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Effects of comprehensive education on elementary school student performance on standardized exams

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EFFECTS OF COMPREHENSIVE EDUCATION ON ELEMENTARY SCHOOL
STUDENT PERFORMANCE ON STANDARDIZED EXAMS

by

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1996

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A dissertation submitted in partial fulfillment
of the requirements for the

**Doctor of Philosophy in Sports Education Leadership
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THE GRADUATE COLLEGE

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ABSTRACT

Effects of Comprehensive Education On Elementary School Student Performance on Standardized Exams

by

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The purpose of this study was to compare math and reading Criterion Reference Test (CRT) scores of 3rd and 5th grade students using two distinct educational models: a comprehensive educational curriculum (CEC) model and a No Child Left Behind (NCLB) curricular model. While the CEC curricular model focuses on a combination of core and non-core curriculum, the NCLB curricular model focused on a combination of intense core remediation and the reduction of some non-core curriculum. Students were from two demographically similar frontier Nevada elementary schools. Test scores were compared in 2004 when both schools used identical curricular approaches, and then subsequently in years 2005-2007 when the differing curricular approaches were put in place. While both schools used the Professional Learning Communities (PLC) model of professional development to maintain a common educational focus on curriculum utilized, School 1 focused on a CEC approach and School 2 used the NCLB curricular model of increased remediation.

Planned comparison t-tests were used to examine test score differences between School 1 and School 2 during the 2004-2007 school years. Results indicated that the only significant difference existed in the math test during the 2004 school year, before any curricular alterations were made. All other results indicated that even though great differences existed between curricular models, no significant test differences existed between the two schools. An upward CRT test score trend was detected in the school using the CEC model of education. This study could allow educational leadership on various levels to develop a curricular vision based on the entire educational experience that students receive versus educational accountability based solely on student test performance.

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CHAPTER 1

BACKGROUND

Since the inception of the federally mandated No Child Left Behind (NCLB, Public Law 107-110) program, which was the reauthorization of The Elementary and Secondary Education Act of 1965 (20 U.S.C. 6301 et seq.), academic emphasis has revolved around increasing basic educational skills for all students who attend public schools in the United States. While many argue that No Child Left Behind's (NCLB) concept is pure in nature and its intent well grounded, it has failed to recognize factors that create well-balanced, healthy American students in public schools (Coe et al., 2006; Sunderman, 2008). The NCLB model, originally intended to enhance the focus of the educational process of schools across the United States, has driven education down a path in which administrators are unable to keep a holistic or comprehensive approach due to the perception that they do not have the time or financial resources needed to keep non-core material in the curriculum. The end result has been a reinforced philosophical approach that has led to marginalized non-core curriculum approaches.

In December of 2003, one study found that nearly half of school administrators and district superintendents believed NCLB was either politically motivated or directed at undermining the public school system (Johnson & Duffett, 2003; Novak & Fuller, 2003). While this was not actually the motivation behind NCLB (Grubb, 2007), school leaders were forced to redesign curriculum to address the needs of children in the bottom quartiles of achievement, and to minimize educational offerings designed to address the needs of the upper quartile of the student population. Most school leaders have felt increased pressure to remediate poor performing students' scores to pass federally mandated tests and have dedicated more funding to address these needs accordingly (Grubb, 2007). Curriculum such as physical education, art and music has become the unplanned casualty of this process (Louvouezo, 2008).

The Problem

There is limited research supporting the notion that decreased non-core curricular time improves test scores in public education. Research has shown that providing non-core curriculum such as physical education, art and music does not appear to have a negative impact on student achievement. (Berlak, 2004; Carnoy et al., 2002; Grissmer & Flanagan, 1998; Grissmer et al., 2002; Skrla et al 2001.; Sunderman, 2005). Therefore, the problem facing administrators is that, when provided with an increased

remedial student population and the same funding base, educational leaders are forced to make decisions about Annual Yearly Progress (AYP) by cutting resource allocations and time to non-core subjects in American public education. Non-core curriculum such as physical education and other physical activity related programs have been severely cut in spite of the current childhood obesity public health crisis. Hence, persistent practices in reducing non-core curriculum in American public education may have negative implications, including those related to children's health and well being.

The distinction between core curricular focus versus comprehensive educational curriculum is a modern reality in today's public school system. Because limiting students' educational experience may have broad implications for students as a whole, its efficacy should be examined. Research should compare student achievement levels in comprehensive educational curriculums (CEC) and NCLB models of core only/ remediation intensive education programs. Such empirical data are greatly needed given that schools regularly reduce the consistent and systematic provision of non-core curriculum in an effort to increase student achievement in areas being tested. This practice exemplifies mainstream education (NCLB curriculum model), yet few studies have shown that this curricular approach consistently produces targeted outcomes.

Statement of the Purpose

The purpose of this study was to examine the achievement levels of elementary students who received a comprehensive educational curriculum (CEC) and elementary school students whose curriculum was based on an NCLB, core curricular focus. Whereas there is very little research tying non-core curriculum reductions to increased standardized achievement score performance, it is important to promote awareness that there may be other administrative options to increased student achievement other than the reduction or elimination of non-core curriculum to meet AYP.

Therefore, does the comprehensive educational curriculum (CEC Model) used in some schools still allow students to score at a statistically similar level to schools utilizing an enhanced core curriculum model of education?

Significance

This research may provide implications for student achievement using two different curricular approaches to education. The first approach is the NCLB model that promotes increased core curriculum

allocated time while reducing time and opportunities for non-core curriculum. The second approach is the comprehensive educational curriculum (CEC) system in which students are provided with daily opportunities in non-core curriculum, and core curricular focus and intensity is applied within the framework of the existing school day. Based on the findings of this research project, we may help inform administrators regarding curricular offerings and an alternative approach to comply with NCLB. This research then, may add to the dialogue relative to differing curricular approaches' attempts to meet demands of NCLB. Furthermore, implications from this project could enable school administrators and local school boards to implement curricular options which could include maintaining programs currently in existence instead of reducing or cutting non-core curriculum.

Scope

This study will examine the effects of comprehensive educational programs on elementary school student performance on standardized exams. This study will use mathematics and reading CRT data from two rural Nevada elementary schools that are demographically similar, but that employ fundamentally different educational programs. One school provided data from a comprehensive education program, while the other provided data from a core focused curriculum.

Assumptions

1. All states utilize standardized testing as a means to provide data on public school improvement on a yearly basis.
2. Comprehensive educational curriculum programs that include physical education, music and art are becoming limited because schools are trying to meet the requirements of NCLB.
3. Historical data description and content is accurate.
4. The CRT test used by the State of Nevada to test student achievement is a valid means to offer data to the federal government and the public regarding the progress of individual schools.
5. Demographic data provided by participants of the schools are accurate.
6. The Professional Learning Communities (PLC) school improvement program allowed teachers within the two schools to teach similar core subject matter leading up to the testing dates.

Limitations

1. Schools purposely selected for participation are isolated geographically in nature.
2. Applications and findings are limited to a local area and are not able to be generalized.
3. Student achievement data are limited to CRT scores.
4. There may be differences between teachers in the two schools which could be included as factors for CRT scores.

Operational Definitions

1. Criterion Reference Test (CRT): The CRT reading and mathematics tests are designed to develop a student test score. Students are categorized into one of four levels: emerging/developing, approaches, meets, and exceeds the standards of instruction. CRT scores are the classification tool used by the state of Nevada to monitor both Annual Yearly Progress (AYP) and individual student progression toward state content standards.
2. Student Achievement: Student performance on selected benchmarks in reading, writing, and mathematics. Student Achievement describes the success a student has achieved on the CRT test administered to Nevada students.
3. No Child Left Behind (NCLB): NCLB was signed into United States law in 2002 and seeks to create more accountability in public education. Schools who do not meet specific goals on standardized tests will face specific penalties.
4. Comprehensive Education Program (CEP): A CEP is a program in which student individual needs are addressed at both the core and non-core levels. Schools identify and implement the core educational needs of students as well as the social, emotional, and physical elements of students in formulation programs of instruction.
5. Core Curricular (CC): Subject matter required by NCLB which includes basic reading, writing, and mathematic skills at the K-12 education level.
6. Non-curricular (NCC): Any curriculum or scheduling design deemed to holistically improve the educational process in schools. Schools identify and implement curriculum based on the needs of students at the social, emotional, and physical levels.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Chapter 2 aims to provide a foundation that supports the concept that comprehensive school reform such as the No Child Left Behind (NCLB) Act of 2001 and the subsequent paradigm shift that has occurred in the educational system in the United States may not improve our educational system. In fact, this reform created a model that has narrowed the scope of educational curriculum to subjects, topics, and skills readily tested by multiple choice items (Abrams, 2002; Smith, 1991; Wolf, 1993). Additionally it caused a diversion of funds and instructional time toward testing and test preparation (Madaus & Raczek, 1996; Smith, 1991) thus causing superficial curriculum and, in primary and pre-primary grades, inappropriate academic focus (Shepard & Smith, 1988).

This review of literature delved into the No Child Left Behind (NCLB) curricular models and their impact on curriculum decisions in the United States. Odden (2000) defined comprehensive school reform as implementing and sustaining school wide change through a complete restructuring endeavor. Throughout the process of educational restructuring due to NCLB legislation, emergence and description of the NCLB curriculum model was developed. When viewing NCLB through lenses which includes research conducted to provide credence to NCLB, attention should be directed to the following curricular matters: 1) the time element NCLB places on educational leadership at the local and state levels, 2) the impact of high stakes testing that drives NCLB curriculum decision making, 3) NCLB funding and issues surrounding unfunded mandates. The key is to use these three items as benchmarks for considering success or failure of the NCLB curricular model. Additionally, the Center for Educational Policy has produced significant research regarding NCLB, allowing a wider picture of the impact of NCLB legislation.

In addition, the literature and data in this review will explore the relationship between the removal of comprehensive education curriculums due to NCLB legislation and the lack of data to support the efficacy of the NCLB educational model for academic achievement gains.

Method of Review

A comprehensive search of literature was conducted using legislation, journal articles, books, conference proceedings, government and corporate reports, theses and dissertations, internet electronic

journals, and magazines that are associated with the profession of education. Additionally, ERIC and Google Scholar were used extensively to locate core material. Furthermore, an exhaustive internet search was conducted using the following key words: No Child Left Behind, comprehensive education, educational leadership, standardized testing, unfunded mandates, high stakes testing, core curriculum, local education agency, annual yearly progress, assessment, teach to the test, educational funding formulas, and the United States Department of Education.

No Child Left Behind Overview

No Child Left Behind (NCLB, Public Law 107-110), the United States legislative act of 2001, is a reauthorization of the Elementary and Secondary Education Act (ESEA) of 1965. It expands on major reforms in areas such as state academic standards, local testing, accountability, and school improvement. This law requires states to develop academic assessments linked to these standards for all students. While each state has offered its version of the solution to NCLB, not one has found the kind of success needed to create a wave of change in public education (Meier, 2004).

One key goal of the federal reauthorization of NCLB is that all students be taught by highly qualified teachers by the end of the 2006 school year. All school districts were tasked with determining how to meet this requirement. In addition, each local educational agency (LEA) was required to develop a plan to demonstrate that all elementary, middle and high school educators assigned to teach core subject matter met the NCLB definition of “highly qualified”. Another key NCLB goal is to gain a snapshot of students progressing through the public education system. The difficulty in the NCLB assessment model is found in the basic premise of the growth model. While snapshots can indicate growth, we often discount the growth of a student who progresses at his or her pace and is therefore classified as “needs improvement”. Once we have classified a student, this snapshot of predetermined subject matter is then used to determine the level of progress each student maintains. The idea is that every student should be at their appropriate grade level in core subject matter of reading and mathematics. While all students should be at or near grade level, outside factors often make it difficult for some to achieve that.

In response to individual differences, each state designed its NCLB system differently. Ultimately, test results give schools the opportunity to demonstrate that they have provided an education to all who enter the public education system. Students may take end-of-course and end-of-grade

assessments. They may take reading and math assessments for grades 3-8 to determine if elementary and middle schools make AYP. In the state of Nevada, assessment results are viewed in each subject for the school as a whole and for each student group. In Nevada, students are tested at the third through eighth grade using the CRT model and then at tenth and eleventh grade using a high stakes testing model. The federally-designated student group categories include: 1) the School as a Whole, 2) White, 3) Black, 4) Hispanic, 5) Native American, 6) Asian, 7) Multiracial, 8) Socioeconomic Status (SES), 9) Limited English Proficient (LEP), and 10) Students with Disabilities. Schools must show Annual Yearly Progress (AYP) for all students in every category or be placed on a public watch list.

2004-2007 Nevada CRT Results

In order to see the overall picture of CRT testing in the state of Nevada, reading and mathematics results are provided in the following figures. It is important to know the impact of NCLB on Nevada testing and the trends that are reflected.

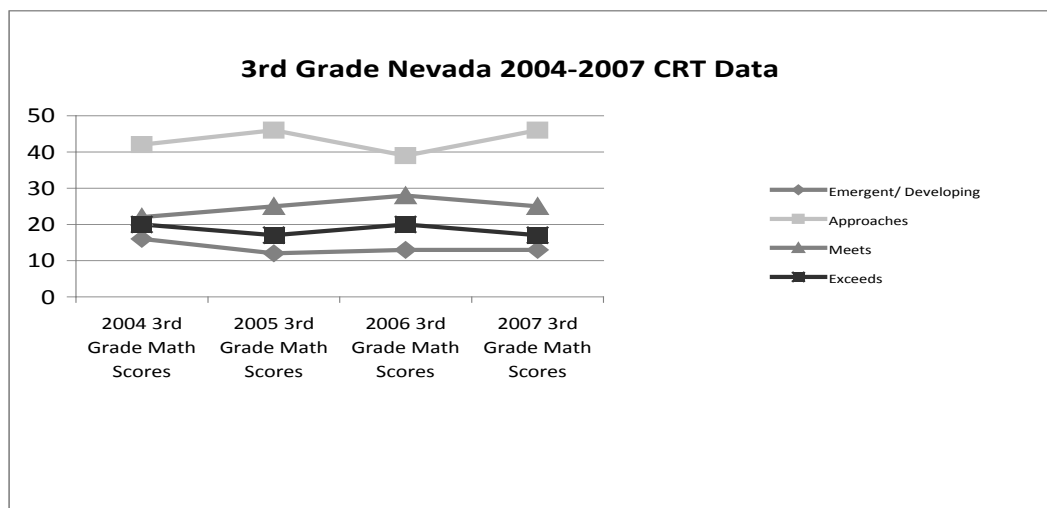


Figure 3.1

Figure 3.1 describes Nevada 3rd grade mathematics scores and their achievement grouping from 2004-2007. The “emerging/ developing” group did not show gains from 2004 to 2007. This group of students is in need of significant remediation and will take a large amount of time and financial resources to bring it to grade level. The “approaches” standards group showed gains from 2004-2007, but in 2006, reading scores fell significantly.

□

3rd Grade Nevada 2004-2007 CRT Data

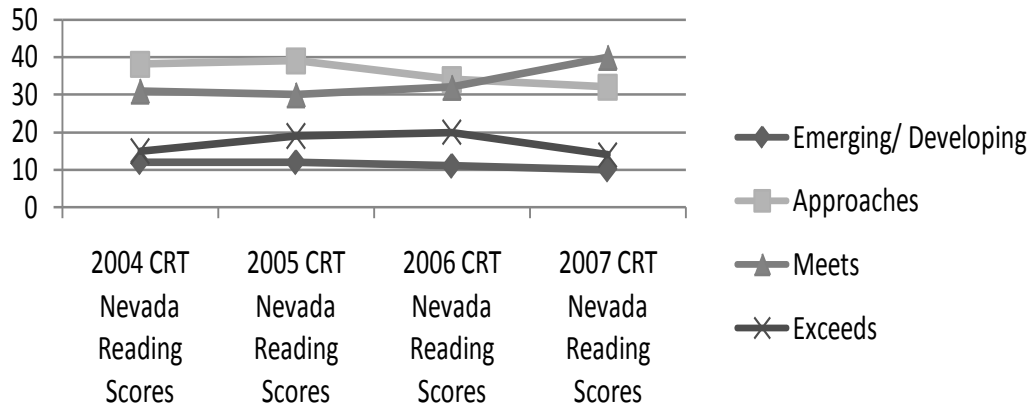


Figure 3.2

In figure 3.2, the Nevada 3rd Grade CRT reading scores from 2004-2007 reflect much the same information that the math scores showed. In the “emergent/ developing”, “approaches”, and “meets” categories, students scored slightly lower over the four year period. Only in the “meets” category did students show a 10 % gain on the test, which is significant.

□

5th Grade Nevada 2004-2007 CRT Data

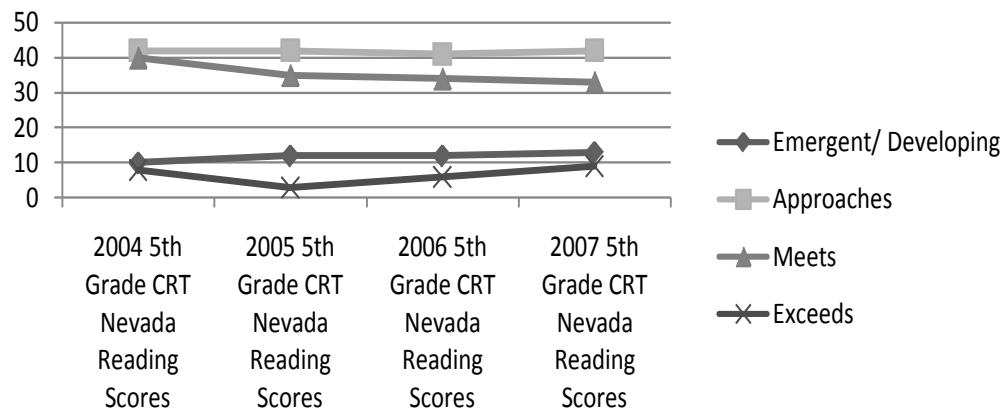


Figure 3.3

In figure 3.3, the “emergent/ developing”, “approaches”, and “exceeds” categories had slight gains. The state lost ground on the “meets” standard as fewer students met the standard of achievement developed to meet the AYP school achievement model.

□

5th Grade Nevada 2004-2007 CRT Data

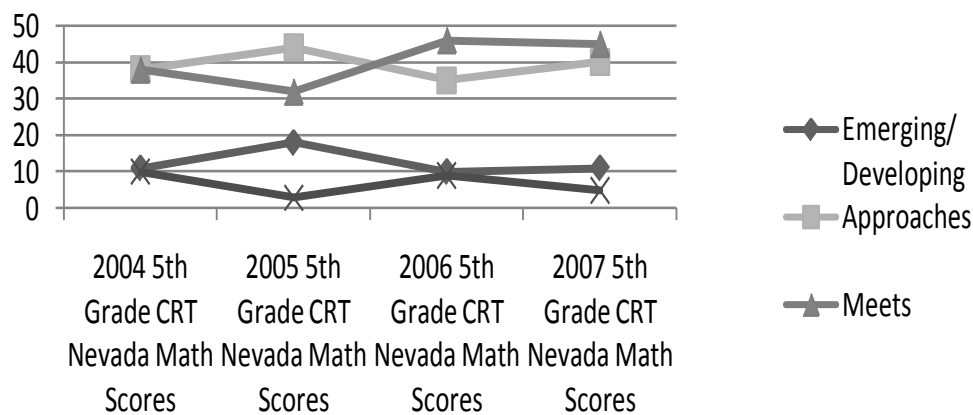


Figure 3.4

In figure 3.4, slight gains are made in the “emergent/ developing”, “approaches”, and “meets” categories. Unfortunately, those gains are offset by those students who exceeded the standard during the four year testing cycle. Once again, there does not seem to be data in the state of Nevada to demonstrate that student achievement has made gains using the current models of education.

NCLB Research

The book *Left Behind By Design* (Neal & Schanzenback, 2007) elaborates on how the NCLB and the business world’s involvement in educational decisions has pushed education away from considering students “students” and renamed them “clients”. The proponents of the NCLB movement cited the desire to bring “business” into public schools and the need to create schools that are “data driven” in ways that emulate the practices of private-sector companies. To add a business concept to public education would cause a focus on the reachable students who would impact testing the most. The result of the NCLB model has caused a stir within educational circles based on the concept that educators would disregard the lowest quartile as “students unable to ever pass the test” and also disregard students

in the top quartile due to their ability to pass any test required in general education (Irons & Harris, 2007). Thus, schools focused on the middle two quartiles, which best impacted their chances of meeting governmental expectations. This business plan approach was the success model according to NCLB but it forced schools to neglect two main population groups (Neill, 2004).

In reality, much of the curricular time allotted is spent meeting the basic goals of NCLB and as such requires substantial time devoted to test taking strategies and skills needed to bring students to the adequate level of achievement (Carnoy & Loeb, 2002). So, educators simply teach to the test. In the textbook *Holding NCLB Accountable: Achieving Accountability, Equity, and Local School Reform* (Sunderman, 2007), NCLB delves further into the academic ideology whereas Daniel Koretz, a Harvard testing expert, argues that in essence we do not know enough about holding schools accountable for improving academic performance.” In addition, “the high expectations of NCLB must be paired with adequate support and greater investment capacity building in low-performing schools and districts” (Koretz, 2003). The formula for success then is to fund education and design ways to evaluate schools and hold them accountable or adjust the curriculum to meet the demands placed upon educators.

NCLB Curriculum/ Time

Curriculum and instructional time is not a new topic. In a 2006 study by Stullich et al., (2006), 52% of schools were classified as needs improvement under the NCLB guidelines and as a result, altered their school days to reflect an emphasis on testing and student test passage. For example, physical education, music, and art curricular minutes were reduced by half so that more time could be diverted to passing tests. Is the change of emphasis making a difference? This study provided no evidence of the success or failure of the restructured emphasis. In all likelihood, this study adds evidence that schools cut back on the range of education received by students and narrow subject matter according to testing. Again, schools, under the guise of NCLB, are encouraged to teach to the test. Another interesting situation that has developed revolves around the premise that “if you choose not to test it, we will not teach it”. In Chicago, students in the lower quartile who were deemed to never be able to pass the test were simply left behind because there was insufficient funding to reach the AYP goals as set by NCLB (Neil & Schanzenbach, 2007).

The report, *Choices, Changes, and Challenges: Curriculum and Instruction in the NCLB Era* (McMurrer, 2007) discovered that 31 % less time was devoted to areas not required by NCLB. In narrowing the realm of education in this manner approximately 30 minutes per day are eliminated from the curriculum so that more time can be devoted to areas in need of remediation. Other reductions in time in the elementary schools included 57 minutes to art and music, 50 minutes for recesses, and 40 minutes for physical education. The reduction in minutes among schools nationally has become the norm since the introduction of NCLB in 2001-2002 (McMurrer, 2007) with no data to show a national increase in test scores, data according to the Center for Educational Policy (McMurrer, 2007).

Testing data is currently being used to determine individual needs of students within the framework of the educational process. Those students not meeting minimum standards are then provided additional measures to ensure minimal mastery levels. Lazear (2006) believes the intention of NCLB is that those students who struggle the most get the most help. He demonstrated that by narrowing the curricular scope of education, students have a greater opportunity to learn basic skills needed to survive in society. In direct opposition to this supposition lies the fact that while raising the educational bar may create greater gains in a large number of students, it may in fact do real harm to those students in the bottom quartile of education who have no real chance of attaining the skill levels demanded by NCLB legislation (Lazear, 2006). The end result is that we take away programs that might entice students to perform at higher levels or simply learn life skills so that a majority of students can pass tests and show rote knowledge of core curriculum. Ultimately, public education then leaves behind a group that really needs non-rote skills to survive and work in society.

NCLB and High Stakes Testing

There continues to be debate on whether an external test as required by NCLB really increases academic achievement among students across the United States. Data from external tests used to determine student performance has seemingly produced a focus on external tests is related to the topic by which those tests are then utilized to determine “Adequate Yearly Progress” by schools. The term “data driven curriculum” has become the NCLB call to arms, but is it actually based on scientific research data? Since the inception of NCLB, state departments of education have moved toward a centered form of education in which all students in a particular state receive the same type of curricular experience.

Amrein and Berliner (2002) evaluated 18 states that used a high stakes testing (HST) system that included the NAEP, SAT, and the ACT measures to determine if HST really caused an increase in academic achievement. Their results were inconclusive. Lee and Wong's (2004) study revealed even more mixed results as they looked at academic excellence versus equity. They found that even though moderate gains were made on math tests, no significant gains were achieved within racial groups or between socioeconomic groups. Unfortunately, the two groups at the center of the NCLB focus did not see significant achievement gains; therefore NCLB may not be the educational answer.

At the heart of NCLB legislation is the goal that all students become proficient at basic skills. This research project again recognizes that while some students do achieve basic skills levels, others are left behind. Examples include the bottom and top quartile students who get lost because such a financial burden is placed on schools trying to meet Adequate Yearly Progress. While students are classified at levels of proficiency (Approaches, Meets, and Exceeds), basic skills and additional educational services are provided based on individual needs.

Sadly, the needs of a student in the bottom quartile are often times too costly, leading to that student being left behind. Administrators and teachers who work in underfunded schools have become increasingly despondent about their role in the process and see themselves faced with a lose-lose situation (Sunderman, Kim & Orfield, 2005). Politicians and school boards attempting to meet the demands of high stakes testing add constraints to educators, and leave them with overcrowded classrooms, limited time and resources and the ever increasing diversity in student population.

The ultimate result for public schools in high-stakes testing results is high stakes embarrassment and loss of autonomy (Goertz & Duffy, 2001). Other results are schools being forced to adjust to a core curricular focus to meet the financial and time demands required to bring all students to a proficient level, meaning they reduce and at times eliminate non-core areas such as music, physical education, and social studies from their curriculum. This shift in focus has created issues regarding the comprehensive curriculum base for students across the United States.

NCLB and the Center for Education Policy

The Center for Educational Policy (CEP) surveyed schools to find out what curricular impact NCLB had on schools in the United States. In July of 2007, it was reported that 62% of all schools had

increased the amount of time elementary schools spent teaching reading skills. In addition, 44% of those schools increased their time teaching mathematical skills. While commendable, in order to accomplish this task, schools opted to eliminate or reduce other programs. Three hundred forty-nine school districts across the United States reported that their elementary schools decreased curricular time in science, social studies, art, music, physical education, and lunch or recess (McMurrer, 2007) to attempt to meet AYP.

In 2008 the Center for Educational Policy released a follow-up report titled, “Instructional time in Elementary Schools: A Closer Look at Changes for Specific Subjects” (Louvouezo, 2008) that caused a pause in the entire scope of NCLB as professionals and policy makers discovered that huge sacrifices had been made to increase the likelihood of meeting NCLB criteria. Non-core curriculum had been narrowed by 32%. This alarming reduction included subject matter such as social studies, science, art and music, physical education, lunch and/or recess. Although passing exams is crucial, this goal has overshadowed the importance of other subject areas and the breadth that had traditionally typified American education. Another key point discovered by the CEP survey was that 44% of the school districts involved reported that of the subjects cut, physical education, music and art were the hardest hit, forcing educators to realize that our kids did not have the surrounding tools needed to truly utilize basic skill levels in a manner other than lower order thinking skills. The NCLB-neglected subject matter was neglected in order to enhance our basic skill levels.

Another alarming statistic relating to elementary reading is that 84% of districts had changed their curriculum “somewhat” or “to a great extent” to become test-ready. In math, 81% of districts had changed curricular emphasis to meet NCLB demands (Louvouezo, 2008). The only feature missing in this study was information that described the effect of those changes on student scores within the framework of standardized testing. The addition of this data provided education officials with a view of subject matter that impacted standardized tests. The systematic dismantling of the United States education system based on mediocrity and everyone passing the same test has not proven to be the a remedy for students struggling to gain basic educational skills. The possible educational impairment of today’s generation in schools could result in students departing from our system lacking crucial life skills needed to take their place in society.

NCLB Funding

Ensuring that all children have highly qualified teachers and that struggling schools have enough tools to make improvements is an expensive process. Research has indicated that recruiting highly qualified teachers for difficult schools requires improving the school working environment, providing up-to-date textbooks and other resources, implementing proven curricula, attracting and retaining visionary administrative staff and providing professional growth opportunities as well as financial resources for teachers (Auchinstein, 2006).

NCLB's intention was certainly noble. The law began with the promise that, at last, public education would leave no child behind. The poor would have the same opportunities as the rich, and the strong arm of a United States government would make it happen. Public support was garnered for equality, periodic testing, highly qualified teachers, and other provisions, thus giving the law a strong support base. As shown by the 87-10 Senate vote, the law was authorized with strong bipartisan support. Congress clearly felt that the goals of NCLB could not occur without accountability and additional resources and so it set a funding authorization for NCLB throughout the cycle. While President Bush's FY 2008 budget increased NCLB funding by \$1 billion, the federal budget has still shortchanged NCLB by a total of \$70.9 billion since the law's implementation. Public schools were forced to choose one program over another program, and even worse, one child over another. The children who performed at a high level saw their programs reduced. The children who never really had a chance before saw the door shut even more tightly as schools raced to meet the NCLB challenge in the best way they saw fit.

It became evident that the proposed increase in funding fell far short of what was needed to get the job done, and what Congress believed would be required. The Kentucky Supreme Court ruled in 1989 that the state constitution mandated schools and students be provided with the resources necessary to meet state standards. This was a breakthrough because schools were being asked to do more with less money. Since then, courts in Arkansas, New Hampshire, New Jersey, North Carolina, Tennessee, and Ohio have issued similar rulings. In addition, the majority of states have now enacted standards-based reforms to meet the NCLB mandate. NCLB has since adopted these state standards and imposed penalties on districts and schools if students do not achieve Adequate Yearly Progress (AYP) in all areas. Thus, determining how much NCLB should cost requires knowing how much it should take to ensure

that all students meet standards and pass the appropriate tests. Two cost breakdown methods are at the forefront of funding formulas.

The first method used a "professional judgment" approach, which utilized panels of experts to carefully list the resources needed for each child to meet the NCLB standards. In the state of Nevada, professionals from around the state met and looked at the resources needed to achieve NCLB-prescribed performance levels. Techniques were put into place to identify the "successful schools". Those schools were used as models to examine resource allocations and spending levels. The panels then generalized the amount of funding needed by other schools to adequately educate the student population.

The "statistical analysis" approach was used to determine appropriate funding levels and to calculate how much an appropriate passing score would cost (dollar amount). These models are particularly useful in figuring regional costs, such as what it would take to draw qualified teachers to rural or difficult locations. The panel was never able to generate a concrete dollar amount due to the fact that it would take the entire Nevada budget to educate students at the level mandated by NCLB.

Within the last four years, new financial studies have estimated the money needed to raise all children's test scores to the state's desired standard (Sunderman, 2008). While certain studies expressly include NCLB costs, most have been based on achieving individual states' standards -- which have since been folded into individual states' NCLB systems. Since each state has its own set of standards, its own political culture, and its own level of needs, a variety of options exists. Nevertheless, recent studies in different states, by different professionals, using different methods, reveal the massive costs of making sure all students pass the mandated NCLB tests.

NCLB Funding to Meet NCLB Overview

The following is a description of studies by different state legislative bodies in response to questions about unfunded mandates. The purpose of each study was to see if schools were being adequately funded for the NCLB task they were being asked to accomplish. Augenblick & Myers, paid consultants, were used by multiple states to address public funding issues. They met with school and state financial officials to determine appropriate funding levels. They then presented results to state legislative bodies for consideration. Each state required slightly different funding formulas. It should also

be made clear that each state conducted its own study and each was funded through a combination of state and local sources.

Two primary study methods were developed to look at school funding. The “Successful Schools” model identified schools at all levels that met a set of standards. Data was collected from individual schools using tailored surveys. The identified schools tended to have lower than average students in special education and low-income families. Funding levels were adjusted to a geographic cost index, and were averaged to determine the recommended spending levels. In the “Professional Judgment” model, seven teams of eight people used statewide averages to design schools and assign staff, technology, supplementary programs, and supplies, as well as district-wide services. A final panel reviewed and adjusted the recommendations, determined appropriate costs for each recommendation, and finally arrived at total spending levels.

The following funding cost studies are from the state with the highest increase in educational spending, the state with the lowest increase in educational spending, and eight additional state studies to show variation in educational spending. Please see the Figure 1 table for a description of the percentage increase of the ten states reviewed.

State Sponsored NCLB Funding Studies

In order for Indiana to meet the "commendable" level on state assessments, it would have to increase its spending from \$5,468 to \$7,142 per pupil -- a 31% increase -- according to Augenblick & Myers, Inc (2002). This study included the costs for bringing the schools into compliance all students, regardless of their current level. The estimates were for just the basic services needed to meet the AYP and did not include any additional costs for special education students, which ranged between \$7,500 and \$8,300 per student. They also did not include the cost of "difficult-to-serve students," who generally average an additional \$4,200 to \$5,300 per student (Augenblick & Myers, 2002). Remediation is an expensive process and requires additional personnel and resources. Bringing students to NCLB achievement levels requires more than the passage of legislation. It is a huge financial commitment.

In Maryland, Augenblick & Myers, Inc. (2001) arrived at a total cost of \$12,060 per pupil for primary schools, \$9,000 for middle schools, and \$9,599 for secondary schools in order to fully fund education. The firm further calculated that a low-income student who could meet standards would

average an excess cost of \$7,748 per student, or almost two times the base cost. The analysts used a professional judgment panel model. They determined class size, professional development, instructional time, and operational support were necessary considerations. The high-achieving-school approach was then used to arrive at costs for Maryland's standards-based models, which included taking the highest performing schools within the state and determining how they used their finances to reach their level of achievement. Results were eerily similar (Augenblick & Myers, 2002). A total cost for schools for fiscal-year 2000 would have been between \$7.9 and \$8.8 billion dollars. Since the expended monies for that year were \$5.9 billion, the required increase was 34% to 49%. To their credit, Maryland lawmakers boosted education spending by \$1.3 billion in the spring of 2002 (Montgomery, 2002). Additional resources, such as competitive grants, were awarded to educators, which allowed non-core programs to survive instead of being eliminated.

Montana's 2002 educational funding study was driven by multiple education organizations and assisted by the National Council of State Legislators (NCSL). The analysts utilized a professional-judgment approach in which educational professionals were used to get to a median cost for funding NCLB requirements based on the current levels of need. They found that a base cost of between \$6,004 and \$8,041 per pupil (depending on district type) was needed to adequately fund their education system, while the current base was only \$4,471. Additional funding for special-needs and remedial students were set at \$8,000 and \$2,000 per student, respectively. Thus, the base costs in Montana would need to increase between 34% and 80%, depending on location and basic level of need (Augenblick & Myers, 2002).

The Nebraska State Department of Education, in cooperation with multiple educational organizations, commissioned a study of what would be required to meet current Nebraska standards under NCLB regulations in 2002-03. Estimated costs ranged from \$5,845 per pupil in a metropolitan K-12 district to \$11,257 in a small, rural K-12 district. Additionally, at-risk and special-education students would need an additional \$1,500 to \$12,000 each, depending on their specific needs. "Total costs for individual circumstances would vary from \$8,103 per student in densely populated K-12 districts to \$13,525 per student in rural K-12 districts" (Augenblick and Myers, 2002). Nebraska expends about \$5,600 per pupil. Therefore the state would need an estimated 45% cost increase in time and resources to

meet the demands of NCLB testing. Nebraska parents and local school officials have taken a close look at the dissatisfaction the NCLB legislation has caused. The state senate has since then called for the federal government to fully fund any educational mandate (Greene, 2002).

The executive director of the New Hampshire School Administrators Association, Mark Joyce, sent the association's members, and state tax payers, an analysis of all NCLB costs. He found that the state could receive an average of \$77 of new federal money for every student, while the obligations imposed by the law will cost over \$575 per student. In other words, New Hampshire would receive about \$17 million in new money for new tasks of \$126.5 million (Joyce, 2002). Additionally, Joyce estimated a state cost for each of the new elements of the law and combined those costs. He contended that these estimates were conservative, and that he was correct in his estimates. Joyce also assumed that the number of special need students would increase by 2%, but he neglected to include the costs of remedial programs for low-performing children. This resulted in a significant underestimate.

Using a statistical technique primarily focused on geographical sectional differences in the costs of meeting standards, Professors Duncombe of Syracuse University and Lukemeyer of the University of Nevada, Las Vegas (2002) produced a median statewide figure of \$7,927 for additional remedial costs, on top of the regular per-student expenditure of \$9,781. They provided several regional cost differences for meeting proficiency standards levels. Their overall sectional cost adjustments estimate 16% should be added to total education spending. The Campaign for Fiscal Equity (a New York Educational Group) launched a major financial study using both the successful-programs and professional-judgment models.

Professional-judgment models estimate for South Carolina to get 85% of its children to the "basic" level of the state's proficiency tests, and for all students to pass the graduation tests in 2011 is a 24% increase in per-pupil spending - from \$4,990 to \$6,189. However, this figure does not include the additional costs of at-risk and special education students. When the two figures for these populations combined, the cost jumps to \$9,182 per pupil (84% increases), according to Augenblick & Myers, Inc. (2002), using the professional-judgment model. Spending in South Carolina must almost quadruple -- increasing from \$3.1 billion in 1999 to a projected \$11 billion in 2011.

While Texas saw large increases in the number of students passing the state proficiency tests after NCLB, these tests were at an eighth-grade level (Linn, 2002). Even with the very low standards of

testing, statistical modeling of NCLB costs on earlier data requires an increase in state aid of 6.9 billion new state dollars. Assuming that local government contributions remained the same, this is approximately a 35% spending increase. For comparison purposes, the present administration has proposed a \$1-billion increase for the entire nation as a whole for fiscal year 2004 (Reschovsky, 2002). In Texas, the major increases were needed in the school districts with very low-wealth populations and in metropolitan -city districts.

In Vermont, the number of students below state standards was determined by test and grade level. Vermont scored 22 to 32 percentile points above national norms, a percentage that is increasing. Vermont has extremely high state standards, with 46.5% of the students "failing" one of the state tests. Estimates from adequacy-cost studies that considered students affected by poverty and those with moderate needs, it was determined that remediation costs of \$149.5 million would be needed to bring the state into NCLB compliance. Testing costs and lost instructional time added an additional \$8.7 million to that figure, for a total of \$158.2 million. However, the state received only \$51.6 million in all titles of the Elementary and Secondary Education Act (ESEA) combined (Mathis, 2002). Vermont would need to add 15.5% to its total costs for remediation and testing alone.

Using the guidelines and parameters supplied by the Institute for Wisconsin's Future, Whitney Allgood and Richard Rothstein (2000) discovered that equal and adequate funding in Wisconsin would be \$11,231 per student when averaged across all students in the state. For high-risk students, the cost would be \$27,879 per student-- more than 2.5 times the cost of earlier estimates. In arriving at this figure, the authors included local clinics, before- and after-school programs, early childhood intervention (ECI), and summer school programs (Rothstein, 2002).

While there is no concrete solution to the educational funding game, there is a certainty that when additional programs are added without sufficient funding levels, hard choices have to be made by leadership. The current decisions in education that are being made involve scaling back or even eliminating non-core programs and subject matter.

Table 1.1
Educational Spending Increase Chart

Educational Financial Studies/ States	Total % Increase in Ed. Spending
Indiana	31%
Maryland	34-39 %
Montana (Highest % Increase)	34-80 %
Nebraska	45 %
New Hampshire	38 %
New York	16%
South Carolina	24 %
Texas	35 %
Vermont (Lowest % Increase)	15.5 %
Wisconsin	39 %

NCLB and Physical Education

There have been numerous studies relating to student achievement and methods of raising academic achievement in elementary schools. However, few have attempted to discover relationships between physical education and academic performance. Studies suggest NCLB legislation should not be grounded in theory that requires reduction to physical education, art, or music on the premise that achievement scores may be increased. In essence, reducing non-core curriculum should not be a definitive answer to meeting AYP for NCLB.

One highly relevant study involving physical education was conducted by Coe, Pivarnik, Reeves, and Malina (2006) and sought to link higher levels of classroom performance to increased levels of physical activity due to increased arousal level, concentration and self-esteem. The results found that although simply enrolling in a physical education program did not yield significant results, vigorous activity levels did. Those results were discovered when students engaged in sports, which leads to the speculation that student involvement in something competitive leads to higher performance on core curriculum. That would lead to a tremendous impact on physical educators seeking means to engage more students in vigorous activity within the framework of the physical education curriculum.

A cross-sectional and longitudinal research project based on elementary students was performed by Roy Shephard (1997). Conclusions from this project included, but were not limited to, the fact that dedicating 14 to 26% of all curricular time to physical education increased academic performance. Simply stated, schools should not limit or reduce the amount of time spent on non-core curriculum to increase the likelihood of meeting NCLB requirements or Annual Yearly Progress (AYP). Dwyer,

Coonan, Leitch, Hetzel, and Baghurst, (1983) undertook a project in Australia in which fifth grade students were provided additional physical education to determine its impact on academic performance. Seven elementary schools participated in this study, and students were randomly assigned to three experimental groups. The first group included a control group which met for three physical education periods, three times per week. This time frame has been recognized as the norm in schools today and has even been reduced if schools struggled to achieve AYP. A second group was provided 60 minutes of structured physical education with predetermined goals and activities. Additionally, this group was provided with a 15 minute session in the morning. No additional time was added to the school day, meaning core teaching time was reduced to make time for activity time. A third group was provided with 75 minutes of physical activity. This group was dedicated to motor skills development. Like group two, no additional time was allotted to the school day, which pulled time from core curriculum to meet the needs of the experiment. Interestingly enough, 285 minutes were removed weekly from the core curriculum and no significant differences were apparent between the three groups throughout this 140-week study. Additionally, a study conducted two years later yielded results that favored the physical education group and the motor development group over the control group that received minimal physical activity (Dwyer, 2001). As described in this research project, students who built a strong body and mind achieved academically at similar levels to those who simply developed their minds.

Between 1970 and 1977, a study (The Trois Rivières Study) was conducted by Shephard and colleagues in which one hour of physical education was added to the curriculum of a 546-student population (Shephard, 1997; Shephard, 1998; Shephard & Lavalée, 1993). Student achievement data was collected in the areas of mathematics, science, French (native language), overall citizenship within the scope of behavior and finally English (at the upper grade levels). This experiment yielded significant results. Students who received additional time in PE earned significantly higher grades, in spite of receiving 14% less core instructional time. Across the spectrum of participants, data showed there was a 15.5 percent difference between the control group and the experimental group, with the experimental group achieving at a higher level. In addition, over 75% of teachers involved saw an improvement in classroom behavior.

Sallis, McKenzie, Kolody, Lewis, Marshall and Rosengard (1999) created the SPARK (Sports, Play, Active Recreation for Kids) program, which has attempted to address the issue of activity level's result on academic achievement. This program provided structured health-fitness activities like jumping rope, aerobic dance exercises, soccer, and Frisbee during class time. It then focused on training teachers to implement the curriculum. The program also promoted physical activity outside of school and rewarded students for engaging in physical activities with their families.

Results of the program demonstrated that when educators were trained to use the SPARK program, there were notable differences between the experimental group and control groups in language, reading, and basic skills. This study provided data to demonstrate that organized physical education programs could impact student performance even in short term experiments. Additionally, evidence demonstrated a tie between obesity and poor school achievement.

Although the relationship between obesity and reduced academic achievement is not yet well known, self-esteem and health problems associated with obesity may add to poor academic performance (Carlson et al, 2008). In 2004, Howard Taras completed reviews and analyses of two decades of related research published in the Journal of School Health. Within the framework of these articles he was able to link obesity, poor nutrition, and physical inactivity to poor student academic performance (Taras, 2005).

The California Department of Education (2005) recently analyzed an adolescent population sample's fitness levels' relationship to standardized achievement levels on educational standardized testing. Strong and direct correlations were discovered; students who were more fit scored significantly better on proficiency tests. Although associations between fitness and academic achievement cannot yet be characterized as cause-and-effect, they indicate that strengthening school-based physical activity programs and providing structured physical activity breaks results in no decrease in academic performance despite the time these activities draw from classroom instruction.

Limitations and Conclusions

The task of bridging NCLB achievement gaps at times seems overwhelming for educators and communities. There are many compelling reasons to promote comprehensive education systems, among them its impact on student academic achievement. The California Department of Education has spent time and resources linking non-core curriculum and academic performance. Multiple research (e.g.,

Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Dwyer et al., 1983; Linder, 1999; Linder 2002; Shephard, 1997; Tremblay et al., 2000) has brought supporting documentation to the link between time dedicated to physical activity and academic performance. These studies imply that we may actually be harming students by cutting back on the time allotted for non-core curriculum. The benefits of increased activity levels to children are numerous and include increased brain function and nourishment, increased ability to concentrate, and increased self-esteem (Cocke, 2002; Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Tremblay, Inman, & Williams, 2000; Shephard, 1997).

A limitation to non-core curriculum implementation is the continued use of unfunded mandates by state and federal governments, which leads to educational leadership making difficult curricular decisions. Due to the lack of funding, educational decisions are not always made with the best interest of the whole student body and mind. Furthermore, evidence is needed to substantiate the pros and cons of the NCLB curricular model of education to insure that this model is the best model to meet the needs of all students.

Finally, the educational system under which we operate should meet the needs of all students and foster a learning environment based on empirical data. Its goals should include, but not be limited to, children leaving the system stronger mentally, physically, spiritually, and socially.

CHAPTER 3

PURPOSE

The purpose of this study was to compare student performance on Criterion Reference Tests (CRT) in two rural Nevada elementary schools, one of which utilized a comprehensive educational curriculum (CEC) and one of which utilized the No Child Left Behind (NCLB) model of enhanced core curriculum to meet educational standards. Both School 1 and School 2 participated in the Criterion Reference Test (CRT) and were classified as adequate during the 2004-2007 school years. The test data used 3rd and 5th grade students who participated in the CRT reading and mathematics testing program during the 2004-2007 school years.

This chapter introduces the schools used in the study and provides information regarding the school demographics of the two schools involved. Additionally, the daily curriculum models used by both schools will be described in detail. Finally, the methodology of the research will be described and the format of the projects will become apparent.

Participants and Setting

This study took place in the southeast region of frontier Nevada. Both schools were selected based on sampling convenience. The schools and models of school curriculum were identified as: School 1 - Comprehensive Education Curriculum model (CEC) and School 2 - No Child Left Behind (NCLB). The study sought to provide statistical evidence that students using the CEC curricular model could achieve the same or a higher achievement level than students using the NCLB curricular model. The hypothesis behind this study was based on the fact that schools were currently reducing or even eliminating programs due to NCLB legislation and the increased need to meet basic skill levels.

Both School 1 and School 2 employed the NCLB model of increased remediation which included limiting or reducing non-core curriculum in 2004. After the 2004 school year, School 1 shifted its curricular focus toward the CEC model by implementing daily doses of physical education, music, and art while elementary School 2 continued utilizing the NCLB curriculum model. Both School 1 and School 2 continued to participate in the Criterion Reference Test and have done so since NCLB's inception. The CRT was used to evaluate the progress of Nevada schools toward Annual Yearly Progress

(AYP). The test data involved 3rd and 5th grade students who participated in the CRT reading and mathematics testing program during the 2004-2007 school years.

Both schools were selected on the basis of a convenient sample, access to the data, and access to comparable data. They were similar in school size, class sizes, gender subpopulations, ethnic subpopulations, and socioeconomic status (SES) of the schools' students. Table 3.1 illustrates the similarities of the two schools over the four-year research period. The sample was 3rd and 5th grade students who attended the schools and who participated in the Criterion Reference Testing conducted at a predetermined date after the 100th school day.

*Table 3.1
School Demographic Averages*

School ID	2004-07 Class Sizes	2004-07 Gender Class Size %	2004-07 Ethnic Class Size %	2004-07 SES Class Size %
School 1	17-22	60 % Male 40% Female	74 % Caucasian 16 % Hispanic 5 % African American 5 % Islander Pacific	59 % F/R
School 2	17-22	55 % Male 45 % Female	80 % Caucasian 15 % Hispanic 5 % Pacific Islander	54 % F/R

Table 3.2 identifies the specific curriculum taught by both School 1 and School 2 during the 2004-2007 school years. This information was relevant because the NCLB curriculum model used by School 2 reduced programs or curriculum in an attempt to meet AYP. Curriculum models were broken down into years beginning with 2004 and ending with 2007.

*Table 3.2
Curricular Offerings School 1/ School 2*

Schools	ELA	Math	Spelling	Social Studies	Reading	Science	Art	Computers	PE	Music
2004 School 1	D	D	D	2X	D	2X	W	2X	2X	W
2004 School 2	D	D	D	2X	D	2X	W	2X	2X	W
2005 School 1	D	D	D	2X	D	2X	D	D	D	D
2005 School 2	D	D	D	2X	D	2X	W	2X	2X	W

Table 3.2 Continues

Table 3.2 Continued
Curricular Offerings School 1/ School 2

Schools	ELA	Math	Spelling	Social Studies	Reading	Science	Art	Computers	PE	Music
2006 School 1	D	D	D	2X	D	2X	D	D	D	D
2006 School 2	D	D	D	2X	D	2X	W	2X	2X	W
2007 School 1	D	D	D	2X	D	2X	D	D	D	D
2007 School 2	D	D	D	2X	D	2X	W	2X	2X	W

Note. Curriculum offerings are identified as either daily (D), two-times per week (2X), or weekly (W) depending on the frequency of offering by North and South Elementary Schools. Curriculum models are broken down into years beginning with 2004 and ending with 2007.

As seen in table 3.2, students at School 2 were offered social studies, science, PE, and computers two times (2X) per week. Those same students only received art and music on a weekly basis. Students at School 1, after switching to the CEC model, received all subjects on a daily basis.

Design

This study used a case-control design to examine 3rd and 5th grade students' CRT math and reading achievement results from the 2004, 2005, 2006, and 2007 school years. In Nevada, schools used CRT test data to meet their individual AYP requirements. CRTs remain intended to measure how well a student has learned a specific body of knowledge and skills.

Both School 1's and School 2's third and fifth grade teachers met monthly using the Professional Learning Communities (PLC) model of professional development and developed curriculum for that month. Teachers taught the same curriculum; using curriculum mapping as a guide for implementation. Students were therefore taught the same material at the same time and then tested (CRT) on the exact same dates (at a designated date after the 100th school day). All students matured academically at similar rates and were promoted based on whether or not they met Nevada State Standards; as well as classroom achievement. All students tested were provided with a test-ready program designed to simulate the CRT and better prepare students for it. The CRT is the recognized standardized test used by the Nevada Department of Education to determine levels of Annual Yearly Progress as mandated by NCLB legislation. CRTs were mailed to schools in January and stored using a state-mandated test security program. After students took the CRTs, they were collected, sealed and returned for processing immediately. All 3rd and 5th grade CRT scores between 2004 and 2007 will be

used on this design. Due to the location and proximity of the two elementary schools utilized in this study, there were issues with external validity. In addition, there were a limited number of participants available in this study due to the rural nature and size of these schools.

Instrumentation

The Criterion Reference Test (CRT) was administered during the years of 2004, 2005, 2006 and 2007. Although test results were only one measure of student achievement in the areas of math and reading, these tests were utilized in assessing overall student learning and progress. Nevada's current testing program, the Nevada Proficiency Examination Program (NPEP), combines different tests to measure individual student performance. Students participated in the tests and then those scores were divided into four categories: Emergent/ Developing, Approaches Standards, Meets Standards, and Exceeds Standards. To be considered for an appropriate passing scale, students must have performed at the level designated as meets or exceeds standards.

CRT Testing Information

CRT results showed the level of proficiency a student demonstrated in each of the subject areas tested. There were approximately 40-50 questions per subject area. It should be noted that teachers at both schools identified 1-3 students who finished the test within ten minutes, while the normal student spent approximately 60 to 70 minutes per test. Once students took the tests, the results were returned to school officials, in order to rate each student and his or her progress toward basic skills as determined by the state of Nevada. Students were rated on one of four levels: emergent/developing, approaches standard, meets standard or exceeds standard. The goal was for all students to score at or above the state standard. The CRT results allowed schools, parents, and students an indication of whether students were moving toward mastery of the Nevada State Subject Matter. Results were also used to determine if schools met Adequate Yearly Progress (AYP) for the No Child Left Behind legislative act of 2001. Although the CRT test gave information regarding student performance, other factors were used to determine the overall education of students.

Multiple measures were available for data collection based on the school report worksheet returned to each school in the month of May, following the February testing date. These dependent

variables were individual CRT reading and math composite scores within the categories of gender, ethnicity, and SES.

General Procedures

The UNLV Institutional Review Board reviewed and approved the study protocol (See insert.)

Local access was granted to CRT results for the testing years of 2004-2007. The Superintendent of the Lincoln County School District reviewed and approved the study protocols, including the use of CRT scores during the 2004-2007 school years, as long as all materials used met IRB security and subject standards of research. Additionally, the Assistant Superintendent collected all data and submitted it to the researcher in spreadsheet form with test data and student identification to maintain student privacy throughout the process. No state CRT forms were provided to the researcher.

Third and fifth grade CRT data was collected for CRTs taken during the 2004-2007 school years. This data included both the math and reading sections of the CRTs. The Nevada Department of Education returns a roster report detailing individual and group outcomes to all Nevada schools. This roster provided the data to input into the Statistical Package for the Social Sciences (SPSS) statistical program to determine performance outcomes for each school, and each school's variables. This roster was used to create the data spreadsheet.

Data Analysis

Descriptive data concerning curricular approaches was gathered from School 1 and 2. After gathering data from the two schools, a Chi-square analysis was conducted on the leading indicators of education outcomes to determine if there were any differences. Planned comparison t-tests were used to examine differences between School 1 and School 2 each year for both math and reading. To maintain family-wise error rate, Bonferroni correction will be used to adjust alpha (.05/4) to 0.0125.

CHAPTER 4

RESULTS

This study compared math and reading Criterion Reference Test (CRT) results of 3rd and 5th grade students from two rural Nevada elementary schools. Comparisons were made because each school used a differing curricular approach, with one school undertaking a comprehensive educational curriculum (CEC) and the other a core academic program only, commonly referred to as the No Child Left Behind curriculum model. School test scores were compared in 2004, when both schools used identical curricular approaches, and then subsequently in 2005-2007, when the differing curricular approaches were put in place. This chapter provides the results from the data analyses. First, an overview of the school demographics and related results of Chi-square tests is provided. Next, an overview of the distinct curricular approaches, including the curriculum fidelity, is provided. Finally, the school test score data analyses result is provided.

Sample Demographics

Each school provided demographic data for each year of analyses. As previously outlined, in 2004, the curricular approaches were the same. Both used the Professional Learning Communities (PLC) models as a professional development model. Teaching staffs met with their grade level counterparts to map curriculum so as to mirror each school's curriculum to be taught in the schools. While curriculum was mirrored, however, the time allocated to each subject matter was altered to meet the philosophical needs of the individual schools. In years 2005-2007, there were distinct differences in curricular approaches concerning time allocation to subject matter. Both schools continued to utilize the PLC professional development model and met monthly. School 1 enhanced its non-core curriculum and added minutes to non-core classes. School 2 maintained a strict focus on core curriculum. Table 4.1 provides the demographics for each school from 2004-2007.

Table 4.1
School 1 and School 2 Demographic Profile

Demographic	School 1	School 2
Year 2004		
Total Enrollment	33	32
% Male	53	60
% Female	47	40
% SES	51	44
% IEP	7	7
% African American	2.2	.8
% Hispanic	3.7	4.9
% Caucasian	85.8	91.8
% Native Indian/ Alaskan Native	6.7	0.0
% Pacific Islander	1.5	2.5
Year 2005		
Total Enrollment	37	31
% Male	50	60
% Female	50	40
% SES	52	39
% IEP	25	14
% African American	2.2	.8
% Hispanic	3.7	4.9
% Caucasian	85.8	91.8
% Native Indian/ Alaskan Native	6.7	0.0
% Pacific Islander	1.5	2.5
Year 2006		
Total Enrollment	36	30
% Male	49	55
% Female	51	45
% SES	49	34
% IEP	8.2	6.1
% African American	2.2	.8
% Hispanic	3.7	4.9
% Caucasian	85.8	91.8
% Native Indian/ Alaskan Native	6.7	0.0
% Pacific Islander	1.5	2.5
Year 2007		
Total Enrollment	44	38
% Male	51	57
% Female	49	43
% SES	57	32
% IEP	8.7	7.2
% African American	2.2	.8
% Hispanic	3.7	4.9
% Caucasian	85.8	91.8
% Native American	6.7	0.0
% Pacific Islander	1.5	2.5

Note. % SES refers to socioeconomic status of students, or the percentage of students who are eligible for free and reduced lunch; % IEP refers to percentage of students classified as special needs

After gathering data from the two schools, a chi-square analysis was conducted on the leading indicators of education outcomes to determine if there were any differences. Table 4.2 demonstrates that over a four year period, there were no significant differences in the areas of enrollment, gender, SES, IEP, or race. After conducting the chi-square test on leading educational indicators, data shows no significant differences between School 1 and School 2 from the years 2004-2007. No significant differences were found for gender ($X^2 = 0.017$, $p = 0.8965$), ethnicity ($X^2 = 2.294$, $p = 0.6819$), IEP ($X^2 = 1.356$, $p = 0.2442$), or SES ($X^2 = 0.271$, $p = 0.6026$). Therefore, gender, IEP, SES, and ethnicity proportion were the same between School 1 and School 2.

Table 4.2
School 1 and School 2 Chi Square Analyses Years 2004-2007

Chi-Square Analyses	<i>df</i>	X^2	P-value
Enrollment	3	.741	$p=.864$
Gender	3	.017	$p=.8995$
SES	1	.271	$p=.6026$
IEP	1	1.356	$p=.2442$
Race	4	2.294	$p=.6819$

Note. “Race” refers to total population of African American, Hispanic, Caucasian, Native Indian/ AK Native, and Pacific Islander; % SES refers to socioeconomic status of students who are percent eligible for free and reduced lunch; % IEP refers to percentages of students classified as special needs; % LEP refers to the percentage of students with limited English proficiency.

Treatment Fidelity

Over the course of the four years in which data were collected, the demographics of the schools remained similar, but the curriculum and number of minutes spent per subject area varied tremendously. Table 4.3 describes the number of minutes a week that both schools allocated per subject area. During the 2004 school year, both schools used similar curricular and time allocation approaches to subject matter. However, during the 2005-2007 school years, School 1 moved toward a more comprehensive curricular model, while School 2 intensified the core curriculum time, otherwise known as the No Child Left Behind model. The Comprehensive Education Curriculum (CEC) reduced the number of minutes in core curriculum and increased non-core curriculum time.

Table 4.3
Weekly Minutes of Instruction

	Time Allocated 2004 School 1	Time Allocated 2004 School 2	Time Allocated 2005-2007 School 1	Time Allocated 2005-07 School 2
Math	240	240	240	180
ELA	240	240	240	180
Spelling	120	120	120	110
Reading	200	200	200	180
Social Studies	160	160	120	120
Art	120	120	100	180
PE	120	120	100	180
Recess	40	40	30	60
Computers	100	100	70	110
Library	80	60	70	80
Health	80	80	100	120
Science	220	240	240	180
Music	80	80	70	120

School 1 and School 2 Achievement Score Differences

Planned comparison t-tests were used to examine differences between School 1 and School 2 each year for both math and reading. To maintain familywise error rate, Bonferroni correction was used to adjust alpha (.05/4) to 0.0125. Table 4.4 provides the results from the planned comparisons conducted to determine significant school differences between math and reading scores by year. The only significant school difference found for math or reading in any year was in 2004, with School 1 scoring significantly higher than School 2 in math ($p=0.00451$).

Table 4.4
School 1 and School Math and Reading Criterion Reference Test Score Differences

Year	Test	School 1 (X)	SE	School 2 (X)	SE	p-value
2004	Math	320.27	9.555	274.82	12.203	$p=0.004$
2004	Reading	281.76	9.223	312.21	10.479	$p=0.032$
2005	Math	279.24	8.389	318.96	16.504	$p=0.039$
2005	Reading	287.33	8.537	306.38	12.137	$p=0.191$
2006	Math	291.18	9.364	325.61	13.118	$p=0.034$
2007	Reading	298.67	9.139	321.52	11.136	$p=0.115$
2007	Math	310.98	8.352	337.84	11.670	$p=0.060$
2007	Reading	311.11	7.464	334.89	10.395	$p=0.061$

Note. Alpha = $0.05/4 = 0.0125$

CHAPTER 5

CONCLUSIONS

This chapter discusses the results of the study as well as describes school demographics, curricular approaches, and differences in CRT math and reading scores. The chapter also discusses the limitations of the study and suggests future research. Conclusions of the study are provided last.

School Demographics

This study compared two rural Nevada Elementary Schools located in the same school district. Both schools used the same academic calendar, the Professional Learning Communities professional development model (teachers from both schools met and planned out their classroom teaching calendars), and the same testing calendar. Additionally, the school demographics mirrored each other. During the 2004 school year, both schools used the No Child Left Behind (NCLB) curricular model which included increasing core curriculum and decreasing and at times eliminating non-core courses and elective activities. Administrators believed that they could meet Annual Yearly Progress (AYP) state mandates using this curricular model. During the 2005-2007 school years, the schools moved philosophically in opposite directions. School 1 utilized a comprehensive educational curriculum (CEC) model that stressed a balanced educational curriculum approach in which students were provided increased time devoted to physical activity, music, art, and computer access.

School administration provided a detailed class schedule which identified allocated minutes to each subject area for 3rd and 5th graders in each school. Table 4.3 demonstrated the curricular approaches utilized by each school to meet AYP in the areas of math and reading. School 2 increased its time spent on math to 260 minutes per week and at the same time increased its reading time to 220 minutes per week. Art, music, and physical education allocations were reduced to 260 minutes per week. School 1 focused on improving the entire curriculum and actually increased time spent in art, music, and physical education to 480 minutes per week. This is almost twice the time spent by School 2. Interestingly enough, after 2004, when curriculum time allocations were the same, there were no significant differences identified even though School 2 reduced the number of minutes dedicated to the subject areas of math and reading (see Table 4.4).

The two schools were classified as rural based on the geographical location of the communities they served, lack of that community's conveniences, and the fact that these schools were small. These elementary schools both have a student population of under 500 students.

School 1 and School 2 Curricular Differences

Again, the purpose of this study was to examine math and reading CRT differences in two rural elementary schools using vastly different curricular models to address NCLB. As Table 4.3 shows, while both schools sought higher student achievement, they used different approaches to attain that goal.

School 1 focused on meeting NCLB by increasing the time allocated to material that was being tested. Essentially, its mission was to prepare kids to pass tests. Table 4.3 describes the process by which School 1 undertook the process. In looking at the core areas, School 1 maintained its focus by dedicating between 220-240 minutes per week to a core curriculum that included math, science, reading, and language arts. In doing so, School 1 "borrowed" minutes from non-core subjects such as music, art, and physical education.

School 2 took a comprehensive approach to its curriculum, focusing on the student holistically instead. In year one, both schools used the same curricular approaches and committed similar curricular time for curriculum (see Table 4.3) and focused primarily on the core subject matter. In years 2-4, School 2 used the Comprehensive Education Curriculum (CEC) to improve student achievement and meet the needs of its students. Table 4.3 demonstrates that the curricular approaches for School 2 included increased time in physical activity (180 minutes per week), art (180 minutes per week), and music (180 minutes per week). School 2 took educational time away from core subject matter and added it to non-core subject material. This curricular approach was instituted despite the NCLB curricular trend to meet Annual Yearly Progress (AYP).

In 2004, both schools allotted 200 minutes per week for reading with an additional 240 minutes per week dedicated to English Language Arts (ELA), and another 120 minutes per week for spelling. In math, both schools allotted 240 minutes per week. In 2005-2007, School 2 took a different approach and allotted 180 minutes per week for reading and an additional 180 minutes per week for ELA, and another 110 minutes for spelling. Minutes that were removed from core subject matter were placed in curricular areas such as art, music, and physical education for the purpose of developing a CEC program. School 1

remained static in its approach to curriculum and focused solely on its core curriculum over the course of the research.

School 1 and School 2 Math and Reading Differences

The 2004 results showed significant math score differences ($t = -2.942, p = .0045$) existed between School 1 and School 2 with School 2 demonstrating a higher mean math test score. Possible reasons for the difference in math scores could be either a strong math teacher in a particular class or a strong math group in the 3rd or 5th grade in School 1. In contrast, the 2004 reading tests demonstrated no significant difference existed ($t = -2.185, p = .0325$). Possible reasons for the lack of significant difference could be that reading programs mirrored one another in both curriculum and time allocation.

When curricular changes were implemented by School 1 in 2005, no significant values were detected regarding math ($t = -2.145, p = .0390$) or reading ($t = -1.332, p = .1913$). It is interesting that during the 6-month block of educational time in which curricular changes were instituted, no significant difference was identified between School 1 and School 2 when students were given the CRT. During the 2006 school year, students were again given the CRT in February. After 15 months using the CEC curricular model, students from School 1 again scored at levels similar to those students using the NCLB curricular model. There was no significant difference in math ($t = -2.156, p = .0390$) or reading ($t = -1.594, p = .1159$). Finally, in 2007, the CRT was given in February to 3rd and 5th grade students in School 1 and School 2. After over two years using the CEC curricular model, no significant differences were discovered in math ($t = -1.908, p = .0600$) or reading ($t = -1.893, p = .0619$).

Figures 4.1 and 4.2 both provide an interesting look at the trends in the areas of math and reading mean scores. Both mean scores trend upward with School 1 having a higher mean score on the CRT math and reading tests throughout the four year cycle. This finding suggests that while curriculum strategies changed dramatically between the years of 2005-2007, the CRT results between School 1 and School 2 were not significantly different. The results are important because they demonstrate that students who were provided additional time for core curriculum did not score significantly higher on the CRT math and reading tests than those who received a CEC curricular approach.

While common theory and practice suggests that additional time and practice in an area promotes greater understanding and thus increased test scores, this research suggests that it is not the

quantity of time spent on core curriculum that leads to improved test scores. Instead the allocation of time that allows students to have a comprehensive educational approach also allows them to maintain their test scores at adequate levels. Meeting students' needs in both core and non-core subject areas is a balancing act. It is a fluid act and should be reviewed so that student educational outcomes are based on maximal performance indicators without sacrificing areas that directly affect the overall student. Thus, these data do not support the theory that more allotted core time leads to increased test scores. That theory leads to a skewed approach and should be viewed carefully when determining if the reward is really worth the losses from the reallocation of teaching time.

A recent youth obesity study conducted nationwide found that more than 16 percent of children ages 10-17 were not just overweight, but obese. This is an alarming figure as schools are increasingly cutting activity time for their students to meet the demands of unfunded federal mandates. In the federal Healthy People 2010 initiative, childhood obesity levels were set at 5%. Only the population of girls in Montana even came close to achieving this standard. Dr. Joe Thompson, the director of the Robert Wood Foundation stated that reasons such as fast food, neighborhoods without sidewalks, television, video games, and schools neglecting physical education were partial causes of the rise in obesity levels.

Additionally, Roberts et al (2009) found that math and language scores are affected by both Body Mass Index (BMI) and fitness levels. On the California Achievement Test 6, the difference between the math and language were separated by approximately 15 percentile points when using the BMI and fitness level index. Increasing activity is a strategy for improving achievement levels in schools. It would seem prudent at a time when student performance stakes are so high, to use measures that have been found to work.

Limitations and Future Research Needs

This study involved the Criterion Reference Tests (CRT) used by the state of Nevada to determine progress by 3rd and 5th grade students. The first limitation is that only one tool was used to measure student progress. While one test allows a glimpse of student progress, it fails to look at the growth of the child in a social, physical, or spiritual level. While the sample size limits generalizability, the study did have appropriate demographic comparability between schools and the findings definitely support the need for future research.

The reliability of this dissertation was not strong due to the rural setting and the low n number. “Reliability” refers to the extent that a measure of a research - such as working with two rural schools - would deliver the exact same results no matter how many times it is was applied to random members of the same target group. In this case, due to the demographics and location of the two schools, reliability of this project is a weakness. In this educational setting, reliability estimates of a question, or set of questions that together are posited to be a measure of a certain concept, can take several forms, including test-retest and split-half reliability testing.

Validity of this dissertation revolved around the external validity, which generalizes this project for other schools. This is generalizable to other rural schools in the State of Nevada. It is not a national or even regional project and so it lacks external validity outside the state. The construct validity is very strong, as it uses a recognizable measure to determine student achievement differences stemming from two models of curriculum. The internal validity of this dissertation remains the strength due to the teachers at the two schools meeting monthly to talk about curricular mapping techniques and best practice strategies. Both schools have 100% highly qualified staff, which meant competent teachers were teaching subject matter. Finally, when viewing the conclusion validity, one must pause because there are so many factors related to student achievement and student testing. Can we say that either educational model is solely responsible for testing gains and losses? Because testing is so subjective and there are so many extraneous variables, the response would have to be no.

Future research should continue to examine subject matter allotment, contact time, and its relationship to student academic performance. These data are essential to school policy makers like, school boards, superintendents, administrators, and politicians as curriculum debate continues.

Conclusions

Current trends find public education veering away from non-core curriculum because it detracts from the mission of improving student achievement levels. The public clamors for higher test scores, and a tremendous pressure from state and local leaders has been placed on school officials struggling to provide the highest level of education possible. Current trend has led administrators to reduce and sometimes even eliminate non-core subject matter in attempt to improve test results. Dr. James F. Sallis (2010) made this same point regarding physical activity levels in school when he stated that “there

appears to be a prevalent myth among education officials that spending time on physical education and physical activity is an unaffordable luxury for schools being pressured to improve academic performance” (2010).

The task of bridging the NCLB achievement gap at times seems overwhelming for educators and communities. Comprehensive education curriculums create compelling reasons other than their impact on student academic achievement to be promoted. The California Department of Education has spent time and resources linking non-core curriculum and academic performance. Research (e.g., Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Dwyer et al., 1983; Linder, 1999; Linder 2002; Shephard, 1997; Tremblay et al., 2000) supports the idea that physical activity levels and academic performance are linked to one another. These studies lend themselves to the theory that we may actually be harming students by cutting back on the time allotted for non-core curriculum. The benefits of increased activity levels to children are numerous and include increased brain function and nourishment, increased ability to concentrate, and increased self-esteem (Cocke, 2002; Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Tremblay, Inman, & Williams, 2000; Shephard, 1997).

The No Child Left Behind Act placed increased burdens on failing schools and required them to adjust their input mix. Such adjustments may very well cause some failing schools to become less efficient in the delivery of educational services. If that occurs, then it seems likely that it will become more difficult for those schools to reach the goals prescribed by NCLB, requiring more adjustments of their input mix, further exacerbating their problems. At a minimum, failing schools are going to require more resources so they can make the adjustments necessary under NLCB without impairing their ability to provide educational services. In the current political environment, one has to wonder if the public will be willing to divert more resources to already failing schools.

In April 2010, the U.S. Department of Health and Human Services, Centers for Disease Control, and the National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health (2010) recommended that further research should examine the relationship between school-based physical activity and academic performance in subpopulations including gender, race, and SES.

The following limitations are based on the financial resources our country dedicates to the education system. It is obvious that the education system has never received adequate funding for the programs it is required to operate. Let us be mindful of the fact that we should make a priority of creating the leaders of the future. The financial analyses that were conducted across the United States allowed leaders to get a glimpse of what is financially needed to accomplish what has been requested and mandated. Even more pressing than a mandate is the need to raise a generation of children who are strong mentally, spiritually, socially, and physically.

The education system which we operate under, and the children within its realm, should be allowed to have services that develop a person as a whole. School leaders should not have to choose between two good things because our system will not allow both to occur. The arts, music, and the physical education of young people should not be eliminated because the costs to remediate problems associated with academic achievement are so great.

Testing data are currently being used to determine individual needs of students within the framework of the educational process. Those students not meeting minimum standards are then provided additional measures to ensure minimal mastery levels. Lazear (2006) believes NCLB was developed so that those students who struggle the most get the most help. He demonstrated that by narrowing the field of education students have a greater opportunity to learn basic skills needed to survive in society. In direct opposition to this supposition lies the idea that while raising the educational bar may create greater gains in a large number of students, it may in fact do real harm to those students in the bottom quartile of education who have no real chance of attaining the skill levels demanded by NCLB legislation without additional resources (Lazear, 2006). The end result is that programs that might help students perform at higher levels, or simply learn life skills, so that a majority of students can pass tests about rote knowledge of core curriculum might be taken away. Ultimately, public education then leaves behind a group that really needs skills to survive and work in society.

Ultimately then, this study supports the premise that students can be provided with a comprehensive educational curriculum and still maintain their scores on the Criterion Reference Tests (CRT). Additionally, taking away from non-core subject matter may be harmful to students as the United States is faced with an obesity crisis. This research is crucial because school boards, school

superintendents, and administrators may utilize this data to drive their curricular decisions when determining academic schedules. Knowledge that students can maintain test scores while also taking diverse curriculum enables schools to use data to drive curricular decisions. This study enables educators to maintain or even increase current levels of physical activity while still meeting educational standards.

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