, as well as inherited items from previous vendors. Nonsecure items were items primarily from the Online Assessment System, used by Georgia educators to

prepare their students for the CRCT. Of the approximate 5,590 QCC items in the Online Assessment System that were reviewed, 82% of the items were able to be aligned to comparable GPS. The remaining items were rejected because they had no comparable GPS alignment (Cox, 2006).

Curriculum and Assessment

Historical Overview

Today's testing movement has its roots in the eugenics movement. Early founders and advocates of IQ testing saw great utility in the ability of tests to sort out the so called feebleminded children (and adults) for purposes of social control (Gould, 1996; Grissmer, Flanagan, Kawata, & Williamson, 2000; Heubert & Hauser, 1999; Sacks, 1999; Stoskopf, 2000). When IQ tests made their way into schools, educational practitioners found them to be useful tools for quantifying notions of merit and aptitude, sorting children, and disbursing educational resources accordingly. Tests became more popular as did society's reliance on tests to hold schools accountable.

Schools in America test more students, with greater frequency, and with a larger number of tests now than during any other time in the history of the United States. Over the last three decades schools have also increasingly relied on tests, to which severe consequences have been attached, to reform our schools. These tests are known as high stakes tests (Sacks, 1999; Kohn, 2000). Advocates of testing argue that attaching stakes to tests is necessary to hold schools accountable, reward high performing schools, and identify failing schools so they may be targeted for extra help. This is a key element of President George W. Bush's education plan (No Child Left Behind ACT, 2001).

However, researchers and numerous others had false notions that accountability measures such as high-stakes tests actually yield increases in academic achievement.

There was evidence that gains on state tests were not necessarily indicators of higher achievement. An experimental study by Koretz, Linn, Dunbar and Shepard (1991) revealed that performance on a high-stakes exam did not generalize to other tests for which students had not been specifically prepared. Klein, Hamilton, McCaffrey, and Stecher (2000), investigated the performance gains celebrated in Texas. They compared the Texas Assessment of Academic Skills (TAAS) scores with the scores taken from the National Assessment of Educational Progress (NAEP) and found the dramatic increases in TAAS were not evident on the NAEP as had been previously purported. Additionally, while the TAAS illustrated that performance gaps between whites and students of color were narrowing, NAEP scores showed that the gaps were widening. Amrein and Berliner (2002) found a similar pattern as they examined increases on 18 states' high-stakes exams and patterns on other tests that tested similar knowledge constructs (e.g., SAT, ACT, NAEP, and AP exams). All researchers found that significant increases on high-stakes exams did not transfer over or generalize to these other exams, challenging the notion that high stakes tests caused increases in academic achievement. High-stakes accountability systems can and do get results (i.e., increased test scores), but the results were not particularly deep or lasting (Fullan, 2001, p. 220).

Given that high-stakes tests had not evidenced authentic learning gains, scholars expressed deep concerns over the negative and harmful results of testing on schools, teachers, students, and the curriculum (Haney 2000; Klein, Hamilton, McCaffrey, &

Stecher, 2000; McNeil, 2000; Valencia & Bernal, 2000). Sacks (1998) contended that focusing exclusively on measurements and accountability may have had precisely the opposite of [their] intended outcomes. This was a major finding in the work of McNeil (2000). McNeil (2000) studied the effects of high stakes tests in classrooms in Texas—the state where dramatic increases in test scores were dubbed the "Texas Miracle." McNeil (2000) revealed that school reform efforts that centered on testing, greatly distorted the educational experiences of students in urban schools. She found that as schools focused more and more on test preparation and teaching to the test, test scores increased, meanwhile the quality of teaching and learning was both compromised and depreciated.

Test results may come to be viewed as ends in themselves, leading to a curriculum that focuses too narrowly on teaching to the test. In many cases, this has meant extending curriculum models that may be appropriate for older children downward to ages where they are not appropriate. What used to be taught in second grade is now taught in first grade, what used to be taught in first grade is now taught in kindergarten, and what used to be taught in kindergarten now appears on tests used to determine children's readiness for school (McFlane, 2001). This kind of overemphasis on preparing students to take tests often resulted in unrealistic expectations about what children should know at any given level. These standards hurt at-risk students most, but even advantaged children often found the inappropriate demands difficult to meet (McFlane, 2001).

During the 1970s and 1980s, the National Assessment of Educational Progress (NAEP) issued several reports revealing that a majority of students were not developing

intellectual capacities necessary for democratic citizenship, lifelong learning, and productive employment in the economic system (Mullis, Owen, and Phillips 1990). Most students seemed to develop basic skills, which involve low-level cognition. However, few students demonstrated the ability to solve multiple-step problems, synthesize data, read analytically, and think critically. Furthermore, performance on tasks requiring high-level cognition has declined since the early 1970s (Mullis, Owen, and Phillips, 1990).

In a summary of findings from twenty years of NAEP, Mullis, Owen, and Phillips (1990) reported that only small proportions of students appeared to develop specialized knowledge needed to address science-based problems, and the pattern of falling behind began in elementary school. A similar pattern of deficiency in knowledge achievement was revealed by the NAEP studies of mathematics, history, literature, geography, and civics. Less than 50 percent of elementary students seemed to have developed both an understanding of key ideas in these core subjects and the ability to apply these ideas to completion of tasks that require high-level cognition (NAEP, 1990). If by the year 2000 American students were to leave school having demonstrated competency in challenging subject matter--the core subjects of the school curriculum--then large improvements in teaching and learning must be accomplished. The current levels of student achievement fall far short of the standard implied by the national education goal (Hammond, 1990).

The various NAEP surveys of achievement in the 1980s included information on relationships between systematic, substantial, and stimulating exposure to core subjects and higher scores on tests of achievement in these academic disciplines. Students who

reported more opportunities to study key topics and ideas in core subjects made higher scores on the NAEP tests of achievement. Another factor associated with higher achievement was active learning. Students who said that their teachers required them to interpret and apply knowledge to the completion of tasks tended to score much higher on these assessments than did respondents who reported that their lessons were limited mostly to passive reception of knowledge through lectures and books (NAEP, 1990).

The United States cannot maintain its constitutional democracy or its economic well being unless all students greatly improve their levels of achievement in the core subjects and development of intellectual capacities. The current levels of student achievement were unacceptably low for our country's needs and aspirations and for the personal goals of its citizens (Mullis, Owen, and Phillips, 1990). Therefore, much effective effort must be undertaken immediately and persistently to substantially improve the teaching and learning of core subjects in the school curriculum, because America is a nation at risk.

Criterion-Referenced Competency Tests

The Criterion-Referenced Competency Test (CRCT) was designed to measure how well students acquire the skills and knowledge described in the Quality Core Curriculum (Spring 2005) or the Georgia Performance Standards (Spring 2006). The assessments provided information on academic achievement at the student, class, school, system, and state levels. This information was used to diagnose individual student strengths and weaknesses and to measure the quality of education throughout Georgia (Cox, 2006).

Georgia law, as amended by the A+ Education Reform Act of 2000, required all students in grades one through eight to take the CRCT in the content areas of reading, English/language arts, and mathematics. Students in grades three through eight were also assessed in science and social studies. The CRCT only assessed the content standards outlined in the QCC (Spring 2005) or the GPS (Spring 2006) (Cox, 2006).

The CRCT was implemented in spring 2000. That year, summative, end-of-year assessments in reading, English/language arts, and mathematics were administered in grades four, six, and eight. Assessments in science and social studies (grades three through eight) were administered for the first time in spring 2002. Additionally, assessments in reading, English/language arts, and mathematics were administered in grades one, two, three, five, and seven in spring 2002 (Cox, 2006).

Scores on all reports were expressed as scale scores, which can range from 150 to 500 for each grade and content area. A scale score was reported for each content area as well as the domains within the content area. Scale scores were developed using various statistical procedures. The process converted the number correct on the test (raw score) to the CRCT scale score. Since the scale scores were equivalent across test forms within the same content area and grade, students obtaining the same score have demonstrated the same performance with respect to the Georgia QCC. Scores for the test administered during Spring of 2005 that were at or above 350 indicate a level of performance that *Exceeds the Standard* set for the test. Scores from 300 to 349 indicated a level of performance that *Meets the Standard* set for the test. Scores below 300 indicated a level of performance that *Does Not Meet the Standard* set for the test, i.e. the state's minimum

level of proficiency, based on this test administration, and indicated a need for some type of additional instructional support.

Scores for the test administered during Spring of 2006 that were at or above 850 indicated a level of performance that *Exceeds the Standard* set for the test. Scores from 800 to 849 indicated a level of performance that *Meets the Standard* set for the test. Scores below 800 indicated a level of performance that *Does Not Meet the Standard* set for the test, i.e. the state's minimum level of proficiency, based on this test administration, and indicated a need for some type of additional instructional support.

The CRCT measured how well a student has learned the knowledge and skills covered by the curriculum for their grade level. Students were not compared to each other but were measured on their achievement in meeting the standards. The student's individual scores revealed his/her strengths and weaknesses as related to the instruction of the GPS or QCC and gauge the quality of education throughout Georgia. Georgia's statewide curriculum sets specific standards or expectations for all students in Georgia's public schools. Reading and English/language arts CRCT were based on the new GPS curriculum and provide baseline results (Cox, 2006).

In the education of our children, it is important to obtain timely, reliable information about their progress, so that educators can make well-informed educational decisions for individual students and for educational agencies. It is important that educators collect this information in an efficient manner so that they don't waste time that might be used for instruction. It is also important that this information be well aligned with the instructional goals of the schools, so that it is useful to teachers (Cox, 2006).

The CRCT provided a high-quality assessment of student achievement and achievement growth. It was quite useful for identifying instructional needs of individual students and for identifying how well the district is doing as a whole. This assessment had two characteristics that make it very desirable for use in Georgia. First, the CRCT was aligned with the curriculum in use. It communicated scores to teachers and students using terms that were common and meaningful across the district. Second, the CRCT for each area are graduated in difficulty. This meant that students taking this assessment were challenged but not frustrated by the questions that are asked (Cox, 2006).

Georgia administered the CRCT to students in grades 1 through 8 in reading, English/language arts and mathematics, while students in grades 3 through 8 also took the CRCT in science and social studies. Georgia was phasing in promotion gates based on the Criterion Referenced Competency Tests in certain grades. In 2003-2004, third-grade students were required to pass the reading CRCT in order to be promoted to the fourth grade, and in 2004-2005, fifth-grade students will be required to pass the reading Criterion Referenced Competency Test to advance to sixth grade (Cox, 2006).

Georgia Performance Standards covered 90% of what is taught in Georgia schools. Systems are required to cover, at a minimum, the material in the state curriculum, but they are free to supplement it with additional topics they expect teachers to cover. Students were tested on their mastery of this material through the state's standardized test, the CRCT. The state curriculum was the minimum of what teachers should teach and what students should know. The Georgia Department of Education

encouraged teachers, however, to incorporate extra activities and projects that would stimulate critical thinking and in-depth learning on the part of their students (Cox, 2006).

Iowa Test of Basic Skills

The State of Georgia mandated a nationally standardized administration of a norm-referenced test to all students in grades 3, 5, and 8 either in the fall. A norm-referenced test was administered for the fundamental purposes of: (1) identifying students' areas of relative strength and weakness in subject areas; (2) monitoring year-to-year growth in basic skills; (3) describing each student's developmental level within a test area; and (4) providing data-enabling national comparisons. The State contract for a norm-referenced test was currently with Riverside Publishing, which produced the Iowa Tests of Basic Skills (ITBS). The ITBS compared the progress of Muscogee county students to that of students in a national sample who took a fall administration (Cox, 2006).

The purpose for using this norm-referenced test (NRT) was to obtain information about how the performance of Georgia's students compared with that of students in a national sample. The Iowa Test of Basic Skills (ITBS) assessed a student's level of achievement relative to other students. The results of scores were used for evaluation, decision-making, and instructional improvement. The ITBS assessed a student's level of achievement within four broad domains including readng, language arts, math, and vocabulary. All items on the ITBS had a multiple choice response format, and all tests were timed (Cox, 2005).

In the Muscogee County Public School System, where Blanchard Elementary School is located, the ITBS was administered to all third, fifth, and eighth grade students in October of each year. The students at Blanchard were given the Survey Battery which contains three, 30-minute sections in reading, language arts, and mathematics. Scores were retrieved from third and fifth graders who were administered the ITBS in October 2005 and 2006.

Subtest scores were provided for each of the three sections and for a core total. The scores were calculated to show Grade Equivalent (GE) and Percentile Rank (PR). GE is an estimate of a student's developmental level. A much higher or lower GE than the student's actual grade level when the test was taken was indicative of exceptional performance (extremely good or extremely poor). The GE was not designed for the purpose of grade placement decisions because the content of the questions was not reflective of the curriculum for higher grade levels. Percentile rank was another score that compared the relative performance of a student to a group. For example, if a third-grade student had a percentile rank of 87, it meant that the student scored better than 87 percent of the students in a comparison group of third graders. The comparison group was the group of students who were tested nationally when norms were established. (Cox, 2005).

The purpose of the ITBS was to obtain information about how the performance of Georgia students compared with that of other students across the nation. While districts concentrated most of their testing resources and attention on the high-stakes statewide CRCT, the ITBS still provided valuable data about how students compare nationally, and

in what specific areas students may need additional help. ITBS results were particularly helpful in identifying reading or math skills where students may need additional instruction. By administering the test in the fall, teachers then have time to work with students before spring CRCT testing begins (Cox, 2005).

Grades

Letter grades are so ingrained in our image of school, due in part to the fact that 80% of schools require letter grades (Polloway et al., 1994), that it is easy to overlook the multitude of meanings or purposes that may be assigned to grades. Several potential purposes for report card grades have been suggested in the literature (Bradley & Calvin, 1998; Carpenter, 1985; Ornstein, 1994). In general, purposed purposes involved communication of information that is specific to the student (e.g., strengths/needs, motivation and work habits, progress on individual goals), communication of information regarding general and comparative achievement (e.g., general achievement on curriculum, how performance compares to that of other students).

The most fundamental measurement principle related to meaningful assessment and grading is the principle of validity (Gallagher, 1998; Gredler, 1999; Linn and Gronlund, 2000; Stiggins, 2001). Although there are many validity issues involved in classroom assessment that classroom teachers should consider, such as making sure the way they assess students corresponds to the type of academic learning behaviors being assessed (Ormrod, 2000), the focus here is on the valid assessment and communication of final class grades as summaries of students' academic achievement of content knowledge of a subject. Validity addresses the accuracy of the assessment and grading procedures used

by teachers (Gallagher, 1998; Gredler, 1999; Linn and Gronlund, 2000). Validity is important because the sole purpose of grades is to accurately communicate to others the level of academic achievement that a student has obtained (Snowman and Biehler, 2003). If grades are not accurate measures of the student's achievement, then they do not communicate the truth about the level of the student's academic achievement. Assigning grades to students is such a complex (and sometimes controversial) issue that some educators have proposed their abolition (Kohn, 1999; Marzano, 2000). The current reality for most teachers is that they are required to assign grades indicating students' academic achievement in the subjects they teach. Therefore, grading should be as valid as possible.

Although students learn many things in the classroom, the primary objective is for students to learn academic content knowledge of a particular subject. In order for teachers to know if students are achieving this academic knowledge, they generally are required to not only assess students' knowledge in some way, but eventually summarize that assessment into a letter or numerical grade. This is known as "summative" evaluation. Hopefully, teachers are also gathering non-graded "formative" assessments of students to provide feedback to students as they learn, as well as considering how to motivate students to learn and encouraging them to be self-regulated learners. However, generally, teachers have to eventually assign a grade indicating what level of content knowledge a student has achieved in the subject listed (Marzano, 2000).

Although there are various means to communicate student learning, currently a single report card grade for each academic subject is the most common and generally accepted system in schools (Bailey and McTighe, 1996; Lake and Kafka, 1996). Authors of major texts devoted to classroom assessment suggested that the major reason for

assigning grades was to create a public record of a student's academic achievement that can accurately and effectively communicate to others the level of mastery of a subject a student has demonstrated (Airasian, 2000; Gallagher, 1998; Gredler, 1999; Linn and Gronlund, 2000; Nitko, 2001; Oosterhof, 2001; Stiggins, 2001). Nitko (2001) points out that: "Grades. . . were used by students, parents, other teachers, guidance counselors, school officials, postsecondary educational institutions, and employers. Therefore [teachers] must assign grades with utmost care and maintain their validity" (2001, p. 365). Due to the wide variability in the criteria used in grading practices from teacher to teacher, the validity of student grades was unknown and they have limited value as guides for planning the academic and career futures of students (Thorndike, 1997). Thus, if a single grade on a report card or transcript was to effectively communicate information to all these varied parties, then that single grade had to have some shared and accurate meaning (O'Connor, 1995). The purpose of an academic report is to communicate the level of academic achievement that a student has developed over a course of study. Therefore, the sole purpose of a grade on an academic report, if it is to be a valid source of information, is to communicate the academic achievement of the student. Since important decisions were often based on a student's grade, invalid grades resulted in dire consequences for the student. Grades can open up or close down important learning opportunities for students (Jasmine, 1999).

Letter grades or numerical grades are used to report the progress of students in grades one through five. In Georgia, student achievement was reported to parents as numerical grades for reading, language arts, mathematics, science and social studies.

Assignment of the grade by the teacher was certification of the degree of mastery of the essential knowledge and skills. Letter grades correspond with numerical scores. For instance, a letter grade of A ranges from 100 to 90. A letter grade of B ranges from 89 to 80. A letter grade of C ranges from 79 to 70. A letter grade of F indicates that the student received a grade below 70 and failed to master the essential knowledge and skills.

Summary

As required by the Quality Basic Education Act of 1985, Georgia must maintain a curriculum that specifies what students are expected to know in each subject and grade. The QCC had been the current guideline for instruction in Georgia since 1985 until a Phi Delta Kappa audit concluded in 2002 that the QCC lacked depth. Teachers used the QCC objectives more as a reference to mention in lesson plans than as a guide for quality instruction. The QCC also did not meet national standards according to the NCLB Act.

The belief that every child can learn is one that is being embraced by education experts around the nation. It is reflected in the federal NCLB legislation. Educators have come to realize that the historical correlation between low socio-economic standing and low-test scores has more to do with the education system than with the capabilities of a child. Georgia's Superintendent of School, Kathy Cox, concluded that to change the direction of a school system, one must change the content taught in the classroom. Her vision for Georgia to lead the nation in improving student achievement began with the replacing the QCC with GPS.

The revised and strengthened GPS went into much greater depth than the content standards used in the previous curriculum. GPS provided clear expectations for assessment, instruction, and student work. They also defined the level of work that demonstrates achievement of the standards. The review of literature confirms that standards-based reform is the setting of clear expectations for student achievement (Medrano, 2003). Curriculum and assessment research also contends that standards provide clear expectations for instruction and define the level of student work that demonstrates achievement (Steed, 1990).

Kathy Cox also believed that a strong curriculum combined with a good testing program, could pave the way for targeted, focused instruction that will help Georgia improve student achievement. Georgia law required that the CRCT be developed and given to students in order to assess the QCC and GPS. All of Georgia's students in grades one through eight are required to take the CRCT in the content areas of reading, English/language arts, and math. Students in grades three through eight were also tested in science and social studies (Cox, 2006).

The CRCT measures whether or not the students have learned the skills taught according to the QCC and GPS (Cox, 2006). The ITBS is a norm-referenced test that compares student's achievement at a national level (Cox, 2005). Grades are also valid measures to communicate academic achievement (Erickson and Strommer, 1991). In summary, the literature review of curricula, CRCT and ITBS testing, and grades provide a sound basis to examine how QCC and GPS impact student achievement for the state of Georgia.

III. METHODS AND PROCEDURES

Introduction

The purpose of this study was to examine the impact of the Quality Core Curriculum (QCC) and the Georgia Performance Standards (GPS) on student achievement. The correlational study measured the association between grades, Criterion-Referenced Competency Test (CRCT) scores, and Iowa Test of Basic Skills (ITBS) scores for the QCC and GPS. A review of the literature revealed that grades and test scores were considered valid measures to communicate academic achievement. Pearson *r* correlation coefficients were set up as Blanchard Elementary students' reading, language arts, and math grades were compared to their reading, language arts, and math test scores. Fisher's z transformations were used to determine if the correlation coefficients were significantly different from each other.

The methods and procedures of the study are presented in Chapter 3. A description of the population and its demographics, instrumentation, data collection procedures, and data analysis procedures are also discussed. A brief summary concludes the chapter.

Population

Participants in the study included 554 of the 650 students who attended Blanchard Elementary School in Columbus, Georgia during the 2004-2005 school term and the

2005-2006 school term. The school includes grades pre-kindergarten through fifth. Students in grades one through five who attended Blanchard Elementary School for the two year period in which the Quality Core Curriculum replaced the Georgia Performance Standards were selected to participate in the study. Attendance information was obtained from the student's cumulative file folder and used to identify participants. Parents permission was not required to obtain this information since permission was given to collect data (See Appendix E and Appendix F). The study was conducted over post hoc data points.

Demographic Data

Blanchard Elementary School is a neighborhood school serving families who represent diverse sizes of socioeconomic levels. The ethnic groups making up the student body were approximately 74% White, 15% Black, 4% Hispanic, 4% Multi-racial, 2% Asian, and 1% American Indian. The school does not qualify as a Title I-funded school because too few of the students, only 32.7% receive free (178 students) or reduced lunch (54 students). At the time of the study, the student body contained about 49% girls and 51% boys. The school is located in a middle income community. Parental support is very high. It is located within the northern part of the city, an area that is experiencing an increasing growth of business and home development. Blanchard is ranked as one of the top ten elementary schools in Muscogee County. Data for this study included reading, language arts, and math grades and both Criterion-Referenced

Competency Test scores and Iowa Test of Basic Skills scores in reading, language arts, and math from the students in grades one through five who attended Blanchard during the 2004-2005 and the 2005-2006 school terms.

Instrumentation

Data collection involved the use of educational tests and private records. The principal investigator collected final grades and test scores from the administrations of the CRCT and ITBS. Test printouts were placed in their cumulative folders after the tests were scored. Their final grades were located on the inside jacket cover of the cumulative folder. Final grades and test scores in reading, language arts, and math for each participant was stored as electronic data in a Statistical Package for Social Science (SPSS) data file on a computer disc.

Data Collection

A letter requesting permission to conduct the study was submitted to the Superintendent of Schools (See Appendix A). A copy of the Research Protocol Review Form was provided for the Supervisor of Research and Evaluation Department of Muscogee County to explain the study in depth and request permission for the research. The director of assessment and accountability and the superintendent granted permission to conduct the study (See Appendix B and Appendix C). The principal investigator also sent a letter to the principal of Blanchard Elementary School seeking permission to conduct research at the school site (See Appendix D). The principal was assured of

anonymity and confidentiality and given the opportunity to ask questions during a meeting to discuss the study. The principal granted permission for the principal investigator to collect the appropriate data (See Appendix E and Appendix F).

Data Analysis

The research design utilized in this study is correlational. The purpose of correlational research is to investigate the extent to which variations in one factor correspond with variations in one or more factors based on correlation coefficients. Correlation coefficients range from -1 (a perfect negative linear relationship) to +1 (a perfect positive linear relationship). The direction of the relationship depends on the sign. If the sign is negative, then the relationship is negative. A negative, or inverse, relationship exists when two variables move in the opposite direction. A positive, or direct, relationship exists when the two variables move in the same direction. The strength of the relationship depends on the numerical value of the coefficient. The more extreme the value, the stronger the relationship. Two variables that are unrelated have a correlation coefficient of 0 (Hair, Anderson, Tatham, & Black, 1998).

A correlation coefficient can be transformed into a z-score for purposes of hypothesis testing. This is done by dividing the correlation plus one, by the same correlation minus one. Then take the natural log of the absolute value of the result and divide the result by two. The end result is Fisher's *z*-score transformation of Pearson's *r*. Fisher's transformation reduces skew and makes the sampling distribution more normal as sample sizes increases (Blalock, 1972).

The correlational research of this study examined the Pearson r correlation coefficients between grades and CRCT scores in order to determine the degree of their relationships and if there is a significant statistical relationship between the implementation of the GPS and ITBS scores. The significance of the difference between the correlations were tested using Fisher's z transformation. The correlations are converted using the table found in Appendix G. The sample distribution of z, is approximately normal with a standard error given by $Sz_r = 1/\sqrt{N-3}$. The standard error of the difference between two values of z_r, is given by $SE = SQRT[1/(n_1-3) + 1/(n_2-3)]$ where n_1 and n_2 are the sample sizes of the two independent variables. The difference between the two values of z_r by the standard error of the difference is divided by the standard error. This is a unit-normal-curve deviate and may be so interpreted. Values of 1.96 and 2.58 are required for significance at the 1 and 5 percent levels. When the *p*-value is less than 0.05, the conclusion is that the two coefficients indeed are significantly different (Blalock, 1972).

The results of this analysis were necessary to answer the following pertinent research questions. First, what is the relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum? Second, what is the relationship between grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards? Third, are there differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who

received instruction with the Georgia Performance Standards? Fourth, what is the relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum? Fifth, what is the relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Georgia Performance Standards? Sixth, are there differences between relationships for grades and Iowa Test of Basic Skills scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards?

Summary

This chapter discussed the methods and procedures that were used in the study. A description was included of the population, demographic information, data collection procedures, and data analysis procedures.

IV: STATISTICAL ANALYSIS AND RESULTS

Introduction

The analyses of data relative to the research questions presented in chapter one were reported in chapter four. The purpose of this study was to examine the impact of Quality Core Curriculum (QCC) and Georgia Performance Standards (GPS) on student achievement, which is defined in terms of grades and Criterion-Referenced Competency Tests (CRCT) scores and Iowa Tests of Basic Skills (ITBS). 554 students enrolled at Blanchard Elementary School in grades 1 through 5 in the spring of 2005 and 2006 participated in the study. This resulted in actual sample sizes of 102, 110, 105, 112, and 125 for grades 1 through 5, respectively. All analyses were done using Statistical Software for Social Science (SPSS). The study consisted of the following analyses. Pearson *r* correlation coefficients were calculated to determine the relationship between grades and CRCT scores in reading, math, and language arts from the Spring 2005 and 2006 assessments. Correlations were also calculated to determine the relationship between grades and ITBS in reading, math, and language arts from the Fall 2004 and 2005 assessments. Fisher's z transformations were used to determine whether the correlation coefficients are significantly different from each other. The research questions and hypotheses are stated and answered based upon information obtained from the statistical tests at the end of this chapter.

Descriptive Analysis of Data

Table 1

Bivariate Correlation Coefficients of Grades and Criterion-Referenced Competency Tests Scores for Different Students

Grades and Test Scores	1st	2nd	3rd	4th	5th
Quality Core Curriculum (2004 – 2005)					
Reading	.50	.50	.26	.37	.70
Language Arts	.44	.44	.20	.44	.69
Math	.46	.46	.23	.41	.66
Georgia Performance Standards (2005 - 2006)					
Reading	.70	.63	.63	.77	.76
Language Arts	.71	.77	.74	.73	.71
Math	.78	.62	.44	.77	.71

Table 1 allows comparisons of correlations for different groups of children before and after the GPS were introduced as a basis for curriculum and assessment in reading and language arts and before they were introduced at all in math. Pearson *r* correlation coeffiecients were calculated to determine the relationship between grades and CRCT scores from reading and language art tests, which were taught and tested using GPS in

2005-2006. GPS standards were not implemented in math during the time of the study. Therefore, the correlations between grades and tests scores in math were taught and tested using QCC objectives in 2004-2005 and 2005-2006. To explain further, the grades and test scores of students that took the CRCT in Spring 2005 instructed with the QCC were correlated with their grades and CRCT test scores in Spring 2006 after the GPS were implemented for reading and language arts but not for math.

The starting point for obtaining a correlation coefficient is having a measurement for each variable being studied. Thus, in this study, one variable is grade the other variable is a corresponding test score. The correlation between reading grades and reading CRCT scores for first grade in spring of 2005 was $r = .50$. The correlation between language arts grades and language arts CRCT scores for first grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for first grade in spring of 2005 was $r = .46$.

The correlation between reading grades and reading CRCT scores for first grade in spring of 2006 was $r = .70$. The correlation between language arts grades and language arts CRCT scores for first grade in spring of 2006 was $r = .71$. The correlation between math grades and math CRCT scores for first grade in spring of 2006 was $r = .78$.

The correlation between reading grades and reading CRCT scores for second grade in spring of 2005 was $r = .50$. The correlation between language arts grades and language arts CRCT scores for second grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for second grade in spring of 2005 was $r = .46$.

The correlation between reading grades and reading CRCT scores for second grade in spring of 2006 was $r = .63$. The correlation between language arts grades and language arts CRCT scores for second grade in spring of 2006 was $r = .77$.
The correlation between math grades and math CRCT scores for second grade in spring of 2006 was $r = .62$.

The correlation between reading grades and reading CRCT scores for third grade in spring of 2005 was $r = .26$. The correlation between language arts grades and language arts CRCT scores for third grade in spring of 2005 was $r = .20$. The correlation between math grades and math CRCT scores for third grade in spring of 2005 was $r = .23$.

The correlation between reading grades and reading CRCT scores for third grade in spring of 2006 was $r = .63$. The correlation between language arts grades and language arts CRCT scores for third grade in spring of 2006 was $r = .74$. The correlation between math grades and math CRCT scores for third grade in spring of 2006 was $r = .44$.

The correlation between reading grades and reading CRCT scores for fourth grade in spring of 2005 was $r = .374$. The correlation between language arts grades and language arts CRCT scores for fourth grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for fourth grade in spring of 2005 was $r = .41$.

The correlation between reading grades and reading CRCT scores for fourth grade in spring of 2006 was $r = .77$. The correlation between language arts grades and

language arts CRCT scores for fourth grade in spring of 2006 was $r = .73$. The correlation between math grades and math CRCT scores for fourth grade in spring of 2006 was $r = .77$.

The correlation between reading grades and reading CRCT scores for fifth grade in spring of 2005 was $r = .70$. The correlation between language arts grades and language arts CRCT scores for fifth grade in spring of 2005 was $r = .69$. The correlation between math grades and math CRCT scores for fifth grade in spring of 2005 was $r = .66$.

The correlation between reading grades and reading CRCT scores for fifth grade in spring of 2006 was $r = .76$. The correlation between language arts grades and language arts CRCT scores for fifth grade in spring of 2006 was $r = .71$. The correlation between math grades and math CRCT scores for fifth grade in spring of 2006 was $r = .71$.

The thirty correlation coefficients ranged from weak ($r = .23$) to strong ($r = .77$). Correlations between grades and curriculum were higher during the year of the implementation of the GPS. The CRCT scores were positively correlated with grades.

Table 2

Fisher's z Transformations for Grades and Criterion-Referenced Competency Tests Scores for Different Students

Subject	First	Second	Third	Fourth	Fifth
Reading	2.28*	1.31	3.34*	3.03*	3.13*
Language Arts	2.99*	3.72*	5.26*	3.46*	2.03*
Math	3.94*	1.55	1.68	4.42*	4.90*

*$p < 0.05$

Table 2 calculates the statistical significance of the difference between the correlation coefficients of tests and grades for each subject as indicated by Table 1 using Fisher's z transformations. The correlation coefficients are converted to z-scores using the table found in Appendix G.

In the reading correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.50$ ($n = 109$) is compared with a correlation coefficient of $r = 0.70$ ($n = 104$). The critical value of $z = 2.28$ ($p < 0.05$), is associated with $p = 0.011$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the language arts correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.44$ ($n = 109$) is compared with a correlation coefficient

of $r = 0.71$ ($n = 104$). The critical value of $z = 2.99$ ($p < 0.05$), is associated with $p = 0.0014$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.46$ ($n = 109$) is compared with a correlation coefficient of $r = 0.78$ ($n = 104$). The critical value of $z = 3.94$ ($p < 0.05$), is associated with $p = 0.011$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.50$ ($n = 88$) is compared with a correlation coefficient of $r = 0.63$ ($n = 104$). The critical value of $z = 1.31$ ($p < 0.05$), is associated with $p = 0.0951$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.44$ ($n = 88$) is compared with a correlation coefficient of $r = 0.77$ ($n = 104$). The critical value of $z = 3.72$ ($p < 0.05$), which is associated with $p = 0.0010$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.46$ ($n = 88$) is compared with a correlation coefficient of $r = 0.62$ ($n = 104$). The critical value of $z = 1.55$ ($p < 0.05$), which is associated with $p = 0.0606$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the reading correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.26$ ($n = 88$) is compared with a correlation coefficient of $r = 0.63$ ($n = 120$). The critical value of $z = 3.34$ ($p < 0.05$), which is associated with $p = 0.0004$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the language arts correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.20$ ($n = 88$) is compared with a correlation coefficient of $r = 0.74$ ($n = 120$). The critical value of $z = 5.26$ ($p < 0.05$), which is associated with $p = 0.0000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.23$ ($n = 88$) is compared with a correlation coefficient of $r = 0.44$ ($n = 120$). The critical value of $z = 1.68$ ($p < 0.05$), which is associated with $p = 0.0475$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.37$ ($n = 120$) is compared with a correlation coefficient of $r = 0.77$ ($n = 114$). The critical value of $z = 4.03$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the language arts correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.44$ ($n = 120$) is compared with a correlation

coefficient of $r = 0.73$ ($n = 114$). The critical value of $z = 3.46$ ($p < 0.05$), which is associated with $p = 0.0003$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.41$ ($n = 109$) is compared with a correlation coefficient of $r = 0.77$ ($n = 104$). The critical value of $z = 4.42$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.70$ ($n = 114$) is compared with a correlation coefficient of $r = 0.76$ ($n = 101$). The critical value of $z = 0.93$ ($p < 0.05$), which is associated with $p = 0.1762$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.69$ ($n = 114$) is compared with a correlation coefficient of $r = 0.71$ ($n = 101$). The critical value of $z = 0.28$ ($p < 0.05$), which is associated with $p = 0.3897$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the math correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.66$ ($n = 114$) is compared with a correlation coefficient

of $r = 0.71$ ($n = 101$). The critical value of $z = 0.68$ ($p < 0.05$), which is associated with $p = 0.2483$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

Fisher's z transformation provides a method by which to determine whether two correlation coefficients are significantly different from each other. Correlation between grades and test scores are significant if the critical value is 1.96 or higher and the *p* value < 0.05. Thirteen of the fifteen correlations were significantly different.

Table 3

Bivariate Correlation Coefficients of Grades and Criterion-Referenced Competency Tests Scores for Same Students

Grades and Test Scores	1st	2nd	3rd	4th	5th
Quality Core Curriculum (2004 – 2005)					
Reading	.50	.50	.26	.37	.70
Language Arts	.44	.44	.20	.44	.69
Math	.46	.46	.23	.41	.66
Georgia Performance Standards (2005 - 2006)	2nd	3rd	4th	5th	6th
Reading	.63	.63	.77	.76	---
Language Arts	.77	.74	.73	.71	---
Math	.62	.44	.77	.71	---

The correlation between reading grades and reading CRCT scores for first grade in spring of 2005 was $r = .50$. The correlation between language arts grades and language arts CRCT scores for first grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for first grade in spring of 2005 was $r = .46$.

The correlation between reading grades and reading CRCT scores for second grade in spring of 2006 was $r = .63$. The correlation between language arts grades and language arts CRCT scores for second grade in spring of 2006 was $r = .77$. The correlation between math grades and math CRCT scores for second grade in spring of 2006 was $r = .62$.

The correlation between reading grades and reading CRCT scores for second grade in spring of 2005 was $r = .50$. The correlation between language arts grades and language arts CRCT scores for second grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for second grade in spring of 2005 was $r = .46$.

The correlation between reading grades and reading CRCT scores for third grade in spring of 2006 was $r = .63$. The correlation between language arts grades and language arts CRCT scores for third grade in spring of 2006 was $r = .74$. The correlation between math grades and math CRCT scores for third grade in spring of 2006 was $r = .44$.

The correlation between reading grades and reading CRCT scores for third grade in spring of 2005 was $r = .26$. The correlation between language arts grades and

language arts CRCT scores for third grade in spring of 2005 was $r = .20$. The correlation between math grades and math CRCT scores for third grade in spring of 2005 was $r = .23$.

The correlation between reading grades and reading CRCT scores for fourth grade in spring of 2006 was $r = .77$. The correlation between language arts grades and language arts CRCT scores for third grade in spring of 2006 was $r = .73$. The correlation between math grades and math CRCT scores for third grade in spring of 2006 was $r = .77$.

The correlation between reading grades and reading CRCT scores for fourth grade in spring of 2005 was $r = .37$. The correlation between language arts grades and language arts CRCT scores for fourth grade in spring of 2005 was $r = .44$. The correlation between math grades and math CRCT scores for fourth grade in spring of 2005 was $r = .41$.

The correlation between reading grades and reading CRCT scores for fifth grade in spring of 2006 was $r = .76$. The correlation between language arts grades and language arts CRCT scores for fourth grade in spring of 2006 was $r = .71$. The correlation between math grades and math CRCT scores for fourth grade in spring of 2006 was $r = .71$.

The correlation between reading grades and reading CRCT scores for fifth grade in spring of 2005 was $r = .70$. The correlation between language arts grades and language arts CRCT scores for fifth grade in spring of 2005 was $r = .69$. The correlation between math grades and math CRCT scores for fifth grade in spring of 2005 was $r = .66$.

The correlation between reading, language arts, and math grades and reading, language arts, and math CRCT scores for sixth grade were not obtained by the principal investigator. Obtaining these CRCT test scores for the sixth grades was out of protocol for data collection approved by the director of assessment and accountability.

Twenty-eight correlation coefficients ranged from weak (r = .20) to strong (r = .77). Correlations between grades and curriculum were higher during the year of the implementation of the GPS. The CRCT scores were positively correlated with grades.

Table 4

Fisher's z Transformations for Grades and Criterion-Referenced Competency Tests Scores for Same Students

Subject	First	Second	Third	Fourth	Fifth
Reading	1.37	1.25	5.77*	4.53*	-----
Language Arts	3.89*	3.12*	5.55*	3.09*	-----
Math	1.62	0.16	6.01*	3.36*	-----

*$p < 0.05$

Table 4 displays the statistical significance of the difference between the correlation coefficients of tests and grades for each subject as indicated by Table 3 using Fisher's z_r transformations. The correlation coefficients are converted to z_rs using the table found in Appendix G.

In the reading correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.50$ ($n = 104$) is compared with a correlation coefficient of $r = 0.63$ ($n = 104$). The critical value of z = 1.37 ($p < 0.05$), is associated with $p = 0.085$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.44$ ($n = 104$) is compared with a correlation coefficient of $r = 0.77$ ($n = 104$). The critical value of $z = 3.89$ ($p < 0.05$), is associated with $p = 0.0000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for first graders, a correlation coefficient of $r = 0.46$ ($n = 104$) is compared with a correlation coefficient of $r = 0.62$ ($n = 104$). The critical value of $z = 1.62$ ($p < 0.05$), is associated with $p = 0.042$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.50$ ($n = 88$) is compared with a correlation coefficient of $r = 0.63$ ($n = 88$). The critical value of $z = 1.25$ ($p > 0.05$), is associated with $p = 0.106$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.44$ ($n = 88$) is compared with a correlation coefficient of $r = 0.74$ ($n = 88$). The critical value of $z = 3.12$ ($p < 0.05$), which is

associated with $p = 0.0000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for second graders, a correlation coefficient of $r = 0.46$ ($n = 88$) is compared with a correlation coefficient of $r = 0.44$ ($n = 88$). The critical value of $z = 0.16$ ($p > 0.05$), which is associated with $p = 0.437$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the reading correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.26$ ($n = 120$) is compared with a correlation coefficient of $r = 0.77$ ($n = 120$). The critical value of $z = 5.77$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the language arts correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.20$ ($n = 120$) is compared with a correlation coefficient of $r = 0.73$ ($n = 120$). The critical value of $z = 5.55$ ($p < 0.05$), which is associated with $p = 0.0000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for third graders, a correlation coefficient of $r = 0.23$ ($n = 120$) is compared with a correlation coefficient of $r = 0.77$ ($n = 120$). The critical value of $z = 6.01$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.37$ ($n = 114$) is compared with a correlation coefficient of $r = 0.76$ ($n = 114$). The critical value of $z = 4.53$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the language arts correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.44$ ($n = 114$) is compared with a correlation coefficient of $r = 0.71$ ($n = 114$). The critical value of $z = 3.09$ ($p < 0.05$), which is associated with $p = 0.001$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the math correlation of CRCT tests scores and grades for fourth graders, a correlation coefficient of $r = 0.41$ ($n = 114$) is compared with a correlation coefficient of $r = 0.71$ ($n = 114$). The critical value of $z = 3.36$ ($p < 0.05$), which is associated with $p = 0.000$. Since $p < 0.05$, it is concluded that the two correlation coefficients differ significantly.

In the reading correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.70$ ($n = 114$) is compared with a correlation coefficient of $r = 0.76$ ($n = 101$). The critical value of $z = 0.93$ ($p > 0.05$), which is associated with $p = 0.1762$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.69$ ($n = 114$) is compared with a correlation coefficient

of $r = 0.71$ ($n = 101$). The critical value of $z = 0.28$ ($p > 0.05$), which is associated with $p = 0.3897$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the math correlation of CRCT tests scores and grades for fifth graders, a correlation coefficient of $r = 0.66$ ($n = 114$) is compared with a correlation coefficient of $r = 0.71$ ($n = 101$). The critical value of $z = 0.68$ ($p > 0.05$), which is associated with $p = 0.2483$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

Fisher's z transformation provides a method by which to determine whether two correlation coefficients are significantly different from each other. Correlation between grades and test scores are significant if the critical value is 1.96 or higher and the p value < 0.05. Eight of the twelve correlations were significantly different.

Table 5

Bivariate Correlation Coefficients of Grades and Iowa Tests of Basic Skills Scores

Grades and Test Scores	3rd	5th
Quality Core Curriculum (October 2004)		
Reading	.70	.71
Language Arts	.70	.75
Math	.64	.64
Georgia Performance Standards (October 2005)		
Reading	.63	.71
Language Arts	.77	.77
Math	.62	.67

The Georgia Department of Education directs all school districts to administer the Iowa Test of Basic Skills (ITBS) each fall. The ITBS complete battery was administered to Blanchard students in grades 3 and 5 in October 2004 and October 2005. The core subjects tested by the ITBS include reading, math, and language arts.

Table 5 allows comparisons of correlations for children before and after the GPS were introduced as a basis for curriculum and assessment in reading and language arts and before they were introduced at all in math. Pearson *r* correlation coeffiecients were calculated to determine the relationship between grades and ITBS scores from reading

and language art tests, which were taught and tested using GPS in 2005-2006. GPS standards were not implemented in math during the time of the study. Therefore, the correlations between grades and tests scores in math were taught and tested using QCC in 2004-2005 and 2005-2006. To explain further, the grades and test scores of students that took the ITBS in Fall 2004 instructed with the QCC were correlated with their grades and ITBS test scores in Fall 2005 after the GPS were implemented for reading and language arts but not for math.

The correlation between reading grades and reading Iowa Test of Basic Skills scores for third grade in October of 2005 was $r = .70$. The correlation between language arts grades and language arts Iowa Test of Basic Skills scores for third grade in October of 2005 was $r = .70$. The correlation between math grades and math Iowa Test of Basic Skills scores for third grade in October of 2005 was $r = .64$.

The correlation between reading grades and reading Iowa Test of Basic Skills scores for third grade in October of 2006 was $r = .72$. The correlation between language arts grades and language arts Iowa Test of Basic Skills scores for third grade in October of 2006 was $r = .71$. The correlation between math grades and math Iowa Test of Basic Skills scores for third grade in October of 2006 was $r = .69$.

The correlation between reading grades and reading Iowa Test of Basic Skills scores for fifth grade in October of 2005 was $r = .71$. The correlation between language arts grades and language arts Iowa Test of Basic Skills scores for fifth grade in October of 2005 was $r = .75$. The correlation between math grades and math Iowa Test of Basic Skills scores for fifth grade in October of 2005 was $r = .64$.

The correlation between reading grades and reading Iowa Test of Basic Skills scores for fifth grade in October of 2006 was $r = .71$. The correlation between language arts grades and language arts Iowa Test of Basic Skills scores for fifth grade in October of 2006 was $r = .77$. The correlation between math grades and math Iowa Test of Basic Skills scores for fifth grade in October of 2006 was $r = .67$.

All twelve of the correlation coefficients were strong ranging from r = .64 to $r = .77$. Correlations between grades and curriculum were high during the 2004-2005 school term in which the curriculum was guided by the QCC objectives and the 2005– 2006 school term when GPS were implemented. The ITBS tests scores were positively correlated with grades for both QCC and GPS.

Table 6

Fisher's z Transformations for Grades and Iowa Tests of Basic Skills Scores

Subject	Third	Fifth
Reading	0.29	0.00
Language Arts	0.14	0.34
Math	0.14	0.38

*$p < 0.05$

Table 6 calculates the statistical significance of the difference between the correlation coefficients of tests and grades for each subject as indicated by Table 1 using

Fisher's z transformations. The correlation coefficients are converted to z-scores using the table found in Appendix G.

In the reading correlation of ITBS scores and grades for third graders, a correlation coefficient of $r = 0.70$ ($n = 109$) is compared with a correlation coefficient of $r = 0.72$ ($n = 104$). The critical value of $z = 0.29$ ($p < 0.05$), is associated with $p = 0.386$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of ITBS scores and grades for third graders, a correlation coefficient of $r = 0.70$ ($n = 109$) is compared with a correlation coefficient of $r = 0.71$ ($n = 104$). The critical value of $z = 0.14$ ($p < 0.05$), is associated with $p = 0.444$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the math correlation of ITBS scores and grades for third graders, a correlation coefficient of $r = 0.71$ ($n = 114$) is compared with a correlation coefficient of $r = 0.72$ ($n = 101$). The critical value of $z = 0.00$ ($p < 0.05$), is associated with $p = 0.500$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the reading correlation of ITBS scores and grades for fifth graders, a correlation coefficient of $r = 0.71$ ($n = 114$) is compared with a correlation coefficient of $r = 0.72$ ($n = 101$). The critical value of $z = 0.00$ ($p > 0.05$), is associated with $p = 0.500$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the language arts correlation of ITBS scores and grades for fifth graders, a correlation coefficient of $r = 0.75$ ($n = 114$) is compared with a correlation coefficient of $r = 0.77$ ($n = 101$). The critical value of $z = 0.34$ ($p < 0.05$), which is associated with $p = 0.367$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

In the math correlation of ITBS scores and grades for fifth graders, a correlation coefficient of $r = 0.64$ ($n = 114$) is compared with a correlation coefficient of $r = 0.67$ ($n = 101$). The critical value of $z = 0.38$ ($p > 0.05$), which is associated with $p = 0.352$. Since $p > 0.05$, it is concluded that the two correlation coefficients do not differ significantly.

Fisher's z transformation provides a method by which to determine whether two correlation coefficients are significantly different from each other. Correlations between grades and test scores are significant if the critical value is 1.96 or higher and the p value < 0.05. In comparisons of QCC and GPS correlations between grades and ITBS scores, none of the correlation coefficients were significantly different from each other.

Research Questions and Hypotheses

The results of this analysis were necessary to answer the following research questions. Research questions one through three are also addressed first, for different groups of students. To further explain, the following results address the correlation between grades and test scores for different students who took the CRCT in the Spring of 2005 guided by the QCC and the Spring of 2006 after the implementation of GPS.

1. What is the relationship between grades and CRCT scores of students who received instruction based upon the QCC? This research question was refined into the following hypotheses:

Null Hypothesis 1: There will be no relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 1: There will be a relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 = \rho_2$).

Null hypothesis 1 was analyzed by calculating the Person *r* correlations (See Table 1). The fifteen correlation coefficients ranged from weak ($r = .20$) in third grade to strong ($r = .70$) in fifth grade. The correlations for the CRCT scores and grades acquired using the QCC standards were moderately correlated. The null hypothesis was rejected.

2. What is the relationship between grades and CRCT scores of students who received instruction based upon the GPS? This research question was refined in the

Null Hypothesis 2: There will be no relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 2: There will be a relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 = \rho_2$).

Null hypothesis 2 was also analyzed by calculating the Person *r* correlations (See Table 1). The correlations for the CRCT scores and grades acquired using the GPS were strongly correlated. The fifteen correlation coefficients ranged from $r = .63$ to $r = .70$ across all grade levels. CRCT scores and grades acquired using the GPS have a strong relationship. Therefore, null hypothesis two was rejected also.

3. Are there differences between relationships for grades and CRCT scores for students who received instruction with the QCC as compared to students who received instruction with GPS? The question was refined into the following hypothesis:

Null Hypothesis 3: There will be no differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 \neq 0$).

Alternative Hypothesis 3: There will be differences between relationships for grades and Criterion-Referenced Competency Test scores for student who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 = 0$).

Null hypothesis 3 was evaluated by using Fisher's *z* transformations which converted the correlation coefficients to z-scores found in Appendix G (See Table 2). The relationship between test scores and grades for QCC and GPS was significantly different in 80% of grades one through five. Thus, the null hypothesis was rejected in favor of the alternative hypothesis (H_o: $\rho_1 - \rho_2 = 0$). There were a few notable exceptions. Second grade reading grades and test scores and math grades and scores in second and

third grades were not statistically, significantly different. Insignificant differences and there possible occurrence are summarized in Chapter 5.

Research questions one through three are also addressed for the same group of students. The following results address the correlation between grades and test scores for the same groups of students who took the CRCT in the Spring of 2005 guided by the QCC and the Spring of 2006 after the implementation of GPS in reading and language arts after promotion to the next grade.

1. What is the relationship between grades and CRCT scores of students who received instruction based upon the QCC? This research question was refined into the following hypotheses:

Null Hypothesis 1: There will be no relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 1: There will be a relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 = \rho_2$).

Null hypothesis 1 was analyzed by calculating the Person *r* correlations (See Table 3). The fifteen correlation coefficients ranged from weak ($r = .20$) in third grade to strong ($r = .70$) in fifth grade. The correlations for the CRCT scores and grades acquired using the QCC standards were moderately correlated. Therefore, the null hypothesis was rejected.

2. What is the relationship between grades and CRCT scores of students who received instruction based upon the GPS? This research question was refined in the following hypothesis:

Null Hypothesis 2: There will be no relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 2: There will be a relationship between students' grades and Criterion-Referenced Competency Test scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 = \rho_2$).

Null hypothesis 2 was also analyzed by calculating the Person *r* correlations (See Table 3). The correlations for the CRCT scores and grades acquired using the GPS were strongly correlated. The twelve correlation coefficients ranged from $r = .44$ to $r = .77$ across all grade levels. CRCT scores and grades acquired using the GPS have a strong relationship. Therefore, null hypothesis two was rejected also.

3. Are there differences between relationships for grades and CRCT scores for students who received instruction with the QCC as compared to students who received instruction with GPS? The question was refined into the following hypothesis:

Null Hypothesis 3: There will be no differences between relationships for grades and Criterion-Referenced Competency Test scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 \neq 0$).

Alternative Hypothesis 3: There will be differences between relationships for grades and Criterion-Referenced Competency Test scores for student who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 = 0$).

Null hypothesis 3 was evaluated by using Fisher's *z* transformations which converted the correlation coefficients to z-scores found in Appendix G (See Table 4). The relationship between test scores and grades for QCC and GPS was significantly different in 66% of grades one through four. Thus, the null hypothesis was rejected in favor of the alternative hypothesis (H_o: $\rho_1 - \rho_2 = 0$). There were a few notable exceptions. In, first and second grade, reading grades and test scores and math grades and test scores were not statistically, significantly different. Insignificant differences and there possible occurrence are summarized in the Chapter 5.

4. What is the relationship between grades and ITBS scores of students who received instruction based upon the QCC? The research question was refined into the following hypothesis:

Null Hypothesis 4: There will be no relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 4: There will be a relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Quality Core Curriculum (H_o: $\rho_1 = \rho_2$).

Null hypothesis 4 was analyzed by calculating the Person *r* correlations (See Table 5). The correlations for ITBS scores and grades acquired using the QCC standards were highly correlated ranging from $r = .64$ to $r = .75$. The six correlation coefficients were also positively correlated with each other. The Iowa Test of Basic Skills scores were strongly correlated with grades. Therefore, the null hypothesis was rejected.

5. What is the relationship between grades and ITBS scores of students who received instruction based upon the GPS? The research question was refined into the following hypothesis:

Null Hypothesis 5: There will be no relationship between grades and Iowa Test of Basic Skillls scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 \neq \rho_2$).

Alternative Hypothesis 5: There will be a relationship between grades and Iowa Test of Basic Skills scores of students who received instruction based upon the Georgia Performance Standards (H_o: $\rho_1 = \rho_2$).

Null hypothesis 5 was analyzed by calculating the Person *r* correlations (See Table 5). The correlations for ITBS scores and grades acquired using the QCC standards were highly correlated ranging from $r = .67$ to $r = .77$. The six correlation coefficients were also positively correlated with each other. The Iowa Test of Basic Skills scores were strongly correlated with grades. Therefore, the null hypothesis was rejected.

6. Are there differences between relationships for grades and ITBS scores for students who received instruction with the QCC as compared to students who received instruction with the GPS? This question was refined into the following hypothesis:

Null Hypothesis 6: There will be no differences between relationships for grades and Iowa Test of Basic Skills scores for students who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 \neq 0$).

Alternative Hypothesis 6: There will be differences between relationships for grades and Iowa Test of Basic Skills scores for student who received instruction with the Quality Core Curriculum as compared to students who received instruction with the Georgia Performance Standards (H_o: $\rho_1 - \rho_2 = 0$).

Null hypothesis 6 was evaluated by using Fisher's *z* transformations which converted the correlation coefficients to z-scores found in Appendix G (See Table 6). The relationship between ITBS scores and grades for QCC and GPS were not significantly different in grades three and five. Thus, the null hypothesis was accepted (H_o: $\rho_1 - \rho_2 \neq 0$). Insignificant differences and there possible occurrence are summarized in the Chapter 5.

Summary

This chapter discussed how the correlational statistical methods and Fisher's r to z transformations were used to answer the six research questions. Five of the six null hypotheses were rejected and the alternative hypotheses were accepted. The last null hypothesis was accepted.

V: SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter provides a complete summary of the study. An overview of the research questions and hypotheses, including discussions of the statistical findings with connection to related literature are also presented. The chapter ends with final conclusions and recommendations for further research.

Summary

The state of Georgia is dedicated to leading the nation in improving student achievement (Cox, 2006). The key to making this vision a reality lies in providing a curriculum that will enhance the quality of education. According to Monson and Monson (1997), the curriculum is crucial for improving student learning because it defines what students are to learn, know, and understand in all content areas and at each grade level.

As required by the Quality Basic Education (QBE) Act of 1985, Georgia established a Quality Core Curriculum (QCC) that specifies what students are expected to know in each subject and grade (Mitzell, 1999). However, a Phi Delta Kappa audit of the state's curriculum concluded that the QCC did not meet national standards according to the No Child Left Behind (NCLB) Act which was signed on January 8, 2002 by President George W. Bush. Georgia's approach to complying with the requirements and regulations of NCLB Act was to implement performance standards that would enhance both instruction and assessment for teachers and students (DuFour, 2004).

The new Georgia Performance Standards (GPS) replaced the QCC as the state's curriculum guidelines. The standards provided clear expectations for instruction and defined the level of student work that demonstrates achievement of the standards (Medrano, 2003). The standards also guided the teacher on how to assess the extent to which the student knows the material and can apply this information (Ravitch, 1996).

The purpose of this project was to examine the impact of the QCC and GPS on student achievement. A correlational research study was conducted to compare the relationship between final grades and Criterion-Referenced Competency Test (CRCT) and Iowa Test of Basic Skills (ITBS) scores of students who attended Blanchard Elementary School, in Columbus, Georgia, after they received instruction guided by the QCC during the 2004-2005 school term and GPS during the 2005-2006 school term. Pearson *r* correlation coefficients between grades and test scores were used to determine the degree of their relationships. Fisher 's *z*-tests were also used to compute the statistical significance of the difference between the correlation coefficients. A summary and discussion of findings follows.

Findings

Summary

There was a moderate relationship between grades and CRCT scores of students who received instruction based upon the QCC. There was also a strong relationship between grades and CRCT scores of students who received instruction based upon the GPS. A significant difference exist between the relationship of grades and CRCT scores

of students who received instruction based upon the QCC as compared to students who received instruction based upon the GPS.

There was a strong relationship between grades and CRCT scores of students who received instruction based upon the QCC. There was also a strong relationship between grades and CRCT scores of students who received instruction based upon the GPS. No significant difference exist between the relationship of grades and CRCT scores of students who received instruction based upon the QCC as compared to students who received instruction based upon the GPS.

Discussion

1. What is the relationship between grades and CRCT scores of students who received instruction based upon the QCC?

The null hypothesis for this research question was analyzed by calculating the Person *r* correlations. The correlations for the CRCT scores and grades acquired using the QCC standards were moderately correlated. The moderate correlation proved that there is a relationship between grades and CRCT scores of students who received instruction based upon the QCC. Therefore, the null hypothesis was rejected.

These results were expected due to the fact that Georgia's QBE Act mandates that the curriculum and CRCT be aligned (Cox, 2005; Mitzell,1999). Mullis (1991) found items on the CRCT that had less than a 50% match with QCC. The study conducted by Firestone and Bader (1992) considered the impact of the QCC on student achievement and concluded that the QCC was constricting to the suburban school districts, such as Muscogee County. The QCC was perceived as only being helpful in Georgia's rural

districts with high numbers of low achieving students and school personnel who had limited experience developing curriculum. The moderate correlation between grades and test scores while the teachers used the QCC to guide what they taught in the classroom and assigned grades that reflected the students knowledge of the information presented during the school year therefore proved to be consistent with these findings.

2. What is the relationship between grades and CRCT scores of students who received instruction based upon the GPS?

Null hypothesis two was also analyzed by calculating the Person *r* correlations. The correlations for the CRCT scores and grades acquired using the GPS were strongly correlated. CRCT scores and grades acquired using the GPS have a strong relationship. Therefore, null hypothesis two was rejected also. These results were expected since the standards taught in the classroom and the CRCT are aligned with the GPS, which is also mandated by the QBE ACT (Mitzell, 199). These findings are truly beneficial because they support the notion of Kathy Cox that GPS improves education for all students so that no child is left behind (Cox, 2006).

Bell (1992) expressed that standardized tests, such as the CRCT, play a valuable role in helping to evaluate the educational achievement of individual students. The higher correlations between grades and CRCT scores support the notion that the new GPS reflect the knowledge and skills essential for competent student performance (Darling-Hammond, 2001; Dodd, 1996; Goodlad, 2002; Otis-Wilborn & Winn, 2000; Roth, 1996; Wigle & White, 1998). The CRCT was redeveloped to reflect GPS in accordance with the phase-in plan for the new curriculum because CRCT are a curriculum-based

assessment programs. Research regarding the validity and reliability of the CRCT written to assess the GPS is recommended to support the accuracy of the study findings.

3. Are there differences between relationships for grades and CRCT scores for students who received instruction with the QCC as compared to students who received instruction with GPS?

Null hypothesis 3 was evaluated by using Fisher's z transformations which converted the correlation coefficients to z-scores found in Appendix G. The relationship between test scores and grades for QCC and GPS was significantly different. Thus, the null hypothesis was rejected in favor of the alternative hypothesis. There were a few notable exceptions. Math grades and test scores in second and third grades were not statistically, significantly different. Math GPS had not been implemented during the time this study was conducted. However, the correlations for math were higher after the implementation of the GPS even though the math curriculum and math CRCT were still aligned with the QCC.

Every item that appears on the CRCT has been reviewed by committees of educators from around the state. All items have been reviewed at least once and in many cases, two or three times before items appear on the spring version of the test. Test form development consists of choosing accepted field test items and item specifications and is completed by the test contractor and approved by the Georgia Department of Education. Great care is taken to select items that measure the full curriculum and not just individual

standards. The Riverside Test Development Specialists aligned the QCC items to 82% comparable GPS which supports the high correlation between grades and CRCT scores (Cox, 2005).

One major limitation that occurred while conducting the study included the questions on the Criterion Reference Competency Test which were different for each year the test was administered because it reflected the curriculum that was administered except in the area of math. The Criterion-Referenced Competency Tests (CRCT) that was administered in the second year of the phase-in for a particular course will be developed and aligned to the new curriculum. The state department is already looking at existing test items and aligning them to the curriculum, rewriting certain questions to reflect the new curriculum, specifying which items need to be moved to another grade level because the skills have been moved to another items, and identifying which questions need to be developed (Cox, 2006).

This study also did not consider the effects of how students and teachers used the curriculum, or when they used the curriculum. Some analyses of timing of use may be possible. However, no data are available regarding how the curriculum was used. Thus, it is not possible to identify the particular manner in which the Georgia Performance Standards may be used most effectively to improve classroom instruction. Finally, it is possible that the implementation of the Georgia Performance Standards was correlated with other factors (e.g., the use of other instructional tools) that contributed to improved Criterion Referenced Competency Test performance. None of these other factors, which

may be responsible for some or even all the performance effects observed, were identified or examined in this study.

Research questions one through three are also addressed for the same group of students. The following results address the correlation between grades and test scores for the same groups of students who took the CRCT in the Spring of 2005 guided by the QCC and the Spring of 2006 after the implementation of GPS in reading and language arts after promotion to the next grade. The correlations for the CRCT scores and grades acquired using the QCC standards were moderately correlated. Therefore, the null hypothesis was rejected. These results were also expected due to the fact that Georgia's QBE Act mandates that the curriculum and CRCT be aligned (Mitzell, 1999).

The correlations for the CRCT scores and grades acquired using the GPS were also strongly correlated. CRCT scores and grades acquired using the GPS have a strong relationship. The relationship between test scores and grades for QCC and GPS was significantly different in 66% of grades one through four. Thus, the null hypothesis was rejected in favor of the alternative hypothesis. In, first and second grade, reading grades and test scores and math grades and test scores were not statistically, significantly different. In comparison, both groups' grades and CRCT scores were more closely related under the administration of the GPS. However, the significant difference between the grades and CRCT scores had higher critical values which indicated a larger range of improvement from one year to the next.

By definition, standardized and norm-referenced test compare children with each other as if development were uniform. They are constructed so that half of all children

who take them must score below a certain norm, even though they may actually be within the range of what is considered normal from a developmental perspective. In general, the younger the age group, the more dramatic the variations in development within the group and the more likely that differences in test scores reflect differences in age or developmental level rather than in ability (Bell, 1992).

4. What is the relationship between grades and ITBS scores of students who received instruction based upon the QCC?

The Iowa Test of Basic Skills scores were strongly correlated with grades. Therefore, the null hypothesis was rejected. These findings supported the research found by the Georgia Department of Education who reported that correlations made between the ITBS and the QCC were positive (Mitzell, 1999). Mullis (1991) reported that the ITBS had a forty-four percent match with the QCC. The ITBS also serves as a diagnosis of individual student as compared to their peers in the nation. Assessments and reports yield information on academic achievement at the national level.

5. What is the relationship between grades and ITBS scores of students who received instruction based upon the GPS?

The six correlation coefficients were also positively correlated with each other. The Iowa Test of Basic Skills scores were strongly correlated with grades. Therefore, the null hypothesis was rejected. Norm-referenced tests (NRT), such as the ITBS, measure instructional standards commonly taught throughout the entire United States of America. Additionally, scores from the ITBS are used to compare the performance of Georgia's students with the performance of students in a national sample, in the same grade (Cox,

2006). The results showed that the grades and ITBS scores have a slightly stronger relationship with GPS; but, the differences were not statistically significant.

6. Are there differences between relationships for grades and ITBS scores for students who received instruction with the QCC as compared to students who received instruction with the GPS?

The relationship between ITBS scores and grades for QCC and GPS were not significantly different in grades three and five. Thus, the null hypothesis was accepted (H_o: $\rho_1 - \rho_2 \neq 0$). The results of this hypothesis support the experimental study of Koretz, Linn, Dunbar and Shepard (1991) which revealed that performance on high-stakes exam did not generalize to other tests which students had not been specifically prepared. In other words, the curriculum is assessed through the CRCT. However, the outcome of the CRCT does not generalize for the student achievement on the ITBS. Therefore, challenging the notion that high stakes test caused increases in academic achievement.

Mullis (1991) reported that correlations made between the ITBS and the QCC were positive. This fact was also true for the ITBS and QCC in this study. There was no significant difference between the correlations of the grades and ITBS scores for both curricula. These results support Carter and Mason (1997) research conclusions comparing standards-based curricula and non-standards-based curricula showed no differences in student learning. However, it is presumed that there was no significant difference between QCC and GPS on the ITBS because the GPS had only been implemented for a few months prior to the administration of the fall ITBS.

It is recommended that the administrators of Blanchard use the results to review the results of the ITBS scores after the implementation of the GPA to identify areas to be addressed in curricular planning by the Instructional Leadership Team and areas that need to be addressed in School Improvement Planning. The Data Management Teams should review the disaggregated data for discrepancies in achievement of subgroups and share their findings with the faculty.

Conclusions

One of the most important indicators of student achievement is curriculum quality. Georgia provides their teachers with a revised and strengthened curriculum that drives both instruction and assessment. The first step to a sound testing program is a standards-based curriculum complete with performance standards that will serve as the foundation upon which Georgia builds as it attempts to attain the goal of leading the nation in improving student achievement.

The stage has been set for Georgia to have a world-class curriculum that is published and usable—a curriculum that sets high standards, maintains clear expectations and places schools and students at the top of the nation and the world. A curriculum framework with performance standards is the key component in all Georgia educational initiatives. With high standards in place, accountability systems, annual state tests, teacher preparation programs, professional learning and other key actions of the districts and schools will be guided by the revised curriculum. Teachers, students, and parents will have a much better understanding of what is expected at each grade level because the revisions and updates to the Quality Core Curriculum (QCC) that are embedded in the

GPS curriculum will incorporate examples of student work and sample problems that demonstrate the meaning of the standards. They will have a solid idea of what each child should be learning at each grade and in each content area.

Widespread concerns about the quality of education in Georgia have resulted in an increased emphasis on testing in recent years. Standardized and norm-referenced achievement tests have become a staple of both student and program evaluation at all levels of education. Standardized tests of all types can and do play a valuable role in helping to evaluate the educational achievement of individual students (Bell, 1992).

Unfortunately, few parents, teachers, or administrators fully understand the limitations of standardized tests. As a result, test scores are often used to draw inappropriate conclusions about individual children's strengths and weaknesses and to make decisions about their educational careers. Parents and teachers may erroneously lower their expectations for some children, and the general perception that test results that fall below the norm are equivalent to failure can have a devastating impact on the expectations and self-esteem of the children themselves (Bell, 1992).

Statewide tests are generally given annually to students in elementary schools. These tests serve several purposes. They measure how each student has achieved in comparison to an established standard, that all students are expected to possess at the grade level. Increasingly, student scores are used to determine promotion (Good, 2001).

The test scores of all the students in a school are used to determine the success of the school. Schools are held accountable by the state for the scores of their students. Schools are, in effect, graded on how well their students do on the tests. If a school's

grade is not high enough, then the state may impose consequences on the school involving funding and/or requirements for improving test scores (Good, 2001).

The state is rated by the federal government (U.S. Department of Education) on the basis of the scores of all the schools in the state. If the state's performance level is not high enough, then the federal government may cut the state's education funding and impose other restrictions. In other words, everyone has a great deal at stake with the statewide tests – students, schools, and the state (McFlane, 2001).

Concerns about the validity and reliability of grades for communicating meaningful information about students' academic progress have been raised for a long time (Starch and Elliot, 1912, 1913a, and 1913b; Adams, 1932). In addition, trying to help teachers to understand the purpose and effective functions of grades in the overall evaluation system has been addressed repeatedly in the literature (Airasian, 2000; Brookhart, 1993; Cross and Frary, 1996; Gredler, 1999; Guskey, 1996; Linn and Gronlund, 2000; Marzano, 2000; O'Connor, 1995; Stiggins, 2001). However, there seems to be little progress being made in this area in actual classroom practice. Two major thrusts need to occur in reforming grading practices. First, if factors such as effort, attitude, compliance, and behavior are to be noted about a student on a report card, then they should be reported with a separate mark and not figured in as part of a grade for academic achievement of content knowledge. Teacher need to model sound grading practices in courses in which grades accurately communicate students' achievement of

content knowledge learned. Research substantiates that when the curriculum is engaging, involving hands-on, interactive learning activities, students will perform well (Moeller and Reschke, 1993).

Recommendations

The information from this study is intended to help schools and districts gain more value from their curriculum and test scores. Continual implementation of the curriculum can help teachers identify students who might need additional help to reach the state proficiency levels on Criterion Referenced Competency Test and Iowa Test of Basic Skills. The relationship between curriculum and assessments also helps provide another reference point that help parents and board members gain more benefit from the data.

It is recommended that classroom teachers should review the results of the ITBS with grade level chairs or department chairs to assess areas of strengths and weaknesses in curricular planning for individual classes. Students who achieved below the 25th percentile should be included on the At Risk Roster and provided a program of treatment designated. It would also being interesting to determine if the results of the ITBS can be used as a predictor of students achievement on CRCT in the spring. ITBS scores are use as one indicator of student performance to continue to achieve even higher expectations and standards for students.

The kind of teaching envisioned in these standards is significantly different from what many teachers themselves have experienced in their classrooms. Since classroom teachers need time to learn and develop this kind of teaching practice, appropriate and ongoing professional development is crucial. For teachers to be able to change their role

and the nature of their classroom environment, administrators, supervisors, and parents must expect, encourage, support, and reward the kind of teaching described in GPS.

Experience suggests that the changes that teachers must adopt are neither trivial nor quickly attained and will require ongoing support over an extended period. Teachers need the opportunity to work through new instructional materials, to confront issues associated with new teaching strategies, and to increase their own knowledge of content. The Muscogee County School District has created and facilitated professional development programs that coincide with curriculum adoption and implementation.

Criticism came from teachers, themselves, who may have supported performance-based assessments of standards in theory but became less than enthusiastic when they discovered that the primary responsibility for the creation and year-round administration of these assessment rests with the classroom teacher. The results of successfully implementing standards will certainly be worth it in academic achievement, fairness, equity, educational opportunity, professional development for teachers, public accountability, and in many other ways. But only the most innovative and courageous districts will endure the pain and discomfort of these criticisms in order to achieve those long-term results. Georgia's curriculum changes will not dilute standards. In fact, with the complete adoption of a rigorous new curriculum containing performance standards Georgia is making an effort to guarantee that no child will be left behind.

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APPENDICES

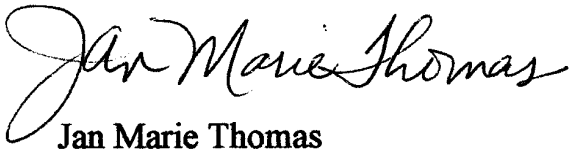
Muscogee County School District
Research, Accountability, and Assessments
c/o Dr. Carol Bradshaw, Director
1200 Bradley Drive
Columbus, Georgia 31901
April 14, 2006

Dear Dr. Bradshaw,

I am a doctoral candidate at Auburn University and I am currently conducting research for my dissertation, which is on the impact of Quality Core Curriculum and Georgia Performance Standards on Student Achievement. I need your permission, indicated by a letter of approval, to obtain Criterion Reference Competency Test scores of students that have attended Blanchard Elementary School for the last two years. I assure you that the information collected will be confidential.

I have enclosed a copy of my Research Protocol Review Form that will explain how I will conduct this research study. Please feel free to contact me if you have any questions or concerns. I will be glad to share any data and results with the county. Thank you in advance for your time. Your cooperation is truly appreciated.

Sincerely,



Jan Marie Thomas
Assistant Principal,
Blanchard Elementary School

Enclosures

jmt

APPENDIX B

Muscogee County School District
Columbus, Georgia

Carol C. Bradshaw, Ph.D.
Director

Office of Research,
Accountability, and Assessment

May 1, 2006

TO: John A. Phillips, Jr., Ph.D.
Superintendent of Education

FROM: Carol C. Bradshaw CCB

RE: Request to Conduct Research

Ms. Jan Thomas, teacher at Blanchard Elementary School, has requested permission conduct a study to determine whether there is a significant difference in achievement between students on the QCC and GPS curricula. She will use Blanchard's archived data from the CRCT for the last two years. Attached you will find Ms. Thomas' request and IRB form.

I have reviewed the request and recommend that it be approved.

This research request has been APPROVED / DISAPPROVED .

John A. Phillips, Jr.

Post Office Box 2427, Columbus, GA 31902-2427
Phone (706) 748-2020 FAX (706) 748-2029
E-Mail: cbradshaw@mcsdga.net

APPENDIX C

Muscogee County School District
Columbus, Georgia

Carol C. Bradshaw, Ph.D.
Director

Office of Research ,
Accountability & Assessment

May 2, 2006

Jan Marie Thomas
Blanchard Elementary School
Columbus, GA

Re: Approval to Conduct Research

Dear Ms. Thomas,

Congratulations! Your project has been approved. This approval, signed by Dr. Phillips, gives you permission to collect data according to the plan that has been submitted. Be sure to have a copy of the attached document available to show to anyone who may question your authorization to collect data from the students.

Good luck on your project. Keep me posted and let me know if I can help further.

Sincerely,

Carol C. Bradshaw, Ph. D.

Copy to Mrs. Rochelle Jones, Principal of Blanchard Elementary

Post Office Box 2427, Columbus, GA 31902-2427
Phone (706) 748-2020 FAX (706) 748-2029
E-Mail: cbradshaw@mcsdga.net

Muscogee County School District
Blanchard Elementary School
c/o Mrs. Rochelle Jones, Principal
3512 Weems Road
Columbus, Georgia 31909
April 14, 2006

Dear Mrs. Jones,

I am a doctoral candidate at Auburn University and I am currently conducting research for my dissertation, which is on the impact of Quality Core Curriculum and Georgia Performance Standards on Student Achievement. I need your permission, indicated by a letter of approval, to obtain Criterion Reference Competency Test scores of students that have attended Blanchard Elementary School for the last two years. I assure you that the information collected will be confidential.

I have enclosed a copy of my Research Protocol Review Form that will explain how I will conduct this research study. Please feel free to contact me if you have any questions or concerns. I will be glad to share any data and results with the faculty. Thank you in advance for your time. Your cooperation is truly appreciated.

Sincerely,

Jan Marie Thomas
Assistant Principal,
Blanchard Elementary School

Enclosures

jmt

APPENDIX E

Blanchard Elementary School

Rochelle M. Jones
Principal

Jan Thomas
Assistant Principal

Olivia Holland
Secretary

Kristine Mitchell
Media Specialist

Randalette Barnes
Counselor

Muscogee County School District
Columbus, Georgia

May 2, 2006

To Whom It May Concern:

Jan Thomas, my Assistant Principal at Blanchard School, has my permission to conduct her research study at Blanchard and to review the school's ITBS scores.

Rochelle Jones, Principal

3512 Weems Road • Columbus, Georgia 31909
Phone (706) 748-2461

APPENDIX F

Blanchard Elementary School

Rochelle M. Jones
Principal

Jan Thomas
Assistant Principal

Olivia Holland
Secretary

Kristine Mitchell
Media Specialist

Randalette Barnes
Counselor

Muscogee County School District
Columbus, Georgia

June 22, 2006

To Whom It May Concern:

Jan Thomas, my Assistant Principal at Blanchard School, has my permission to conduct her research study at Blanchard and to review the school's CRCT scores and students' grades during the summer.

Rochelle Jones, Principal

3512 Weems Road • Columbus, Georgia 31909

Table E

Transformation of r to z_r

r	z_r	r	z_r	r	z_r	r	z_r	r	z_r
.000	.000	.200	.203	.400	.424	.600	.693	.800	1.099
.005	.005	.205	.208	.405	.430	.605	.701	.805	1.113
.010	.010	.210	.213	.410	.436	.610	.709	.810	1.127
.015	.015	.215	.218	.415	.442	.615	.717	.815	1.142
.020	.020	.220	.224	.420	.448	.620	.725	.820	1.157
.025	.025	.225	.229	.425	.454	.625	.733	.825	1.172
.030	.030	.230	.234	.430	.460	.630	.741	.830	1.188
.035	.035	.235	.239	.435	.466	.635	.750	.835	1.204
.040	.040	.240	.245	.440	.472	.640	.758	.840	1.221
.045	.045	.245	.250	.445	.478	.645	.767	.845	1.238
.050	.050	.250	.255	.450	.485	.650	.775	.850	1.256
.055	.055	.255	.261	.455	.491	.655	.784	.855	1.274
.060	.060	.260	.266	.460	.497	.660	.793	.860	1.293
.065	.065	.265	.271	.465	.504	.665	.802	.865	1.313
.070	.070	.270	.277	.470	.510	.670	.811	.870	1.333
.075	.075	.275	.282	.475	.517	.675	.820	.875	1.354
.080	.080	.280	.288	.480	.523	.680	.829	.880	1.376
.085	.085	.285	.293	.485	.530	.685	.838	.885	1.398
.090	.090	.290	.299	.490	.536	.690	.848	.890	1.422
.095	.095	.295	.304	.495	.543	.695	.858	.895	1.447
.100	.100	.300	.310	.500	.549	.700	.867	.900	1.472
.105	.105	.305	.315	.505	.556	.705	.877	.905	1.499
.110	.110	.310	.321	.510	.563	.710	.887	.910	1.528
.115	.116	.315	.326	.515	.570	.715	.897	.915	1.557
.120	.121	.320	.332	.520	.576	.720	.908	.920	1.589
.125	.126	.325	.337	.525	.583	.725	.918	.925	1.623
.130	.131	.330	.343	.530	.590	.730	.929	.930	1.658
.135	.136	.335	.348	.535	.597	.735	.940	.935	1.697
.140	.141	.340	.354	.540	.604	.740	.950	.940	1.738
.145	.146	.345	.360	.545	.611	.745	.962	.945	1.783
.150	.151	.350	.365	.550	.618	.750	.973	.950	1.832
.155	.156	.355	.371	.555	.626	.755	.984	.955	1.886
.160	.161	.360	.377	.560	.633	.760	.996	.960	1.946
.165	.167	.365	.383	.565	.640	.765	1.008	.965	2.014
.170	.172	.370	.388	.570	.648	.770	1.020	.970	2.092
.175	.177	.375	.394	.575	.655	.775	1.033	.975	2.185
.180	.182	.380	.400	.580	.662	.780	1.045	.980	2.298
.185	.187	.385	.406	.585	.670	.785	1.058	.985	2.443
.190	.192	.390	.412	.590	.678	.790	1.071	.990	2.647
.195	.198	.395	.418	.595	.685	.795	1.085	.995	2.994

FROM: Allen L. Edwards, *Statistical methods*, 2d ed., Holt, Rinehart, and Winston, Inc., New York, 1967.