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Comparative Outcomes Of The Clark County School District Year-Round And Nine-Month Schools (Nevada)

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COMPARATIVE OUTCOMES OF THE CLARK COUNTY SCHOOL DISTRICT YEAR-ROUND AND NINE-MONTH SCHOOLS

by

Judith Susan Costa

A dissertation submitted in partial fulfillment
of the requirements for the degree of

Doctor of Education

in

Educational Administration

Department of Educational Administration
and Higher Education
University of Nevada, Las Vegas
April, 1987

The dissertation of Judith Susan Costa for the degree of Doctor of Education in Educational Administration and Higher Education is approved.

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University of Nevada
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April, 1987

ABSTRACT

This study compared achievement in reading, mathematics, and language of elementary students attending traditional-calendar nine-month schools with the achievement of elementary students on the 45-15 staggered plan in year-round schools. Also investigated were attendance and enrollment data for elementary students in both types of schools, and teacher evaluation of their respective schools for both types of schools.

To conduct the investigation of achievement effects, an ex post facto criterion-group design was used. The two criterion groups were the two school types--year-round and nine month; the dependent variables were mean school achievement test scores in reading and mathematics (on district-developed criterion-referenced tests at grades two through six and commercially produced norm-referenced tests at grades three and six), and language (on norm-referenced tests at grades three and six). For the analysis of attendance, the average annual percent attendance was calculated for both types of schools by dividing average daily attendance by average daily membership. Further analysis of year-round school attendance was conducted by adjusting this ratio to take into account reduced summer enrollment. Teacher attitudes about their schools were compared via their respective mean rating of five Elements of Quality which described school environment or climate.

The school sample consisted of seventy-five elementary schools, sixth-grade centers, and middle schools in the Clark County School District in Las Vegas, Nevada. The school was the unit of analysis, with the school score for each dependent variable consisting of the mean score for all students at a particular grade level on a particular test. The analysis of attendance data and teacher opinionnaire data also used the school as the unit of analysis.

An analysis of covariance using student socioeconomic status, percent minority students, and student "school ability" as the covariates, school structure as the independent variable, and mean school test scores in reading, mathematics, and language as the dependent variables was conducted. No consistent statistically significant differences were found in favor of either type of school, although a statistically significant difference in favor of the nine-month schools was found in six out of ten comparisons at grade three. Attendance at year-round schools was found to be only slightly lower than that at nine-month schools before adjustment was made for the effects of reduced summer enrollment. However, adjustment for this phenomenon showed substantially reduced summer attendance at year-round schools. Teacher opinionnaire data showed no difference in favor of either type of program.

The following recommendations were offered: (1) that the district could proceed with year-round schooling without concern for detrimental effects on achievement; (2) that summer enrollment patterns should be studied, with subsequent action taken, if

necessary; (3) that the study of achievement effects should be expanded over a longer time period; (4) that a study of achievement using attendance as a covariate should be conducted; (5) that a study of the effects of absenteeism on students in the two types of schools should be conducted; and (6) that the factors contributing to a reduction in summer enrollment and the variability in these factors from school to school should be examined.

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CHAPTER 1

Introduction

The idea of an extended school year, recently put forth as an antidote to the mediocrity of American education by the National Commission on Excellence in Education in its report A Nation At Risk (1983), is not new. In the middle of the nineteenth century, a few school districts throughout the United States were experimenting with variations on the now-customary nine- or ten-month schedule in order to provide opportunities for instructional innovations and flexibility; optimal utilization of facilities, with accompanying reduction of capital investment; and expansion of educational alternatives for students. However, for various reasons the concept did not catch on, and by 1915, most schools in the nation were operating on a traditional-calendar schedule (TCS) (Saville, 1970).

By 1925, schools were again turning to the extended school year, but this time the reasons were almost solely economic, and the practice did not survive the pressures of the Depression. The post-World War II baby boom provided the impetus for another surge in the demand for extended-year or year-round schooling (YRS) in the late 1940s and early 1950s. This time, however, the demand was short-lived, subsiding as soon as the population boom was accommodated (Saville, 1970).

The next wave of interest in YRS began during the late 1960s and early 1970s, when increasing numbers of school districts began to consider the possibilities of YRS as an alternative to more traditional patterns in education (Hollingshead, 1975). For a majority of these districts, the most important factor behind their consideration of the year-round calendar lay in its potential to prevent or reduce further capital outlay or public indebtedness at a time of rapid enrollment growth and already-crowded conditions (Heller & Bailey, 1976). However, during the second half of the 1970s, this interest diminished, even though evaluation of existent YRS programs revealed no negative effects. The number of YRS programs began to decline until only sixteen states were offering some kind of YRS in 1980, a decline of almost fifty percent from the mid-1970s' figures (National Council on Year-Round Education [NCYRE], 1981). Many of the states and districts that discontinued YRS did so because of projected declines in the school-aged population for the next five years and because of the administrative difficulties associated with the year-round schedule (Baker, 1978).

Today, YRS continues to be a viable educational alternative mainly in those Sun Belt cities where population is expanding rapidly. Recently, the Los Angeles Unified School District--the second-largest in the country--announced plans to convert all of its 618 schools to YRS in the next five years in order to accommodate the school overcrowding attributable to the population shift in tandem with a tide of immigration into that area (Gottschalk, 1986).

However, in the face of a growing need for YRS on an economic basis, there exists little evidence of its educational advantageousness. For instance, of twenty-five reports on YRS prepared during the 1970s both by individual school districts and by centralized institutions such as the Education Commission of the States, only twelve discussed the effect of YRS on direct or indirect measures of student achievement (Muzio et al., 1977). Results of these studies were summarized as follows:

1. A substantial portion of the educational literature on year-round schools was concerned with delineation of process rather than product.

2. The methodology employed in most of the studies which did attempt to discover achievement differences was not sufficiently rigorous to warrant faith in the conclusion of those studies.

3. Outcomes of those studies with reasonably sound methodology indicated that learning--as measured by criterion- and norm-referenced achievement testing--was comparable under the two different school schedules (Muzio et al., 1977).

Statement of the Problem

It was the purpose of this study to determine if there were different achievement effects, attendance patterns, and teacher support for school programs for year-round and nine-month schools. With this general purpose, data collection and analysis were designed to provide the information necessary to answer the following questions:

1. Are there significant differences in student achievement scores in reading, mathematics, and language at year-round schools compared with those at nine-month schools, which cannot be accounted for by differences in student ethnic distribution, student socio-economic status, and student "school ability"?

2. What are the attendance patterns of year-round school students compared with those of nine-month school students?

3. How do teachers at year-round schools evaluate their respective schools compared with teachers at nine-month schools?

Hypotheses

The null hypotheses to be tested were:

1. There is no statistically significant difference ($p \leq .05$) between student achievement scores in reading at year-round and nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

2. There is no statistically significant difference ($p \leq .05$) between student achievement scores in mathematics at year-round and nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

3. There is no statistically significant difference ($p \leq .05$) between student achievement scores in language at year-round and nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

Research Hypotheses

From the above null hypotheses and the preliminary findings of informal studies of attendance (Bundren, 1985) and student achievement at year-round schools (Matty, 1978; Johnson, 1984), the following research hypotheses were derived:

1. Student achievement scores in reading are statistically significantly lower ($p \leq .05$) at year-round schools than at nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

2. Student achievement scores in mathematics are statistically significantly lower ($p \leq .05$) at year-round schools than at nine-month schools, when student ethnic distribution, student socio-economic status, and student "school ability" are accounted for.

3. Student achievement scores in language are statistically significantly lower ($p \leq .05$) at year-round schools than at nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

Significance of the Study

Although total public school enrollment has experienced a steady decline on a national basis since 1971, in the Sun Belt school enrollment has increased due to a shift in population and a flood of immigration to that area. For instance, in Los Angeles schools, student enrollment rose from 534,000 in 1980 to 579,000 in 1986 (Gottschalk, 1986). Similarly, the Clark County School District, the nation's nineteenth-largest school district, experienced a steady rise throughout the 1970s and early 1980s in the number of students

enrolled--particularly in the lower grades--and predicted an increase of over 8,000 students in grades K-6 between 1985 and 1990 (Nevada Development Authority, 1985).

These two factors--the population shift and immigration--together with increasing demands on public dollars (Bayles, 1979) and the shifting of the education funding burden from the federal government to state and local governments (Shanker, 1986) have resulted in an increasing interest in YRS. Both educators and the general public are turning to YRS as an alternative to new school construction (Gottschalk, 1986).

For example, in the Los Angeles Unified School District, the second-largest in the nation, twenty-five percent, or 130,000, of its students were already attending year-round schools at the end of 1985, and the school board requested that school officials initiate plans to convert all remaining district schools to the year-round schedule within the next five years (Gottschalk, 1986). In the Clark County School District, fifteen of seventy elementary schools, housing approximately one-fourth of the district's elementary school population, had been converted to the year-round schedule by 1984-85 to alleviate overcrowding in the wake of a series of defeated bond issues.

However, in the face of this growing tendency to select the year-round schedule as a means for accommodating growing numbers of students to be housed, the need for examining the educational consequences of this alternative became fairly urgent. In addition to the primary impetus for turning to YRS, which was the largely

uncontested notion that capital outlay for new construction would be drastically reduced (Hollingshead, 1975), a second contention often offered in support of YRS was the largely unsubstantiated belief that continuing instruction all year long would eliminate/reduce the hypothesized forgetting/learning loss that occurred during the summer months (New York State Education Department, 1978). This conclusion was supposed to be especially true for disadvantaged students whose home life and experiences did not introduce new adventures/experiences and mental stimuli during the long, hot summer months (Gottschalk, 1986). Language-minority students were another group of students for whom the presumed benefits of YRS were great, in that acquisition of the new language could be continuous (Gottschalk, 1986).

However, although in theory such continuous instruction served to reduce "summer learning loss," this belief remains empirically unsubstantiated. A brief review of the literature on the effects of YRS on achievement failed to find evidence in support of that claim; it even failed to find many studies designed to yield evidence for or against (Muzio et al., 1977). This review of literature included approximately twenty-five reports prepared both by individual school districts and by centralized institutions. Of these reports, only twelve discussed the effect of YRS on direct or indirect measures of student achievement, although some of these studies reported achievement data from several districts (Muzio et al., 1977).

In general, the literature reviewed suggested that YRS should be advantageous educationally because:

. YRS reduced summer learning loss;

- YRS reduced the lost learning time of the first and last school months incurred under traditional calendar schedules;
- YRS provided increased opportunity for individualized schedules;
- YRS offered greater flexibility and opportunity for instructional improvement; and
- YRS offered additional time for remediation or enrichment (Costa, 1981).

However, reported outcomes did not document posited advantages, nor was the methodology of YRS evaluation sufficiently rigorous to warrant confidence in outcomes, whether positive or negative. Muzio et al. (1977), in Year-Round Education: Operations Notebook 15, discussed these methodological problems and concluded that, as with other educational innovations, "the effect of YRE on students is seldom systematically assessed and/or reported" (p. 27). The variety of variables which contributed to differential achievement outcomes was not held constant, thus precluding the identification of any particular variable as an agent of change. In addition, of twenty-one reported comparisons of achievement between year-round and traditional-calendar programs, only one reported statistically significant gains for YRS, and that study reported that the gains, though statistically significant, were not educationally significant. Half of these reports indicated no advantage for either program. Other studies reported slight differences for YRS or TCS which were not statistically significant or which were not observed at all grade levels (Muzio et al., 1977).

More recent studies, though few in number, have begun to employ quasi-experimental research designs and to report achievement effects that favor the nine-month rather than the twelve-month calendar. For example, a 1978 comparison by Matty of algebra achievement for ninth-grade students in TCS and YRS found significantly higher achievement for the TCS students. Similarly, a 1984 study by Johnson of achievement and attendance in Los Angeles year-round schools found significantly higher mathematics achievement and significantly higher attendance in TCS than in YRS.

In summary, throughout the literature on YRS there was a lack of concern and conclusion about the effect of YRS on student achievement, a lack of rigor in evaluation design, and a pre-occupation with the details of YRS implementation and operation. In much of the literature, a "How Can We Do It?" and "How Can We Sell It to the Community?" focus displaced emphasis on the objective measurement of achievement outcomes, thereby precluding formulation of an answer to the real question: What are the academic effects of YRS in comparison with those of traditional-calendar schedules? (Costa, 1981).

Perhaps the most relevant material for providing a theoretical framework in which to compare school outcomes of YRS and TCS was social systems theory, an application to the social sciences of Bertalanffy's formulation of general systems theory as a mechanism for understanding process and product (outcome) in the biological and other physical sciences (Owens, 1981). According to Boulding and Buckley, who first broadened Bertalanffy's general systems theory

by using its concepts to describe social organizations, education is a system which can be described in terms of its inputs, processes, and outputs, as are other systems. Owens (1981, p. 64) presented the following diagram of education as a social system involving inputs, processes, and outputs:

SCHOOLING AS AN INPUT-PROCESS-OUTPUT SYSTEM

INPUTS FROM SOCIETY	EDUCATIONAL PROCESS	OUTPUTS TO SOCIETY
Knowledge Values Goals Money	Structure (for example, grade levels, classes, school levels, departments, organizational hierarchy) People (for example, teachers, bus drivers, counselors, coaches, custodians, supervisors, dieticians, administrators, nurses) Technology (for example, buildings, class schedules, curricula, laboratories, libraries, chalkboards, books, audio-visual equipment, buses) Tasks (for example, teach classes, serve food, run buses; administer tests; account for funds; stewardship; supervise personnel; conduct extracurricular program)	Individuals more able to serve themselves and society because of improved . Intellectual and manual skills . Powers of reason and analysis . Values, attitudes, motivation . Creativity and inventiveness . Communication skills . Cultural appreciation . Understanding of the world . Sense of social responsibility

According to Owens (1981), the most important advantage of applying social systems theory to educational organizations was its refusal to deal with cause and effect on a simplistic basis. The concept of multiple causation, a central concept in systems theory, counterbalanced our cultural tendency to ascribe single causation to phenomena, when

"in fact, the causes of even relatively simple organizational events are often very complex" (Owens, 1981, p. 62). In particular, the central component in this system was relevant to the consideration of the effects of YRS. Educational process, as defined in the diagram above, included structure, people, technology, and tasks. It was apparent that with the variation of only one of those process elements--structure--the outcome of the educational process would change. Based on the implications of this aspect of social systems theory, it was our contention that educational achievement--a dependent variable reflecting the intervening variable of learning--would decline with the introduction of YRS.

In the Clark County School District, the concept of YRS was first introduced on a pilot basis in January, 1973. The acknowledged objectives of the pilot program were:

1. maintenance of student achievement at a level commensurate with that of similar district students at nine-month schools;

2. provision of educational alternatives which would maintain or increase student attendance;

3. inculcation in students of favorable attitudes toward school and education;

4. development of curricular modifications which would amplify options for individualizing instruction; and

5. maintenance of favorable attitudes among staff and parents toward the year-round concept (Hollingshead, 1975).

At the end of two and one-half years of operation, this program was found to be meeting all these objectives, with the exception of attendance. There was, however, no evidence of improved achievement,

and the conclusion was drawn that the promise of non-traditional vacation schedules and reduction of capital outlay for new school construction were more tenable arguments for YRS implementation than was improved achievement or attendance (Hollingshead, 1975).

Despite this half-hearted endorsement of YRS, within five years two additional schools had been converted to YRS--both purportedly to relieve overcrowding in the school and prevent new construction. A second district study (Costa, 1981) of the effects of YRS after conversion of the two additional schools to YRS concluded that:

> Carefully implemented YRS can be and is primarily an effective means of accommodating increased student enrollment with additional school construction. At the present time, it has not been shown either to enhance or to reduce academic achievement, although it customarily brings about changes in instructional practice (p. 22).

Between 1983 and 1985, an additional twelve district elementary schools were converted to YRS to accommodate growth in the district's enrollment, until by June of 1985, fully one-fourth of the district's elementary school population was attending school on the year-round schedule. Further study of the achievement effects was not planned; however, in July, 1985, test results for the year-round schools on the third-grade administration of the Stanford Achievement Test, 1982 Edition, came in lower in every subtest area by one to three percentile points than results for the district's nine-month schools. Initial cursory analysis of test results showed that the lower results at YRS did not seem to be accounted for by differences in student ethnic distribution, percent of language-different students, or percent of students receiving Aid to Families with Dependent Children (AFDC). Although there were no immediate plans to expand the

number of year-round schools, the district's continuing reliance on the year-round schedule for a large segment of the elementary population strongly suggested that the problem warranted further study.

Assumptions

The following assumptions were made in the design of this study:

1. Test scores from nationally standardized achievement tests and locally developed achievement tests reflected actual learning outcomes.

2. Whatever invalidity existed in districtwide test scores was randomly distributed throughout the school population.

3. The Clark County School District (CCSD) year-round program was representative of the year-round programs of other districts nationwide.

4. Student socioeconomic status, ethnic distribution, and "school ability" were related to achievement.

5. Other process variables which affect the outcomes of education, such as curriculum or method of instruction, did not vary systematically between the two groups of schools.

6. Enrollment declines which customarily took place during summer months made it necessary to adjust the calculation of percent attendance for the twelve-month schools to account for the declines.

Delimitations of the Study

The study was delimited in the following ways:

1. Outcome data for elementary schools (nine-month and year-round) in the CCSD only were collected.

2. Data were collected for the years 1984-85 and 1985-86 only.

3. Reading achievement was measured by the Total Reading score on the Stanford Achievement Test for students in grades three and six, as well as by scores on the CCSD Reading Criterion-Referenced Tests in grades two through six.

4. Math achievement was measured by the Total Math score on the Stanford Achievement Test for students in grades three and six, as well as by scores on the CCSD Math Criterion-Referenced Tests in grades two through six.

5. Language achievement was measured by the Total Language score on the Stanford Achievement Test for students in grades three and six.

Research Design

1. Student Achievement - Using an ex post facto criterion-group research design and an analysis of covariance, student achievement was analyzed using student demographic factors, including percent of minority students, percent of students receiving AFDC, and student "school ability" as covariates, with school structure (YRS or TCS) as the factor whose effect was examined. Scaled scores in Total Reading, Total Math, and Total Language on nationally standardized norm-referenced tests (NRTs) administered in grades three and six on a districtwide basis were used as the dependent variables, as were, in a separate analysis, percent correct scores in reading and mathematics on district-developed criterion-referenced tests (CRTs) administered to all students in grades two through six. All test scores were obtained from the CCSD Research and Development

Department's records, which contained microfilmed records of test results from 1970-71 to the present.

2. Attendance - Student attendance percentages for the nine-month schools were calculated by dividing average daily attendance (ADA) by average daily membership (ADM), or enrollment, for the entire school year. Unadjusted student attendance percentages for the year-round schools were calculated in the same manner (ADA divided by ADM). However, in order to determine if reduced summer enrollment had the effect of obscuring reduced summer attendance, an adjusted student attendance percentage was also calculated. For this calculation, ADA for the entire year was divided by the average ADM for the seven attendance periods representing the traditional September-through-May school year, multiplied by a factor of ten (because there were ten attendance periods all together, including the three summer attendance periods, for the year-round schools). All attendance data were provided by the Student Accounting Section of the CCSD Accounting Department. Data were gathered for the years 1984-85 and 1985-86.

3. Teacher Evaluation of School Program - Teachers rated five dimensions of elementary schools on a scale of 1-4, with "1" indicating the most unfavorable response and "4" indicating the most favorable response. Mean scores were compared for the nine-month schools as a group as opposed to the year-round schools as a group, for each aspect or dimension rated on the questionnaire, and for 1984-85 and 1985-86. Data were provided by the CCSD Research and Development Department, which has compiled these statistics annually at the request of the district's Elementary Education Division.

4. Parent opinionnaire results, which were originally to be included in the study, were not examined. These opinionnaires were administered at the end of the first quarter of each school year, thereby rendering doubtful their classification as an "outcome measure."

Definition of Terms

The following terms were used in the study as they are defined below:

Year-Round Schooling (YRS): A school attendance pattern whereby student attendance occurs during a twelve-month period rather than during the nine-month, September-to-June traditional-calendar school year, although total attendance time per student does not exceed 180 days (Pelavin et al., 1978).

Traditional-Calendar Schooling (TCS): The nine- or ten-month, September-to-June pattern of school attendance common throughout most of the United States (Pelavin et al., 1978).

The 45-15 Year-Round Plan: A YRS attendance pattern under which there are four attendance groups, or "quads," with each attending school forty-five days (nine weeks) and then "vacationing" for fifteen days (three weeks). At any one time, three attendance groups are attending school and the fourth is on "vacation" (Pelavin et al., 1978).

Type of Year-Round Schedules: There are a variety of calendar schedules which come under the classification of YRS. Those most commonly used, as specified by the National Council on Year-Round Education in its Eighth Annual National Reference Directory of Year-Round Education Programs (1981), include:

1. The 45-15 Block Plan (or 45-15 Single-Track Plan). The 45-15 block plan divides the calendar year into four quarters, each consisting of approximately nine weeks of school followed by three weeks of vacation. This schedule is altered slightly to provide additional weeks of vacation at Thanksgiving and Christmas. On the 45-15 block plan, all teachers and students are in school or on vacation at the same time. The schedule is not designed to save space or accommodate overcrowding; it is designed merely to replace the long summer vacation with several shorter ones. In addition, the "inter-sessions" may be used to provide additional instructional alternatives for students who wish/need to avail themselves of such.

2. The 45-15 Multiple-Track Plan (or 45-15 Staggered-Track Plan). This plan is similar to the 45-15 block plan, except that in the staggered plan students are placed into one of four groups, and their attendance and vacation are rotated so that three groups are in attendance at any one time, while the fourth is on vacation. This provides the capability for a thirty-three percent increase in total enrollment. Teachers are usually assigned to one particular group, or "quad," thus following the track of their students, although they may instead elect to teach year-round on an extended contract.

3. The Flexible 45-15 Plan. The flexible plan is operated on either the block or staggered 45-15 track system, and provides a personalized approach which allows the student to come and go as needed, as long as s/he attends a minimum of 180 days.

4. The 60-20 Plan. A variation of the 45-15 plan, the 60-20 plan provides for three sixty-day (twelve-week) attendance periods

per year, each followed by a four-week vacation period. This plan can be conducted on either a single- or multiple-track basis.

5. The 90-30 Plan. This plan features two ninety-day semesters separated by a thirty-day vacation period, and it may be conducted on either a block- or multiple-track basis. Four groups of students are identified, with any three attending school at one time and the fourth on vacation.

6. The Concept 6 Plan. The Concept 6 Plan breaks the year into six terms of about forty-three days apiece. Students are divided into three groups, one of which is always on vacation. Students must attend four of the six terms, and must attend each two of these four terms in a row. Although this plan falls short of providing the 175-180 days of instruction most states require, the additional time can be made up by extending the school day slightly. This plan has the potential to accommodate up to fifty percent additional enrollment.

7. The Quarter Plan. The Quarter Plan, which was introduced early in this century as the first year-round calendar, divides the year into four twelve-week periods corresponding to the seasons. Students must attend three of the four sessions and may attend the fourth for remedial or enrichment purposes.

8. The Flexible All-Year Plan. This is a fairly individualized plan, whereby school is conducted for 240 days, and the student may attend between 180-240 days, at his/her own discretion.

Criterion-Referenced Test: A test designed to help assess how well a student has mastered specific learning objectives in the curriculum, such as the ablity to work a particular kind of math

problem. Scores on such a test estimate a student's levels of performance on each of the objectives covered in the test and give specific information about the instructional needs of the student. Such a test provides an absolute rather than a comparative measure of performance (CTB/McGraw-Hill, 1987).

Norm-Referenced Test: A test designed to provide a systematic sample of individual performance, administered according to prescribed directions, scored in conformance with definite rules, and interpreted in reference to certain normative information. Some would further restrict the usage of the term "standardized" to those tests for which the items have been chosen on the basis of experimental evaluation, and for which data on reliability and validity are provided (Lennon, n.d.).

Unadjusted Mean Score: A term used in the analysis of covariance process, meaning the actual mean score recorded on a particular test, before the effects of any covariates have been taken into account (Nie et al., 1975).

Average Daily Attendance (ADA): The average number of students present per day, during a particular reporting period, for a particular attendance reporting unit, such as a school or the school district.

Average Daily Membership (ADM): The average number of students enrolled per day, during a particular reporting period, for a particular attendance reporting unit, such as a school or the school district.

Unadjusted Attendance: Attendance percentages calculated by dividing ADA by ADM for the entire school year.

Adjusted Attendance: Attendance percentages calculated to take into account the effects of decreased enrollment during the summer

attendance reporting periods. For this calculation the same numerator--ADA--has been used as for unadjusted attendance, but the denominator has been increased by using the average ADM for the seven September-through-May attendance reporting periods, multiplied by a factor of ten, since there are ten attendance reporting periods all together, including the three summer ones.

Organization of the Study

A brief description of the study follows. Chapter 1 included the introduction, a statement of the problem, an indication of the significance of the study, the assumptions which were made in the design of the study, the delimitations of the study, a description of the method of research used, and definitions of special terms. Chapter 2 consisted of a comprehensive review of the available literature on outcomes of year-round schools. Chapter 3 contained a description of the research procedure to be followed, including data gathering and data analysis. Chapter 4 presented the results of the data analysis and discussion of the results. Finally, Chapter 5 contained a brief restatement of the problem, a summary of the research, the findings, the conclusions drawn, and recommendations concerning further areas for study.

CHAPTER 2

Review of Literature

The available literature from the following areas was reviewed: theoretical bases for the problem, historical reports of the implementation of year-round schooling (YRS) nationwide, and reports of affective, cognitive, and financial effects of YRS throughout the United States. In the review process, the following sources were used: a computerized bibliographic search service, which searched the data bases of both the Educational Resources Information Center (ERIC) and Dissertation Abstracts (Diss Abs); books, newspapers, and periodicals; published and unpublished reports from other school districts; and unpublished reports produced by the author's own district.

Theoretical Base

The theoretical base on which this study was founded was general systems theory, first put forth by Ludwig von Bertalanffy, a biologist, in the 1950s (Owens, 1981). As interpreted by Andre Lwoff in 1966, Bertalanffy's general systems theory viewed an organism as "an integrated system of interdependent structures . . . which must work in harmony" (Owens, 1981, p. 16). If an organization were to be considered an organism, and the human beings and processes making up the organization were to be considered the "interdependent" structures working together in harmony, the resultant product would represent

F. Kenneth Berrien's application of general systems theory to organizational thinking (Owens, 1981).

This concept, which has now received widespread acceptance by theoreticians in all fields of human inquiry, including systems management, has generally been taken to imply, according to Knezevich (1984), that

> complete understanding of a complex organization is not possible by analysis of its separate units in isolation or without due consideration of the relationships and interactions among individual parts (p. 140).

Johnson and associates described a system as an arrangement of constituent parts that were, in their collectivity, designed to bring about a specified objective in a specified way (Knezevich, 1984). Inherent in the concept was an orderly, pre-established arrangement for allocating and dedicating input factors--such as "materials, energy, and information"--to the accomplishment of an agreed-upon goal.

According to Knezevich (1984), another way to view a system was as the action and interaction of a group of elements to bring about the objectives of an "organized entity with well-defined boundaries that aid or impede interchanges with its external environments" (p. 140). In general, there were two kinds of systems, "closed" and "open." Closed systems were those which did not interact with their environment, while open systems did interact with their environment. In addition, there were two main concepts which were central to the theory: the concept that there were multiple causative factors for phenomena, and the concept that there were many subsystems operating within the system (Owens, 1981).

Education has often been viewed from a systems theory perspective, an application stimulated in part by the writings of Kenneth Boulding, an economist, and Walter Buckley, a sociologist. Owens (1981) elaborated on the concept of education as a system composed of inputs from society, including knowledge, values, goals, and money; process, including subsystems of structure, people, technology, and tasks; and outputs to society, individuals who have been changed by their experience with and in the system. Following is a diagram of this application, as stated by Owens (1981, p. 64):

SCHOOLING AS AN INPUT-PROCESS-OUTPUT SYSTEM

INPUTS FROM SOCIETY	EDUCATIONAL PROCESS	OUTPUTS TO SOCIETY
Knowledge Values Goals Money	Structure (for example, grade levels, classes, school levels, departments, organizational hierarchy) People (for example, teachers, bus drivers, counselors, coaches, custodians, supervisors, dieticians, administrators, nurses) Technology (for example, buildings, class schedules, curricula, laboratories, libraries, chalkboards, books, audio-visual equipment, buses) Tasks (for example, teach classes, serve food, run buses; administer tests; account for funds; stewardship; supervise personnel; conduct extracurricular program)	Individuals more able to serve themselves and society because of improved . Intellectual and manual skills . Powers of reason and analysis . Values, attitudes, motivation . Creativity and inventiveness . Communication skills . Cultural appreciation . Understanding of the world . Sense of social responsibility

Viewed from this perspective, it was evident that changes in the educational process, consisting of four primary components, should change the outcome, or output, of the system. The further breakdown of these four major components--structure, people, technology, and tasks--began to suggest the complexity and variety of the factors influencing the outcome. This framework was then applied--without oversimplifying the task--to the question of how variations in organizational structure--in this case, manipulation of school structure (as represented by the nine-month or year-round schedule)--affected the product. Assuming that all other variables (elements in the process) were held constant, we could examine the product when education had transpired via a traditional nine-month schedule as opposed to a twelve-month schedule. It was the purpose of this study to conduct such an examination.

Historical Background of YRS

The length of the school year, along with the corresponding length of vacation periods, varied from one region of this country to another throughout the nation's history. In the early, predominantly rural days of United States history, the necessities of an agricultural economy determined the length of the school year for most areas of the country. The need for children to perform farm work from late spring through early fall caused a shortened school year, by today's standards, with most students attending school only during the winter months. Nor were teachers employed for twelve-month periods. Traditionally, men were employed to teach during the

winter, while during the summer, women taught children who were too young to help on the farm (Clark County School District [CCSD], 1968).

In contrast to the abbreviated status of the school year in rural areas of the country, in the cities schools were in session almost all year long prior to 1840. Buffalo, Baltimore, Cincinnati, New York City, and Chicago all conducted school for either eleven or twelve months a year, with the school year generally divided into four twelve-week sessions, with a one-week vacation between each session (Helton, 1975).

During the seventy-five years from 1840 to 1915, the length of the school year in urban areas was gradually diminished and the length of vacation periods was correspondingly augmented. During the same time period, the length of the school year in rural areas gradually increased, until rural and urban school calendars began to approximate each other. By 1915, although slight variations existed from one section of the country to another, a nine-month school year was standard throughout most of the nation (CCSD, 1968).

Between 1924-25 and 1931, a time of burgeoning enrollment and rising costs for school construction, many communities considered and debated the advantages of an extended school year, and some adopted such a calendar. However, the pressures of the Depression brought an early end to this practice (Saville, 1970).

The post-World War II baby boom provided the impetus for another surge in the demand for an extended year or YRS between 1947 and 1953. Again, however, as soon as housing was provided for this influx of students, interest in YRS declined, and only a few YRS programs--

mainly those that were exploring other dimensions of YRS than its ability to accommodate increases in enrollment--remained in existence (Saville, 1970).

The most recent surge of interest in YRS began during the late 1960s and the early 1970s, when an increasing number of school districts in the United States began to examine YRS as an alternative to traditional patterns in education (Hollingshead, 1975), with the primary impetus for most of them being their need to prevent or reduce further capital outlay at a time when enrollment was expanding rapidly or conditions were badly overcrowded (Heller & Bailey, 1976). Many school districts also saw YRS as attractive because of its potential for improving educational opportunities (Helton, 1975).

During that period, YRS expanded rapidly, experiencing pressures that ultimately led to a reduction in the variety of possible year-round schedules, and to central organization and guidance on a national basis. By 1971, six hundred school districts across the nation were seriously considering the merits of YRS (Muzio et al., 1977). In 1972, the National Council on Year-Round Education (NCYRE) was formed, with its stated purpose being "to serve as a clearinghouse for information and to provide assistance to school districts and individuals interested in year-round programs, and upgrading educational programs" (NCYRE, 1974, p. 1). During this period, YRS was initiated in school systems from Virginia to California, and from Florida to Minnesota. By 1974, some form of YRS existed in schools in Arizona, California, Colorado, Connecticut, Florida, Illinois, Indiana, Kansas, Michigan, Minnesota,

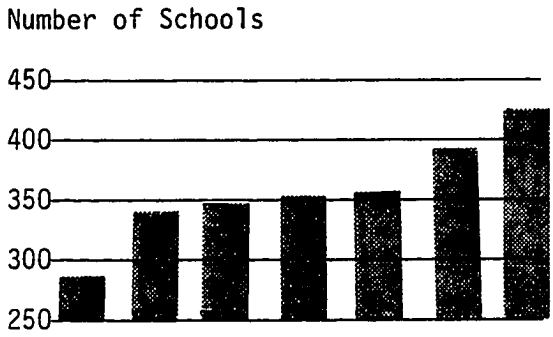
New Hampshire, New York, Oregon, Pennsylvania, South Carolina, Utah, and Virginia (NCYRE, 1974).

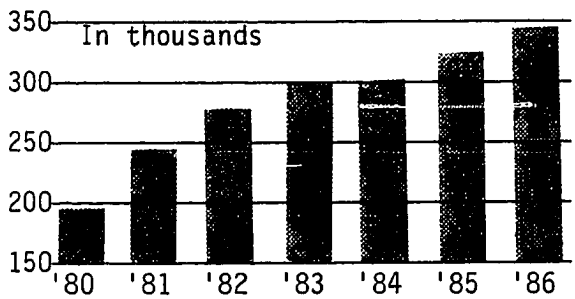
However, during the second half of the 1970s, despite the absence of evidence of any negative effects of YRS, the number of YRS programs in districts throughout the nation began to decline, and the twenty-eight states which offered some form of YRS in 1976 dwindled to sixteen by 1980 (NCYRE, 1981). Many of those states and districts that discontinued YRS were exemplified by the Prince William County School District, which reverted in 1978 to a traditional nine-month calendar schedule after experimenting with a dual system--both YRS and TCS--because the county's school-aged population was expected to decline in the ensuing five years and "the year-round schedule proved to be exhausting to many teachers and a scheduling nightmare for administrators" (Baker, 1978, p. 1).

During the early 1980s, the number of schools and school districts employing the year-round schedule grew slowly. No longer touted as the "wave of the future," but now viewed more realistically in terms of both its advantages and its drawbacks, YRS was employed mainly to relieve overcrowding and avoid new construction. In the second half of the 1980s, especially in those Sun Belt cities where population expanded rapidly, YRS continued to be a viable educational alternative. In 1986, the Los Angeles Unified School District--the second-largest in the country--announced plans to convert all of its 618 schools to YRS in the next five years in order to accommodate the school overcrowding attributable to the population shift in tandem with a tide of immigration into that area (Gottschalk, 1986).

By the end of 1985, according to a recent article in the Wall Street Journal (Gottschalk, 1986, p. 27), the school districts with the largest numbers of year-round students, and the numbers of students attending YRS in those districts, were as follows:

Growth and Size of Year-Round Programs





Districts with Largest Numbers of Year-Round Students

Los Angeles, CA	130,605
Jefferson County, CO	31,879
San Diego, CA	13,917
Clark County, NV	12,939
Santa Ana, CA	10,805
Fresno, CA	9,908
Montebello, CA	9,024
Houston, TX	8,800
Oxnard, CA	6,944
St. Charles, MO	5,507

Source: National Council on Year-Round Education. Cited in Gottschalk, E. C. Jr. Wall Street Journal, CXIV, p. 27.

Note: For school terms ending in years 1980 - 1986 as indicated.

Purposes of YRS

Many school districts that have turned to YRS in recent years undoubtedly subscribed to the description Pelavin (1978), in A Study of Year-Round Schools: Executive Summary, gave of the purpose of year-round schools:

> YRS programs are rarely implemented to increase student achievement gains. Rather, most frequently they are intended to alleviate over-crowding and to eliminate double sessions without increasing the cost or adversely affecting the quality of education. By this criterion, a YRS program is a success as long as it has no adverse effect on learning (p. 7).

Although the acknowledged purpose of YRS was to reduce or eliminate capital outlay while alleviating overcrowding, most educators were also in agreement, according to Heller and Bailey (1976), that "the curricular program and its results upon the achievement of students, should be the primary concern for any school contemplating conversion to year-round education" (p. 363). For example, in the early 1960s, parents in one New York suburban community rejected the notion of YRS because it had originated in the state legislature as a cost-saving measure rather than in the State Department of Education. According to Bienenstok, these parents found the emphasis on the economic benefits of the program to be "inappropriate and indefensible" (Helton, 1975, p. 100) and thought the education department officials had failed to show sufficient dedication "to their profession to defend the rights of children" (Helton, 1975, p. 100).

Historically, this duality of purpose was a persistent theme in the development of YRS. The earliest interest in YRS focused on the extension of the school year as an opportunity to promote equality of the lower strata of society with those more fortunate by

increasing their contact with both formal school and with a variety of cultural and social experiences. At the beginning of the twentieth century, the vacation school movement and the summer Bible school movement flourished as antidotes to the deteriorating conditions of the cities attributable to industrialization and immigration. When the success of the movements became apparent, educators took over from charitable organizations the promotion of an extended school year, touting it mainly as a vehicle to improve various conditions of education--e.g., absenteeism, idleness, and limited work opportunities. The first four-quarter school program in the U.S.--that implemented in Bluffton, Indiana, in 1904 by William A. Wirt--had alleviation of such problems as its goal, along with its facility to delay or avoid construction costs (Helton, 1975).

In the next twenty years, the implementation of YRS spread slowly. The primary impetus for some districts was the enlargement of educational opportunity, while for others it was the opportunity to save money. A third purpose, for still other districts, was to provide an extension of the teacher year. YRS in these districts provided an opportunity to pay teachers to acquire additional training, participate in staff development or curriculum development activities, and/or to teach "summer school" classes which combined arts, crafts, and music with the regular curriculum. In contrast, those districts that were primarily concerned with the cost-cutting effects of YRS frequently increased the teacher work load by 33 percent (using the four-quarter plan) while increasing their salaries by 25 percent (Helton, 1975).

Other minor purposes that year-round programs traditionally purported to serve were more efficient facility use, increased educational benefits due to the continuity of instruction (minimization of "summer learning loss"), and opportunities for remediation during inter-sessions or off-sessions. In addition, some school districts cited the following reasons for implementing YRS: improved student and staff attitudes due to more frequent vacation periods, reduced vandalism occasioned by student boredom during lengthy summer vacation periods, enriched vacation opportunities by featuring vacation periods other than at peak tourist times, and increased opportunities for employment during vacation periods throughout the year (Los Angeles Unified School District [LAUSD], 1981).

Outcomes of YRS: Evaluations

Early YRS Programs: 1900-1950.

The first YRS program for which achievement outcomes were reported in the literature was that instituted in Newark, New Jersey, in 1912 to enable a student to finish elementary school in six years rather than eight (Helton, 1975). The Newark YRS experiment flourished, and by 1921, eight all-year schools had been developed, serving students from grades K-12. However, in 1924 a new superintendent questioned the efficacy of these schools and commissioned a thorough investigation of the outcomes. Corson stated that this investigation revealed that students gained one year in the elementary school sequence, but not two, as originally believed; assimilation of TCS students into YRS high schools was frequently difficult; and YRS students scored lower than TCS students in reading, spelling, penmanship, and arithmetic (Helton, 1975).

In a subsequent investigation of the effects of the program, Farrand and O'Shea found that the "racial, economic, social and hygienic conditions" of the YRS students were significantly lower than those of the TCS students (Helton, 1975, p. 60). Farrand and O'Shea also reported that students with low socioeconomic status were progressing through the YRS more rapidly than students with comparable backgrounds were progressing through TCS; and students from depressed socioeconomic strata were much less apt to drop out of school if they attended a YRS rather than a TCS.

A four-quarter program in Nashville, Tennessee, initiated in 1924, was reported by the Nashville superintendent to have achieved excellent results in those areas, described by Hebb, "regarded as of prime importance in the training of the child--regularity, punctuality, attention to duty, contentment, cheerful obedience to authority, health of body, mind, and soul . . ." (Helton, 1975, p. 134). However, a more scholarly evaluation of the program conducted by researcher Caswell from George Peabody College found an inverse relationship between mental ability and length of schooling and between achievement and length of school attendance, for any particular grade level of student. He also found an increased failure rate during the summer months. He concluded that a physical basis for mental maturity existed, and that development of mental capacity could not be hastened merely by spending additional time in school (Helton, 1975). In his study of student attendance in the program, Caswell also discovered that summer attendance was about half that of the other three quarters, and that summer dropouts were twice as frequent as those recorded in the other quarters.

A third YRS plan which was discussed in the literature in terms of its outcomes rather than merely its implementation was the Omaha (Nebraska) four-quarter plan, which operated in a single Omaha high school between 1918 and 1940. Reported outcomes indicated that no time loss was associated with the plan and that it was popular both with educators and with community members (CCSD, 1968).

Another YRS plan for which educational outcomes were reported was that implemented in Aliquippa, Pennsylvania, in 1928. Although this plan was implemented in order to relieve overcrowding, it was not originally regarded as merely a stop-gap measure until new construction could afford a longer-range solution to the problem. Reported outcomes of this experiment state that there were no detrimental effects on student achievement. Reports of outcomes also noted no decline in pupil attendance during the summer, as had been feared. Economically, the experiment was also reported to be a success, with an estimated savings of over $350,000 (in 1935) during the first seven years of implementation. However, disadvantages to the program were also reported; primary among these were the difficulty and cost of building maintenance and repair, problems with both parents and teachers in regard to assignment of vacation periods, and an increase in paperwork and difficulty of administration. These problems led to abandonment of the experiment after ten years of implementation (CCSD, 1968).

The Ambridge, Pennsylvania, school system adopted a four-quarter YRS in 1932 to house a burgeoning student enrollment while new construction was being undertaken. According to school officials, end-of-the-year records of pupil promotion showed that YRS students

had not scored lower on standardized tests or on report cards. An analysis of attendance by Irons during the four quarters showed higher attendance for the YRS plan than that district had experienced on a TCS, although an increased summer withdrawal rate was also reported (Helton, 1975).

Toward the end of this period, few districts except for Ambridge and Aliquippa continued to experiment with YRS due to the effects of the Depression and World War II and the related needs to curtail educational costs (Helton, 1975).

More Recent YRS Programs: 1950-1975. Once the Depression and the war had receded into the past, the economy began to thrive. When the product of the post-war baby boom became of an age to require schooling, interest in the year-round calendar also began to revive. However, along with the obvious impetus of the need to house rapidly increasing numbers of students, a second force behind the movement was a year-round program model of a slightly different nature. In Glencoe, Illinois, in 1946 a year-round program, reported by Sternig, designed to foster teacher growth and improvement had been implemented (Helton, 1975). In this program, which ushered in the new era of consideration and debate of the benefits of YRS, summers were used for teachers to develop curriculum, attend conferences and workshops, and meet with educational consultants. Thus, once again interest in improvement of education and interest in reducing the costs of education were intertwined as propelling arguments for YRS (Helton, 1975).

One of the first post-war YRS programs was that initiated in Rochester, Minnesota, in 1947. Modeled on the Glencoe program, but designed to alleviate the teacher shortage, it allowed students to accelerate their progress through school, Gaumnitz stated, by taking a variety of vocational and academic courses throughout the summer months (Helton, 1975). From an evaluation of the program in 1959, Figgins reported that achievement test scores placed the students among the top 8 percent in the nation (Helton, 1975).

Florida also had a YRS program during this period, initiated in 1948, to reduce the juvenile crime rate by providing constructive summer activities for youth. By 1956, evaluation of the program revealed, according to Collins, that every one of Florida's sixty-seven counties had a juvenile crime rate well below the national average (Helton, 1975).

Although few YRS programs were in operation during the period of the 1950s and the early 1960s, debate over the advantages and disadvantages of YRS raged hot and heavy. Claimed advantages usually centered around educational enrichment/improvement, upgrading teacher status, and reaping economic benefits through more intensive utilization of facilities and personnel. Disadvantages usually cited were additional stress/strain on teachers, students, and facilities, increased operating costs, lack of articulation with existing programs, and disruption to families. However, both critics and proponents felt free to discuss the pros and cons of YRS with little or no documented evidence of outcomes (Helton, 1975).

In the early 1960s, the Cato-Meridian School District in New York adopted a quadrimester plan that involved both a longer school year

and a longer school day for students. Comparison of results on standardized achievement tests for students on the extended year and students on the regular schedule showed slight advantages for the former group. Thomas reported that the same study also found a higher attendance rate for the extended-year students (Helton, 1975).

Additional experiments in other New York school districts continued to find higher achievement to be a correlate of additional school days per year for almost all students and for almost all subjects. However, many of the studies of these programs compared non-comparable groups, programs with different instructional methodologies as well as different lengths of time, and programs implemented in succession rather than concurrently. In addition, these programs also involved additional school days rather than merely a rescheduling of the regular number of days (Helton, 1975).

In 1971, reporting on a Dade County project instituted to avoid overcrowding or double sessions and using the quinmester program, Boxer cited significant gains in both reading and math for YRS students over TCS students (Helton, 1975). Boxer also reported an attendance rate nine points lower for the YRS students than for the TCS students. However, the sample size (thirty) of the experimental group and the evaluation's failure to identify tests used or scores earned cast doubt upon the validity of the findings (Helton, 1975).

A more careful study of comparative achievement outcomes of a 45-15 plan designed to alleviate overcrowding in the Becky-David Elementary School in St. Louis, Missouri, was conducted by Craigmile and Hynes in 1969. This study evaluated student achievement as

measured by the Stanford Achievement Test (SAT) and involved the use of "matched" experimental and control groups. Findings showed that gains during the 1969-70 school year were greater for the TCS group in both math and reading. However, the testing schedule had not been adjusted to provide for the same number of days of instruction for both groups, and the TCS students had actually had more days of instruction from beginning to end (Helton, 1975).

A more recent year-round program was the Valley View (Illinois) School District 96's 45-15 plan, launched in 1970 to accommodate the school population of a district that was growing by 500-600 students per year, that was going to experience the initial year of mandatory kindergarten, and that was pushed to the legal limits of bonded indebtedness. During the first two years of the program, achievement testing was conducted which showed non-significant gains over the two-year period. However, since the entire district had been converted to YRS, no comparisons were possible with TCS students' achievement over the same time period (Helton, 1975).

Evaluation of a Chula Vista, California, 45-15 program, implemented in 1971 to alleviate overcrowding, studied reading gains made by YRS and TCS students on the Cooperative Primary Reading Test. No advantages were found for either of the groups, which were matched for I.Q., percent minority, and pretest scores in reading. A higher rate of absenteeism for the YRS group was found (Lahaderne, 1972).

In Prince William County, Virginia, a district also using the 45-15 plan, a pretest to posttest comparative study of TCS and YRS student achievement on the Metropolitan Achievement Test (MAT) showed

no advantage for either schedule after the second year of operation (Jacobson, 1972). In spite of careful attention to the identification of "matched" experimental and control groups, a lack of equivalent instructional time between pre- and posttesting rendered the verity of the results doubtful. However, the study was of note because it also took into consideration the effects of instructional method and classroom management behaviors (Helton, 1975).

The La Mesa-Spring Valley (California) School District initiated a year-round program in 1971 to alleviate massive overcrowding. Using a 45-15 plan in two district elementary schools and one junior high, the designers of the program made provision for evaluation to be part of the process from the beginning. Initial evaluation, conducted after the program had been in existence only a year, consisted of a survey distributed to project students, their parents, staff, and community members. These target populations were asked to indicate their perception of YRS compared to TCS in regard to student achievement, behavior and attitude, teacher morale and interest, parent interest, and instructional comprehensiveness. Response to every survey item was reported as being favorable to YRS. However, acknowledgement was also made that the enthusiasm apparent in the survey response could be merely an indication of the Hawthorne effect at work, and that test data should be gathered to determine whether the year-round schedule in actuality bore out proponents' claims of reducing review time, thereby increasing teaching time and presumably student achievement (Garner et al., 1972).

At about the same time that La Mesa-Spring Valley was experimenting with YRS to alleviate overcrowding, the Atlanta, Georgia,

public schools were experimenting with a form of YRS that had as its purpose the provision of increased educational opportunities. In the Atlanta Four Quarter School Year experiment, schools increased their own and students' flexibility by restructuring courses to create more relevance and by permitting students a greater degree of self-pacing through the high school years. Although achievement outcomes were not reported, a careful analysis of attendance data revealed a decline from morning to afternoon and from fall to summer (Barnes & Schwartz, 1973).

Problems in Early Evaluations of YRS

From the first implementation of YRS, assessments of its effects had a diverseness of focus that was attributable to the lack of unity of purpose for YRS programs. Since most of the early efforts to implement YRS had more than one purpose, with "educational" considerations intertwined with economic ones, it was not surprising that "evaluation" of these programs frequently consisted of an assessment of their economic consequences balanced against the difficulty of implementation and administration. Community reaction to YRS was an additional factor in their ultimate fate. Assessment of the educational effects was rare.

The difficulty in evaluating the worth of YRS that stemmed from its duality of purpose was compounded by the difficulties inherent in attempting to assess the effects of any educational innovation. In a 1977 review of the literature on the achievement effects of YRS, Muzio et al. stated that the effects of any kind of educational change on the student have seldom been measured systematically. They also stated that the problem of measuring the effects of any kind of change

was "a complicated methodological problem due to the vast number of variables present in the school system" (p. 22). Unless all other variables had been held constant, the authors pointed out, it was difficult to point to one variable--such as YRS--as the "cause" of student gains or losses from one year to the next. Thus, the effects of YRS on the student--as with numerous other educational variables--had seldom been systematically assessed or reported. Muzio et al. concluded that this was a virtually unavoidable problem when the public school served as the setting.

Muzio et al. (1977) further reported that existent data on actual effects on students of YRS were derived from two primary sources: results of questionnaires and results of achievement tests. The writers suggested that both these sources suffered from contamination by a variety of factors. In particular it was found that questionnaire results were contaminated by three variables: respondents' incomplete or incorrect recall in regard to the situation that existed prior to YRS, self-assessment by subjects with ego-involvement in the outcome, and comparison of YRS results with those of a TCS group without attempting to account for other independent variables. Similarly, according to Muzio et al., achievement test results were contaminated by the presence of variables other than the YRS configuration, by changes in curriculum that accompanied YRS, and by variability in achievement measures used by YRS schools.

After reviewing the available literature, the authors' conclusion was that "the present information on affective and cognitive effects of YRS is inconclusive" and that reports of YRS outcomes

"suffer from a lack of validity due to methodological issues on a variety of levels and poor design" (p. 31). The logical consequence of this conclusion was that such studies could not then be used to help formulate generalizations about the effects on students of YRS.

Helton, who in 1975 conducted a comprehensive review of literature on many dimensions of year-round schools, agreed with this idea, stating:

> Despite the large amount of research conducted on year-round schools, little of it can be accepted without seriously challenging its validity. Much of it consists of a comparison of factors that are not really comparable. Perhaps, the most critical concern should be expressed over the brief time span covered by most of the research. It was much too short to allow for the complete acceptance of the achievement results that were reported. Reservations must be cited about each of the research studies (p. 173).

Helton (1975) also discussed several of the particular claims of educational superiority for YRS and examined the evidence related to these claims. He found that existing research data did not support the claim that YRS eliminates the need for extensive review and that conflicting evidence existed about the claim that YRS could reduce the dropout rates of students who have difficulty keeping up. He also found that most of the studies of YRS effects were conducted ex post facto, with data collected under differing conditions for YRS and TCS, and in many cases not collected for concurrent time periods. Further problems included the short duration of the periods studied, and the unequal number of days of instruction for comparison groups.

Johnson (1984), who conducted a more recent review of the literature than either Helton (1975) or Muzio et al. (1977), found that the "available data on pupil achievement in year-round schools

indicates mixed conclusions as to the effectiveness of the program" (p. 52). Johnson's review also showed that while some research found beneficial effects for YRS, other research found either no differences, or differences in favor of traditional-calendar schools. She concluded that more studies needed to be conducted.

Recent Evaluation of YRS: 1975-1985

In the past ten years, as YRS became a necessity rather than an experiment or a luxury for many of its practitioners, evaluation of YRS programs became more extensive and thorough. Although still plagued by many of the problems identified by Helton (1975) and Muzio et al. (1977), evaluative efforts attempted to eliminate extraneous differences in those factors which could be controlled, such as the number of instructional days between pre- and posttesting, differences in socioeconomic status of comparison groups, and variations in curriculum.

Cherry Creek (Colorado) District 5. The Cherry Creek, Colorado, District 5, which implemented a year-round program in 1971, conducted a major evaluation of the program four years after its inception. In their evaluation of YRS in Cherry Creek, evaluators Smith and Glass (1975) posed four major questions:

1. What were the characteristics of school programs associated with YRS?
2. What was the reaction of parents to the YRS, its inconveniences and conveniences?
3. What were the effects of YRS on student achievement?
4. What were the costs of YRS compared to the costs of alternative scheduling systems?

Answers to the first question were derived through a study of school documents, including minutes of meetings and other records and

reports, and interviews with the principal and several teachers from each school. An overview of the school programs at the three YRS elementary schools in the Cherry Creek District 5 showed that there was considerable autonomy at the school level in regard to the instructional program and school organization; common district goals existed, but centrally prescribed curricula and staffing patterns did not; individualized instruction and instructional innovation were stressed, and were necessary for YRS to function properly; most instruction was planned, coordinated, and delivered through instructional teams, with a common schoolwide curriculum in place at only one of the three schools; and teachers felt that YRS provided better learning opportunities for students (Smith & Glass, 1975).

Through parent response to a questionnaire, Smith and Glass also found that the YRS schedule was a source of some inconvenience to many families, especially to those planning family vacations who had older children in school on TCS, and to those whose children were regularly involved in summer sports. The major "convenience" mentioned by YRS parents was that they believed their children maintained more learning momentum without the summer break. Overall attitudes toward YRS favored YRS over TCS by about a 2:1 ratio (Smith & Glass, 1975).

The answer to the third question was pursued through an analysis of performance on the Iowa Test of Basic Skills (ITBS). Using groups of students from YRS and TCS which were "matched" on grade, sex, and I.Q., the analysis resulted in the finding of small differences in favor of the TCS students. These differences were not deemed to be educationally significant and therefore "should not be interpreted as a negative effect for YRS," according to the evaluators (p. 38).

They also reported small and nonsignificant differences in achievement among the three YRS schools after background factors had been taken into account. Additionally, they reported that there appeared to be neither consistent nor important effects of YRS for different I.Q. or grade levels (Smith & Glass, 1975).

In regard to the fourth general question--the cost of YRS--program evaluators largely discounted operating costs and focused mainly on building costs or the costs of converting a TCS to a YRS (which meant air-conditioning the schools). In addition, the cost of housing additional enrollment by converting to YRS was compared with the costs of making such accommodation through other means, such as redistribution of students, double sessions, or temporary buildings. Conclusions in this area were that operating costs of YRS and TCS were essentially equal; YRS was primarily a means of accommodating such growth; and as a means of accommodating enrollment growth, YRS was more expensive than double sessions or enrollment redistribution but cheaper than building new buildings (Smith & Glass, 1975).

Smith and Glass (1976) conducted an additional investigation of the Cherry Creek District 5 YRS program subsequent to their initial findings of no achievement differences between YRS and TCS. This second investigation was prompted by the repeated oral testimony of YRS school personnel that YRS provided greater educational benefits to students due to the continuity of the learning process. The second study thus was designed to "refine the analysis and resolve the apparent differences between the oral testimony and the test results" (p. 5), with the focus on "learning opportunity" and student

achievement. For this analysis, local tests designed to measure achievement of district objectives were used as possibly being more sensitive to variations in local instruction than were nationally standardized tests (Smith & Glass, 1976).

Student achievement was assessed by developing an objective-referenced test for sixth-graders, with the selection of math as the area of interest, since it was generally believed that math was the subject for which learning loss was most likely to occur over the summer. This math test was administered during the second week of each child's respective school year, and results were analyzed using an analysis of covariance, with the covariate being the student's ability score on the Cognitive Ability Test, part of the ITBS (Smith & Glass, 1976).

The findings from this study indicated that less post-vacation time was spent reviewing in YRS schools than in TCS; that YRS teachers rated loss of learning that occurs over the vacation as less severe than did TCS teachers; that YRS teachers also rated vacation buildup of non-appropriate school behaviors as less severe than did TCS teachers; and that YRS students' attitudes about returning to school were significantly more positive than were those of TCS students. In addition, the comparison of post-vacation math achievement for the two groups of students, TCS and YRS, using "ability" and ITBS math grade-equivalent scores as covariates, did show a small, non-significant increase in achievement for the YRS group compared with the TCS group (Smith & Glass, 1976).

San Diego. One of the more rigorous studies reviewed by Muzio et al. (1977) was one conducted in the San Diego YRS, wherein an attempt was made to minimize the influence of contaminating variables. In the San Diego study, schools were matched for geographic location, socioeconomic status, ethnic distribution, and number of years in the program. In addition, pretest advantages were taken into account by use of an analysis of covariance technique. In all, a total of fifty-two comparisons were made. Of these fifty-two, seventeen showed statistically significant differences in achievement, with fourteen of these differences in favor of the YRS and the other three in favor of TCS. Those comparisons which revealed differences in favor of YRS were found to be most heavily concentrated in grades two, three, and six. In addition, differences in achievement which favored YRS over TCS were more apt to be found in students who had been in YRS schools for two years rather than one. The conclusion of the researchers who conducted the study, according to Muzio et al. (1977), was that

> while the trend of differences favored students in the year-round program for two years, it was not judged to be sufficient to constitute a definite pattern of superiority, due to a continuation of insignificant differences in over half the comparisons and one in favor of the control schools (p. 30).

Pajaro Valley Unified School District (PVUSD). In 1978, Pelavin and his associates at Stanford Research Institute (SRI) conducted a comprehensive study of YRS for the office of the Assistant Secretary for Planning and Evaluation (ASPE) of the Department of Health, Education, and Welfare. This study was based on the YRS program in the PVUSD, located about ninety miles south of San Francisco, California. In 1971-72, the PVUSD instituted YRS in one

junior high school and its four feeder elementary schools, in the wake of nine bond or tax override election defeats and overcrowding so acute that approximately 15 percent of its students were attending double sessions or were housed in facilities not intended for classroom use. The particular year-round schedule instituted in PVUSD was the 45-15 staggered plan. The objectives of the study were to assess the economic impact of YRS on educational costs; the educational impact of YRS, particularly on migrant students and special education students; and the social impact of YRS on parents, teachers, and the community. Investigators reached the following conclusions:

1. Economic Impact

According to Pelavin et al. (1978), it was easy to determine whether YRS had met its primary goal--to alleviate overcrowding and avoid new construction--but it was difficult to reach a precise estimate of its effects on the overall cost of education. To attempt to arrive at such an estimate, Pelavin and his associates compared the actual costs incurred under a YRS program with the costs that would have been incurred had the same services been provided to the same students under a TCS plan. This comparison included capital, transition, and operating expenses.

Using this method, Pelavin found that annual per-pupil cost had been reduced 4.1 percent on the year-round program and would have been reduced by 4.7 percent, had the district not already owned land for new school construction. The study also showed that while some operating costs--such as administrative salaries--were higher under YRS, other costs--such as teacher wages--were higher under TCS, and that overall operating costs for the YRS were very slightly less than

for TCS. In addition, the cost to transform a nine-month school to a twelve-month school was calculated to be slightly over $800 (in 1978).

Pelavin et al. (1978) also found that several factors could be manipulated to produce greater or smaller savings, with the most important of these being pupil:teacher ratio and maximum utilization of facilities. A small reduction in pupil:teacher ratio and operation at less-than-maximum capacity both resulted in substantial reduction of savings. Based on their findings, Pelavin and his colleagues estimated that a district might expect to save a maximum of 12-15 percent of its total annual budget and an average of 8 percent of its annual operating budget by conversion to a well-designed YRS program.

2. Educational Impact

Pelavin et al. (1978) analyzed the achievement effects of the PVUSD YRS from the point of view that since the program was not implemented to improve student achievement, it had been successful as long as it did not affect achievement adversely. To study the achievement effects, student performance on the Comprehensive Test of Basic Skills (CTBS), administered to students in grades two, five, and seven at both YRS and TCS on a fall-spring-fall schedule, was compared. Results of this comparison showed "there was no difference in the size of achievement gains between students in the YRS and TCS programs" (p. 7). However, additional analysis of the performance of student sub-groups revealed that disadvantaged students in the YRS program, as well as those in the TCS program, made gains in achievement dramatically larger than would have been predicted based on prior research.

3. Social Impact

The same study by Pelavin et al. (1978) also investigated the response of parents, teachers, and community members to YRS, and found mostly favorable attitudes to YRS among these groups. Parents of students in both YRS and TCS programs responded favorably to questions regarding their satisfaction with their children's academic, social, and emotional progress. Parents of YRS students favored that program over TCS by a 2½:1 ratio. In addition, in the five years during which parental attitude was surveyed, that response became consistently more favorable. Teachers who were surveyed appeared to favor the program they were in, with YRS teachers highly positive in regard to YRS but TCS teachers equally favorable to TCS. In addition, teacher favorableness to YRS increased with the amount of exposure. Community response to YRS, measured on the basis of the opinions of twenty-one prominent community members, indicated that the program had generated neither positive nor negative attitudes in the community-at-large.

In summary, Pelavin and his associates (1978) concluded that the PVUSD YRS had had a positive financial and social impact, and a neutral educational impact. They also concluded that length of association with YRS was positively correlated with approbation.

Prince William County, Virginia. Evans et al., in 1978, conducted a more extensive analysis than that reported earlier of the effects of the YRS (45-15 plan) in comparison with those of the TCS in Prince William County, Virginia. This second study was conducted after that county had had 60 percent of its

schools operating on YRS since the early 1970s as a response to rapid enrollment growth. The primary objective of the study was to discover how education on YRS differed from education on TCS in regard to achievement (test scores and grades), attendance, extra-curricular activities, and course offerings. A second objective was to determine the reaction of elements of both the educational community and the broader community to YRS as compared to TCS.

To conduct the study, Evans and his associates collected and analyzed data from three pairs of matched schools, one pair at the elementary level, one pair at the junior high level, and one pair at the senior high level. In regard to the first objective, Evans and his colleagues found that there was no evidence of differences in achievement, based on analysis of mean percentile scores on standardized tests; that at the elementary school level only, students in the YRS received higher grades; that there was no difference in attendance rates at the elementary or junior high level, but at the senior high level, attendance was higher at the TCS; and that students from the TCS high school earned academic scholarships at a greater rate.

Findings in regard to the second objective were equivocal. Of educators on the YRS, 51 percent wished to remain on it, while 49 percent did not; of educators on TCS, only 2 percent wished to change to YRS. Overall, of the 70 percent of the 2,000 Prince William County educators who responded to the survey, about 70 percent preferred the TCS. Of parents whose students were in YRS, about 62 percent preferred to remain on that schedule, while 38 percent did not; of parents whose students attended TCS, about 21 percent

indicated a wish to try YRS. Overall, of the 10 percent random sample of parents interviewed, preference was evenly divided between YRS and TCS. Of students on YRS, 67 percent preferred to stay on that schedule while 33 percent preferred to revert to TCS; of students on TCS, 83 percent wished to stay on TCS while 17 percent wished to change. Overall, of the 1,300 students who were interviewed and expressed a preference for one or the other schedule, about 53 percent preferred YRS. Two-thirds of the 20 percent sample of members of business and civic organizations that were interviewed were neutral in regard to YRS; the remainder were evenly divided between being positive or negative towards it. The overall conclusions about YRS compared to TCS made by Evans et al. (1978) were that

> no evidence of differences between the calendars existed that were of any educational significance. . . . The issue appears to resolve to one of attitude and, therefore, it may best be approached from that standpoint (p. 17).

Arizona YRS. In 1978, Matty, a doctoral candidate at the University of Arizona, compared the achievement of algebra students in YRS with those on TCS, using a quasi-experimental pretest-posttest design and students from two Arizona school districts. Using as outcome measures math achievement on a standardized test, Cooperative Mathematics Test, Form A, and math achievement on a teacher-developed multiple choice test, Matty compared seventy-two ninth-grade TCS students with seventy-two ninth-grade YRS students. Half of the students in each group were of Hispanic origin.

Matty found significant differences in achievement on the standardized test for TCS students, even after adjustments were made for differences in pretest scores, using an analysis of covariance.

The same results occurred on the teacher-made test, with TCS students scoring significantly higher, again after an analysis of covariance adjustment for pretest differences. Matty also looked for sex or ethnic differences in achievement for TCS and YRS groups, but found no interaction with the main effect of calendar for either of these classification variables.

Los Angeles Unified School District (LAUSD). Perhaps the most comprehensive evaluation of a year-round program yet to be conducted was that reported in Evaluation of the Year-Round Schools Program, an evaluation of YRS in the Los Angeles Unified School District conducted from 1981-83 by members of that district's Research and Evaluation Branch, with Alkin and Atwood as the chief investigators. In the LAUSD, according to Alkin et al. (1983), YRS was initiated as part of an effort to relieve overcrowding at individual schools. By 1982-83, the LAUSD had ninety-five schools on YRS, with a combined enrollment of over 121,000. These ninety-five schools represented only 10 percent of the schools in the LAUSD, but they housed approximately one-quarter of its population. Students at these schools attended school on one of four year-round plans: the 45-15 staggered plan, the 90-30 staggered plan, the Concept Six plan, and the 60-20 plan. The 45-15 and 90-30 plans were used at the elementary level, and the Concept Six and 60-20 plans were used in LAUSD high schools. However, since earlier studies of the relative merits of the various year-round schedules had revealed no differences based on type of schedule, the Alkin study included schools and students from all types under the guise of "year-round" and assessed the outcomes of interest together.

Since the stated purpose of the Los Angeles year-round program, as reported by Alkin et al. (1983) was to "relieve overcrowding without educational disadvantage to YRS students or adverse reaction from their parents" (p. 13), the related purposes of the study were to answer the following questions:

1. How successful had participating year-round schools been in relieving overcrowding?
2. What were teachers' and administrators' opinions about the advantages and disadvantages of year-round schools?
3. What were the attitudes of parents of participating students toward year-round schools?
4. What kinds of attitudes and behaviors did YRS students exhibit?
5. What were YRS students' achievement levels?

Given these research questions, Alkin et al. (1983) analyzed the following data sources: responses to surveys eliciting parent, teacher, and administrator reactions to YRS; pupil attitudes toward school, as measured by the School Attitude Measure; records of discipline problems, pupil attendance, teacher absenteeism, staff morale, site vandalism, and use of facilities; and student achievement, as measured by the Survey of Essential Skills (SES) at the elementary level and the CTBS at the junior high level.

In regard to the first question, Alkin et al. (1983) found that YRS resulted in a substantial reduction in overcrowding, from the previous 64 percent above rated capacity to the current 7 percent at the elementary level. There was also a reduction from 70 percent to 8 percent above rated capacity at the high school level.

They also found that a preference for YRS rather than TCS was reported by both teachers and administrators. These groups thought

the chief strengths of YRS were the increased continuity of instruction, the improved teacher morale and opportunity for teacher rejuvenation, the increased opportunity to use vacation periods for remediation and parent conferencing, the avoidance of double sessions, improved student safety and behavior, and more sustained contact with parents. They felt the negatives associated with YRS were an increased need for more timely repairs for extra maintenance, the need for air-conditioning to reduce discomfort associated with summer heat and smog, the need to provide additional support to roving teachers, the need for additional district accommodation of the YRS program, and the need to establish year-round community programs (Alkin et al., 1983).

Rather than providing for a comparison group of TCS parents or asking parents to compare TCS with YRS, evaluators asked YRS parents to rate the program in its second year compared to its first year. Ninety-five percent of the parents of elementary students indicated they felt more positive about the program in its second year than they had in its first, while 75 percent of the parents of junior high students responded in a similar manner (Alkin et al., 1983).

On measures of student behavior and attitudes, it was found that students' attitudes were below national averages in most instances, that students' attitudes showed no growth in favorableness from 1981-82 to 1982-83, and that suspensions and vandalism increased at the senior high level, but declined at the elementary and junior high levels (Alkin et al., 1983).

Archival data were used to compare the achievement of students in YRS with that of students in TCS. Because of a limitation of resources

and organizational differences between the year-round and traditional-calendar schools, the investigation was limited to achievement test outcomes for fifth-grade classes in thirty-four elementary schools, seventeen of which were on YRS and seventeen of which were on TCS. The two sets of schools were matched on geographic region within the district, size, poverty ranking, and percent Hispanic or other non-Anglo students. Analytic techniques employed simple descriptive statistics, including means, standard deviations, and frequencies, and inferential tests, where appropriate. Outcomes indicated that systematic differences were not observed and that there did not appear to be a consistent advantage or disadvantage associated with either the YRS or the TCS. Of the seventeen comparisons made, nine favored YRS, and eight favored TCS. Given the above outcomes, Alkin and his associates concluded that no substantive statements could be made about the effects on student achievement of YRS and that further study in this area should be conducted (Alkin et al., 1983).

Johnson Study (LAUSD). In a 1984 study, Johnson, a doctoral candidate at Pepperdine, also studied the achievement effects of YRS in the LAUSD, subsequent to the above-reported study. Johnson studied the reading and math achievement of fifth-grade students in YRS and TCS and also examined the interaction effects of sex with calendar. Johnson selected for the study twelve YRS schools that had been on the year-round schedule since 1980 and twelve TCS schools that matched the YRS schools on such characteristics as socioeconomic status of the neighborhood, ethnic distribution, nature of special programs, and school size. Subjects were 1,041 fifth-grade students

within these schools who had attended the same school since third grade, who were fluent English speakers, and who had complete test scores on file as both third graders and fifth graders. Performance on the reading and math sections of the Comprehensive Test of Basic Skills (CTBS) was used as the dependent variable. The relationship between attendance and achievement was also examined.

Using data on file in the LAUSD Research and Evaluation Branch, Johnson found that math achievement for the TCS students was statistically significantly higher than for the YRS students. No statistically significant differences were found in reading for TCS and YRS students, although there was a statistically significant interaction effect between calendar and sex, with YRS girls scoring lower in reading than YRS boys, and lower than both boys and girls at TCS. She also found that absence and achievement in both reading and math had a statistically significant negative correlation.

Clark County School District (CCSD). The Clark County School District (CCSD) in Las Vegas, Nevada, first turned to YRS on a pilot basis in 1972-73 to accommodate rapidly expanding enrollments in certain areas of the city. Initially implemented in only one elementary school in January 1973, a rather thorough evaluation of the program was conducted in 1975, prior to the district's conversion of additional elementary schools to the year-round schedule (Hollingshead, 1975).

The program at the Fay Herron Elementary School, which had a rated nine-month capacity of 950 students, enrolled over 1,200 students once the year-round program gathered momentum, and used a

45-15 staggered attendance plan. This particular plan featured student enrollment in four groups or quadrants ("quads"). Each group attended school for forty-five days (nine weeks) and then went on vacation for fifteen days (three weeks). Each three weeks, when one quad went on its break, a new quad began its nine-week instructional period. By this means, the school was able to expand its capacity by about 33 percent. An additional feature of the Fay Herron year-round program was that in the primary grades teachers worked in phase with one quad of students, teaching for forty-five days and then taking fifteen days off, while in the intermediate grades (four-six), the teachers taught year-round except for twenty-two days of paid vacation, in addition to the regular school holiday periods (Thanksgiving, Christmas, and Easter), when no students were in attendance. This arrangement meant that students in these upper grades attended classes composed of students in all four quads, so that the composition of any one classroom was changing regularly. These teachers, then, had to use instructional strategies that took into account the changing student presence; to do so, some teachers completely individualized their instruction, others used frequent small group presentations, while still others used whole group instruction with at least two scheduled presentations of each "lesson."

Because the district projected rapid growth in the years ahead and wished to understand the effects of accommodating this growth by YRS, in 1975, at the end of two and one-half years of YRS at the pilot school, a thorough investigation of the effects of YRS on student achievement, student attendance, student attitude, staff attitude, and parent attitude was conducted (Hollingshead, 1975).

1. Effects on Student Achievement

A comparison of second- and fifth-grade student scores on the Metropolitan Achievement Test over a four-year period (1971-72 to 1974-75) was conducted. This time period included one and one-half years of TCS and two and one-half years of YRS. The project evaluator found that student achievement had risen slightly for second-grade students over the period in question (the final cohort of second-grade students had spent its entire school career in YRS), while at fifth grade, achievement had declined slightly in reading and language, and stayed the same in math. The evaluator, as reported by Hollingshead (1975), concluded that

> the standardized achievement test results at Fay Herron have maintained rather consistent levels over the course of the last four years, the last two and one-half years of which have been on the year-round schedule (p. 6).

Extension of the analysis to student achievement on district-developed criterion-referenced tests administered in the fall and the spring found that, relative to other district students, Fay Herron students scored higher in the fall testing and lower in the spring testing. Hollingshead concluded that this pattern of performance probably reflected summer learning loss by nine-month district students, but that the effect of that loss had dissipated by the time of spring testing.

2. Average Daily Attendance

Investigation of student attendance at the year-round school revealed that it dropped 2-3 percent immediately after implementation of the new schedule, and that summer attendance rates reflected a decline of over 5 percent, compared to previous attendance at that

school while the TCS was in effect. Since attendance was better during the second full year of implementation of the program than it was during the first full year, the evaluator concluded that initial attendance losses were, perhaps, rectifying themselves.

3. Student Attitude

To permit comparisons, student responses were compared for the 1973-74 school year (first full year of implementation) to the 1974-75 school year, and for students whose families contained only students attending YRS as opposed to students whose families contained members attending YRS and TCS. Total survey response indicated that overall student attitude was more favorable after the second year of YRS than after the first, and that children whose siblings attended YRS responded more positively than children whose siblings attended TCS. One noteworthy exception to the above generalizations was that students were less likely to say after the second year of implementation that they thought they were learning more under YRS than they would have under TCS (Hollingshead, 1975).

4. Parent Attitude

A parent questionnaire revealed that over 80 percent of the responding parents said they liked the year-round program and wanted the school to stay on the year-round schedule. Parent response after the second full year of implementation was almost identical to that after the first full year of implementation. Parents whose children did not all attend Fay Herron responded less favorably than did parents whose children were all at the year-round school. However, even these parents responded favorably to all survey items (Hollingshead, 1975).

5. Staff Attitude

A staff survey--tailored slightly to the different situations of the primary and intermediate teachers--revealed that teacher attitudes were strongly favorable to the year-round program. Teachers were less sure after the second year than after the first that their students were learning more because of the continuous nature of the year-round schedule, and they were less inclined to report feeling more "professional" due to their year-round employment. However, they were more inclined to report that they preferred YRS to TCS and that they hoped Fay Herron would continue on the YRS. In addition, for both years' results, teachers in the intermediate grades (who had extended-year contracts) responded more favorably overall than did the teachers on the regular 184-day contract (Hollingshead, 1975).

The overall conclusion of the program evaluation, according to Hollingshead (1975), was that the YRS concept was a "viable alternative" in the CCSD, but that

> no evidence exists that improved achievement or attendance should be used as arguments in favor of its implementation. Instead, a desire for non-traditional vacation schedules or reduced new-school construction would be more tenable advantages (p. 18).

Faced with continuing population growth and a series of defeated bond issues for new construction, the CCSD continued to study various effects of YRS as it continued its conversion of nine-month schools to the year-round schedule on an as-needed basis. In 1981, the district conducted a second study of YRS after one elementary school had been on the year-round schedule for about eight years, a second had been on it for about two years, and a third was concluding its

first year of operation on YRS. This study included a review of literature that touched briefly upon the economic, educational, and social impacts of YRS on a district and its community. The study concluded that a substantial savings in capital outlay could be realized through YRS, but its impact on per pupil operating costs was more difficult to assess; student achievement had not been shown either to rise or to decline as a result of YRS; and members of the educational community who had had experience with YRS were usually very favorable towards it, while those with little or no experience were generally not positive towards it (Costa, 1981).

1. Attendance Effects

Although this study presented no local achievement data for analysis in terms of the educational impact of YRS, it did present the results of a local study of comparative attendance between YRS and TCS and within each school--before its conversion to YRS and after. Costa's (1981) study concluded that

> attendance at the year-round schools has neither increased nor decreased as a result of institution of the year-round calendar. Rather, each school appears to have maintained its characteristic attendance patterns, which bear a specific relationship to districtwide attendance totals and which are undoubtedly attributable to demographic factors associated with the particular population the school serves (p. 15).

However, Costa's (1981) study also concluded that

> a report of attendance percentages may not be a totally accurate representation of the true [attendance] picture. It has been conjectured that many parents of year-round students withdrew their children from school early (during the summer) or enrolled them well after the beginning of the YRS school year (p. 16).

Further investigation of enrollment figures did not produce evidence of this phenomenon at the two schools which had been on YRS

for only a short time, but it did find reduced enrollment during the summer months to be the usual state of affairs at the YRS that had been operating on that schedule for eight years. At this school, it was found that the attendance period in which enrollment was lowest was consistently the last (including the end of June and all of July), that the period in which enrollment was highest for seven out of the eight years was consistently the second or third (the second included the time at which the traditional school year began), and the diferences between the lowest and highest enrollment figures ranged from 15-25 percent of total enrollment (Costa, 1981).

A later, more comprehensive study of the attendance phenomenon at CCSD YRS was conducted in 1985-86, when the district was operating a total of fifteen elementary schools on a year-round schedule. Bundren's (1985) study attempted to answer two questions:

1. How did the attendance percentages of year-round schools compare with the average for the Las Vegas Area Elementary (LVAE) schools?

2. For the nine schools which initiated year-round scheduling in 1984-85, how did attendance percentages in 1984-85 compare with those of the preceding year when these schools were on traditional scheduling?

To answer the first question, attendance percentage for each of the year-round schools was compared with that of the LVAE for each of six attendance periods (periods 2 and 3, 6 and 7, and 9 and 10, with 9 and 10 being the last two of the academic year and occurring during the summer months for the year-round schools). This analysis revealed that in 58 percent (fifty-two out of ninety) of the comparisons, the year-round schools had a lower attendance percentage than the LVAE,

that during the ninth and tenth attendance periods, the percent attendance at the year-round schools was consistently lower than it was during the same periods for the LVAE, and that the percent attendance at four year-round schools was consistently below that of the LVAE, while at one YRS, it was consistently above (Bundren, 1985).

The answer to the second question was derived by comparing attendance percentages for six attendance periods (periods 1, 2, 6, 7, 9, and 10) for 1983-84 and 1984-85 for each of the nine schools that had instituted the year-round schedule in 1984-85. It was found that in 65 percent (thirty-five out of fifty-four) of the cases, the attendance percentage was lower after conversion to the year-round schedule than before (Bundren, 1985).

A supplement to this study examined the question of whether the attendance percentage adequately represented the attendance problem, or whether enrollment itself also had to be taken into consideration. This report, which compared the number of students present for each attendance period as well as the number of students enrolled, concluded that a significant percentage of the year-round student population enrolled in school late (at about the time that nine-month school began) and withdrew early (slightly after nine-month school ended), and that if the effects of late enrollment and early withdrawal were combined with absenteeism, it became evident that a significantly higher absenteeism rate existed during July and August than during those parts of the year during which nine-month schools were also in session (Bundren, 1985).

2. Achievement Effects

In 1984, when over one-fourth of the district's elementary school population was attending schools on the year-round schedule, and conversion of additional schools to accommodate rapid growth was being considered, the district conducted a brief study of achievement at the three elementary schools that had been on the year-round schedule for several years. This study (CCSD, 1984) compared achievement gains or losses over a three-year period (1980-81 to 1982-83) registered on the districtwide administration of criterion-referenced tests (CRTs) in math and reading at grades two through five and the Stanford Achievement Test (SAT) at grade three. Each school's performance on these tests over the three-year period was compared with that of the rest of the district as a whole (comprised of seventy elementary schools). Achievement comparisons for CRTs were reported in terms of gains or losses in mean percent correct over the three-year period. Performance comparisons on the SAT were presented in terms of gain or loss in normal curve equivalent (NCE) scores, which are equal interval scores derived from percentile scores. When achievement comparisons were made for each school with the district for CRTs at grades two through five and the SAT at grade three, the total number of comparisons equaled thirty. Of these, the district made greater gains in sixteen cases, while the year-round schools made greater gains in fourteen. Thus, substantial educational advantage was not claimed for either TCS or YRS on the basis of this particular study (CCSD, 1984).

Summary

In Chapter 2, the theoretical base for the study was provided. General systems theory, applied to organizations, was a means for examining how a change in one of the facets of the educational process--structure--affected educational output, in this case defined as achievement.

A brief history of year-round education in the United States was also provided, with an emphasis on the variation in purpose of the different year-round experiments. The reflection of these varying purposes in the designs and findings of evaluations of year-round programs was also reviewed, along with the methodological problems of the studies. The primary problem with most of the studies was the failure to isolate the effects of other confounding variables from the effect of structure. Finally, the many studies of YRS that have been conducted were reviewed, and the effects of the various YRS programs on such outcome variables as student achievement, attendance, student, parent, and staff attitude, and costs were noted.

From these studies, the following conclusions may be drawn:

- There has been a dearth of rigorous evaluation of the educational effects of YRS.
- Many educational advantages have been posited for YRS, but none have been documented.
- YRS has sometimes been accompanied by reduced student attendance.
- YRS has served to reduce educational costs, particularly in regard to capital outlay.
- Parents and staff members who have had experience with YRS have appeared to prefer it to TCS.

CHAPTER 3

Research Design and Methodology

The purpose of Chapter 3 was to describe the research design used in the study to answer the following questions:

1. Are there significant differences in student achievement scores in reading, mathematics, and language at year-round schools compared with those at nine-month schools, which cannot be accounted for by differences in student ethnic distribution, student socio-economic status, and student "school ability"?

2. What are the attendance patterns of year-round school students compared with those of nine-month school students?

3. How do teachers at year-round schools evaluate their respective schools compared with teachers at nine-month schools?

Chapter 3 was divided into four sections:

1. description of the research design and presentation of the null hypotheses;
2. description of the setting of the study and of the subjects;
3. description of the instrumentation; and
4. description of the statistical procedures used to analyze the data.

Research Design and Null Hypotheses

This study was designed to study the relationship between school structure (a nine-month schedule as opposed to a year-round schedule)

and student achievement. The design used was an ex post facto criterion-group design, whereby pre-existing achievement test scores were the dependent variable, and the two criterion groups were year-round schools and traditional-calendar schools in the Clark County School District, Las Vegas, Nevada. Differences between the two groups in other variables known to affect school achievement were minimized by use of an analysis of covariance.

In the analysis of covariance technique, the independent (non-metric) variable for each hypothesis was school structure, as represented by the nine-month or twelve-month calendar. The covariates (metric factors or variables) for each hypothesis were: percent of low-income students at the school, as measured by the number of students from families receiving Aid to Families with Dependent Children (AFDC), divided by the total number of students at that school; the percent of minority students (black, Hispanic, Asian, American Indian, or other ethnic minorities) at the grade level involved; and the average "school ability" of students, as measured by performance on the Otis-Lennon School Ability Test, 1979 Edition, administered at grades two and five, with data reconstituted for each grade level. Finally the dependent variables were the mean scaled scores in Total Reading, Total Mathematics, and Total Language on the Stanford Achievement Test, 1982 Edition, for grades three and six; and percent correct scores in reading and mathematics on the Clark County School District Reading and Mathematics Criterion-Referenced Tests (CRTs) for grades two through six. Data for two years--1984-85 and 1985-86--were included in the analysis, but were analyzed separately.

This research design was used to investigate the following null hypotheses:

1. There is no statistically significant difference ($p \leq .05$) between student achievement scores in reading at year-round as opposed to nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

2. There is no statistically significant difference ($p \leq .05$) between student achievement scores in mathematics at year-round as opposed to nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

3. There is no statistically significant difference ($p \leq .05$) between student achievement scores in language at year-round as opposed to nine-month schools, when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

All norm-referenced and criterion-referenced test scores were obtained from the Research and Development Department of the Clark County School District, while AFDC data and percent minority by grade level data were obtained from the records of the Grants Administration and Government Relations Department and the Zoning Section of the School Planning Department, respectively.

In addition to the achievement test data analyzed to provide evidence for or against the research hypotheses, two other sets of data were gathered and analyzed using descriptive statistics only. Attendance data for all schools were recorded for both years. The mean percent attendance for each of the two groups was then compared,

both before and after adjustment of the year-round-school mean for reduced summer enrollment. Teacher opinionnaire data from two years were also collected, summarized with descriptive statistical techniques, and compared.

Setting of Study and Description of Subjects

The Clark County's fifteen year-round elementary schools, with either a K-5 or K-6 configuration, represented the population of year-round schools. These schools were located in all geographic areas of the Clark County School District, a large urban school district housing over 95,000 students and covering more than 8,000 square miles, and encompassing all of Las Vegas, Nevada, and several small nearby suburban and rural communities.

The student population of these schools ranged from about 650 students to over 1,200, with an average of almost 1,000. Three of the year-round schools had operated on the year-round schedule for at least five years, with the original school having been converted to that schedule in January 1972, the second converted in August 1979, and the third beginning year-round operation in 1980-81. These three schools operated on a schedule whereby at grades K-3, each teacher had students from only a single quad, and the teacher had the same three-week vacation periods as his/her students. At the upper grades, though, teachers were on extended contracts, had students from all four quads, and did not rotate regularly with a single group of students. Three of the other twelve year-round schools were converted to the year-round schedule in 1983-84, and the remaining nine were converted in 1984-85. These twelve schools all operated with teachers

at all grades having students from a single quad, thus sharing the same schedule as their students.

The nine-month schools included in the study were of two types. There were forty-six K-5 or K-6 large elementary schools, ranging in size from about 400 students to over 1,000 students. This category included all the Clark County School District elementary schools that had at least forty students per grade level but excluded eight outlying schools with enrollments ranging from no children at a particular grade to a maximum of forty students per grade.

There were also eight traditional-calendar "sixth-grade centers," which housed the bulk of the district's sixth-grade students, and which had an enrollment of 300-700 students each.

Table 1

Number of Schools by School Configuration
1984-85

	Grades Housed				
Structure	2	3	4	5	6
Year-Round K-5	9	9	9	9	--
K-6	6	6	6	6	6
Total	15	15	15	15	6
Nine-Month K-5	37	37	37	37	--
K-6	9	9	9	9	9
6th-Grade Centers	--	--	--	--	8
6-8	--	--	--	--	6
Total	46	46	46	46	23

Table 2

Number of Schools by School Configuration
1985-86

Structure	Grades Housed 2	3	4	5	6
Year-Round K-5	10	10	10	10	--
K-6	5	5	5	5	5
Total	15	15	15	15	5
Nine-Month K-5	36	36	36	36	--
K-6	10	10	10	10	10
6th-Grade Centers	--	--	--	--	8
6-8	--	--	--	--	6
Total	46	46	46	46	24

Instrumentation

Achievement tests. Measurement of achievement in reading, mathematics, and language was derived from test scores recorded from the districtwide administrations in the spring of 1985 and in the spring of 1986 of the Stanford Achievement Test, 1982 Edition, a nationally standardized, norm-referenced test, to students in grades three and six. Additional test data measuring reading and mathematics performance on district-developed CRTs were derived from the districtwide administrations in the spring of 1985 and in the spring of 1986 of the Clark County School District Reading and Mathematics CRTs to students in grades two through six. Thus, the following data sources were available and were used as dependent variables for each group of schools for both 1984-85 and 1985-86 data. (Separate analyses were conducted on each outcome measure for each year.)

Table 3

Achievement Measures
(Dependent Variables)

	Reading	Mathematics	Language
Grade 2	CCSD CRT-R Grade 2	CCSD CRT-M Grade 2	
3	SAT, '82 Edition Primary III (Total Reading)	SAT, '82 Edition Primary III (Total Math)	SAT, '82 Edition Primary III (Total Language)
	CCSD CRT-R Grade 3	CCSD CRT-M Grade 3	
4	CCSD CRT-R Grade 4	CCSD CRT-M Grade 4	
5	CCSD CRT-R Grade 5	CCSD CRT-M Grade 5	
6	SAT, '82 Edition Intermediate II (Total Reading)	SAT, '82 Edition Intermediate II (Total Math)	SAT, '82 Edition Intermediate II (Total Language)
	CCSD CRT-R Grade 6	CCSD CRT-M Grade 6	

According to the test publisher (Psychological Corporation, 1982), the Stanford Achievement Test series--in both its older editions and in its current form--was designed to measure the acquisition of skills, knowledge, and understandings that are common to curricula throughout the United States. To assure this kind of content validity, development of test specifications was preceded by a thorough analysis of current textbook series, state curriculum guidelines, course syllabi, and research on vocabulary acquisition and concept development.

The test specifications that were then developed provided a framework indicating what proportion of the test should be devoted to

each topic, as delineated by a set of instructional objectives, in order to achieve "balanced coverage." Item writing and subsequent construction of subtests was followed by review of these subtests by teachers, psychometricians, curriculum specialists, and editors. Review for various types of bias was also provided by a group of minority educators. A National Item Analysis Program was then conducted to provide information on the items themselves and to allow necessary culling and revision. The item analysis process was followed by a National Standardization Program, conducted both to "obtain normative data" and to "establish the statistical reliability and validity of the tests" (Psychological Corporation, 1982, p. 10).

The reported internal consistency reliability coefficients, based on the Kuder-Richardson Formula #20, reported by Psychological Corporation for the various test parts, are as follows:

	Primary 3	Intermediate 2
Total Reading	.96	.96
Total Mathematics	.96	.96
Total Language	.94	.96

The task of ascertaining content validity is, according to the authors, best accomplished by individual users, based on a comparison of the objectives covered by the test with the objectives specified in the user's curriculum.

The Ninth Mental Measurements Yearbook (Mitchell, 1985) provides a review of the SAT 7 by Davison, Professor of Educational Psychology at the University of Minnesota. Davison states:

> The seventh edition of the Stanford Achievement Test Series continues a tradition extending back to 1923. The tradition is an evolving one, and this new edition initiates or extends the authors' attempts to incorporate new testing technologies, adjust to changing curricula, and accomodate

> [sic] educators' requests for more and different types of information. . . . Like previous editions of the Stanford Achievement Test Series, this is one of the best available achievement batteries. . . . This edition continues an excellent tradition of content analysis, item writing, item analysis, and norming. Yet the authors have evolved the tradition further by incorporating the Rasch analysis into the development of scaled scores, improving the narrative reports, adding an optional writing assessment, and augmenting the reading content clusters. Some things improve with age (pp. 1449-1450).

The SAT 7 was published by the Psychological Corporation, New York, New York. It contained one hundred fourteen reading items, one hundred fourteen mathematics items, and eighty-two language items at the third-grade level. At the sixth-grade level, it contained one hundred twenty, one hundred eighteen, and one hundred items, respectively, in reading, mathematics, and language. All items were multiple-choice items with four alternatives.

Students at both grades three and six recorded their anwers on NCS Trans-Optic answer sheets. Answer sheets were then scanned and data were aggregated electronically in the district's Data Processing Department.

A variety of scores and score reports were produced from the SAT 7 administration. Scores were reported as raw scores, percentiles, stanines, grade equivalents, and scaled scores. These scores were recorded by classroom and by grade level (third and sixth only) for each elementary school, as well as for the entire district. Results were produced in paper copies as well as on microfilm.

The second test series used was the district-developed Mathematics and Reading Criterion-Referenced Tests for grades two through six. In 1984-85, the edition of the mathematics test used was one which

was developed in 1980. In 1985-86, a revised edition was used, which corresponded to the revisions in the mathematics curriculum upon which the test was based. The reading test, one developed in 1977, was the same for both years. Table 4 shows the number of items on each test.

Table 4

Number of Items per Test
CCSD Criterion-Referenced Tests

Grade Level	Reading CRT 1977 Edition	Math CRT 1980 Edition	Math CRT 1985 Edition
2	54	44	56
3	60	61	60
4	54	61	58
5	66	61	84
6	76	61	61

Table 5 shows the Kuder-Richardson Formula #20 reliability coefficient, indicating the internal consistency of each test. The number of students upon whose scores these calculations were based exceeded 5,000 in all cases.

Both the reading and mathematics tests, both editions, reflected a one-to-one correspondence with district curriculum. Test items were originally developed by task forces of district elementary teachers, with consultation provided by testing specialists from the district's Research and Development Department. Item development was followed by item validation via content review and then item analysis using extensive field testing with students below, at, and above grade

Table 5

Kuder-Richardson Formula #20 Reliability Coefficients
CCSD Criterion-Referenced Tests

Grade Level	Reading CRT 1977 Edition	Math CRT 1980 Edition	Math CRT 1985 Edition
2	.87	.85	.89
3	.90	.91	.90
4	.89	.92	.90
5	.89	.94	.94
6	.93	.94	.92

level. Items were selected or further revised based on item statistics and input from teachers. The reading test sampled content in the areas of phonetics and structural analysis, reading comprehension, and study skills. Math content was divided into numbers/numeration, operations, measurement, geometry, and problem solving.

Students at all grades (two through six) recorded their answers on customized NCS Trans-Optic answer sheets, which were then scanned and scored electronically in the district's Data Processing Department. Score reports, which aggregated results by grade level for each school, were then produced both in paper copies and on microfilm.

Attendance data. Attendance data for the nine-month schools were obtained from the Student Accounting Section of the Accounting Department. These data included the annual average daily attendance (number of students present) and the annual average daily membership (number of students enrolled) by grade level for each elememtary school for school years 1984-85 and 1985-86. For year-round schools, these data were obtained for each of the ten attendance periods, as well as for the entire year.

Teacher Opinionnaire. The Elementary Teacher Opinionnaire was first developed in 1980-81 by a committee of elementary teachers, principals, and central office administrators. Input or reaction from all these groups, after the opinionnaire was put into use, led to a revised version of the opinionnaire for the 1983-84 school year. A construct validity study was then conducted to determine if, in fact, items that were intended to represent certain facets of a particular evaluative criterion, did so. Based on the outcomes of this study, minor revision to the opinionnaire was undertaken, and this revised version was then used to gather teacher reaction to important elements of school operations during both the 1984-85 and 1985-86 school years. The opinionnaire from which the data presented in this study were derived contained thirty-six items, which addressed or provided evidence in regard to five Elements of Quality, which were part of the district's accountability plan on which principal assessments were based. Response to each item was recorded in terms of a continuum of response from "Strongly Disagree" to "Strongly Agree," with the least positive response being accorded a value of "1" and the most positive response accorded a value of "4." Table 6 shows the Elements of Quality that were addressed and the opinionnaire items that provided data in regard to each of the elements.

This opinionnaire was administered to all teachers at all elementary schools. Response was recorded on NCS Trans-Optic answer sheets, which were then scanned and scored by Data Processing. Results reported showed the mean response of all teachers at each school to each item, as well as to each group of items corresponding to a

Table 6

Elements of Quality and Corresponding Opinionnaire Items

Element of Quality #6

Management processes of assessment, priority planning, and evaluation are effectively utilized.

Opinionnaire Items

- The principal assists me in identifying my high priority objectives.
- The principal involves me in a formal self-assessment of my performance in relation to Elements of Quality 1-5.
- The principal monitors and assesses my progress in relation to my high priority objectives.
- The high priority objectives for the school are attainable.
- The principal communicates the expectation that CCSD curriculum guides are the basis for instruction.
- My teaching performance is accurately assessed in relation to district-established criteria (e.g., Elements of Quality).
- When conferring with me regarding my classroom performance, the principal provides specific suggestions for improvement.

Element of Quality #7

Personnel management procedures prescribed by law, regulation, contract, and administrative guidelines are effectively administered.

Opinionnaire Items

- My teaching performance is evaluated in terms communicated to me in advance (e.g., Elements of Quality, observation and conferencing procedures).
- The office personnel of the school are helpful.
- The principal ensures the staff is held accountable for all applicable employee obligations (e.g.,

Table 6 (continued)

instructional planning, meeting deadlines, student supervision, record keeping).

. The principal protects my instructional program from unnecessary interruptions.

. The principal makes frequent visits to my classroom to directly observe the instructional program.

Element of Quality #8

Staff effectiveness is promoted by the administrator through the application of appropriate principles of leadership and management.

Opinionnaire Items

. The principal is willing to make adjustments in plans to achieve the school's objectives when more appropriate alternatives are presented.

. The principal uses specific examples when reinforcing teacher performance.

. Specific procedures are used by the principal to provide staff input in decision making.

. The principal provides opportunities for me to participate in instruction-related staff development activities.

. Meetings conducted by the principal are efficient and purposeful.

. The principal is willing to discuss important issues with me.

. The principal provides opportunities for staff involvement in priority goal setting for the school.

. The principal offers the staff opportunities to select in-service programs that are relevant to their needs.

. The principal is an active participant in the school's staff development activities.

. The principal provides opportunities for me to share my expertise with others.

. When appropriate, the principal adapts leadership-behavior to accommodate the individual differences among staff members.

Table 6 (continued)

Element of Quality #9

Community confidence in the school is established and maintained.

Opinionnaire Items

- The community is kept well informed regarding school objectives, programs, and procedures.
- Procedures are established for parents to express opinions and suggestions regarding the school.
- The principal encourages parent involvement at the school.

Element of Quality #10

Organization and procedures for the management of the school are clearly written, consistent with the established procedures, and effectively administered.

Opinionnaire Items

- Supervision of students during non-instructional time is effectively managed.
- The principal follows established guidelines when correcting student misconduct.
- Routine school management functions reflect efficient operating procedures (e.g., purchasing, scheduling, budgeting).
- The school's library and resource center programs complement my instructional program.
- The principal has implemented an equitable, need-based system for distributing supplies and equipment.
- Standard school regulations and management procedures are clearly written in a staff handbook.
- The school's homework policy is clearly communicated to staff, parents, and students.
- The school's homework policy is realistic in terms of teacher and student time constraints.

Table 6 (continued)

- The principal encourages programs that promise student self-responsibility.
- Student needs and interests are considered in designing student activities programs.

particular Element of Quality. Mean teacher response to all items for each school was also produced. For the purpose of comparison in this study, the means of all items for a particular Element of Quality, as well as the grand mean for all items, were recorded for each group of schools--nine-month and year-round--for school years 1984-85 and 1985-86. Thus, for each year six comparisons were offered. Descriptive statistical techniques were used to make the comparisons, and summary statistics were provided.

Data Analysis

Test data and teacher opinionnaire data were analyzed using the Statistical Package for the Social Sciences (SPSS), which, according to the publishers, is "an integrated system of computer programs designed for the analysis of social science data" (Nie et al., 1975, p. 1). The mainframe version of this system provides for the simple and convenient analysis of many different types of data, and has practically no limitations on the amount of data it can handle, as opposed to many other statistical software packages. SPSS provides for descriptive statistics, frequency distributions, and cross tabulations. It also performs simple and partial correlations, multiple regressions, analysis of variance, factor analysis, and other more esoteric techniques.

Data analysis for the achievement test data consisted of use of the SPSS analysis of variance (ANOVA) subprogram, which provided for analysis of covariance among main effects (structure) after the effects of several covariates--in this case, percent minority students, percent of students from families receiving AFDC, and mean "school ability" level--were accounted for. The method of conducting the analysis of covariance called for an initial adjustment for all covariates, performed by using regression procedures to remove variation in the outcome measures, followed by an ordinary analysis of variance on the adjusted scores. A probability of occurrence equal to or less than .05 was taken to represent a statistically significant rather than a chance event.

The annual percent attendance for each grade level (three and six) for each of the nine-month schools was computed by dividing the average daily attendance (average number of students present) by the average daily membership (average number of students enrolled). For the year-round schools, similar figures for the annual average attendance rate were collected. However, in addition, the attendance figures--the average daily attendance and the average daily enrollment--for each of the ten attendance periods were recorded and analyzed separately. The ten attendance periods covered the entire school year for the year-round schools, with attendance period one representing the August-early September portion of the year (at the beginning of the Clark County School District school year for year-round schools), and periods nine and ten representing most of June and July. Although the actual dates of the different attendance periods varied

slightly for the different quads, in general, periods one, nine, and ten represented the summer months. Figures for these attendance periods were examined to determine, first, if there was reduced attendance, and second, if there was reduced enrollment during the summer months--which would have had the effect of obscuring reduced attendance. To answer the question as to reduced enrollment during the summer months, the following procedure was used. Average daily enrollment for the seven non-summer attendance periods was calculated. The average enrollment for these seven periods was then used as a base with which to compare average daily enrollment during the three summer periods. Finally, average attendance for each of the three summer periods--and for the entire year--was calculated using the cumulative recorded average daily attendance for each attendance period as the numerator and using the average daily membership (enrollment) for the seven non-summer months, multiplied by a factor of ten, for the denominator. This adjustment had the effect of calculating attendance based on a regular school year enrollment rate and revealing the existence of reductions in summer enrollment, if that, in fact, occurred.

Test data and teacher opinionnaire data were collected from the various departments in which the records were housed, recorded on a spreadsheet, and entered into a series of SPSS data files. After data entry, printouts of all files were obtained and then proofread against original data sources. After errors were corrected, input files were created by the researcher, and the programming was then run as specified. Output files were available for immediate review and analysis.

Summary

Chapter 3 was divided into four sections: (1) research design and null hypotheses, (2) setting of the study and description of the subjects, (3) instrumentation, and (4) data analysis.

The study used an ex post facto criterion-group design, with the two criterion groups being nine-month schools and year-round schools.

The section describing the setting of the study indicated the grade level configuration of all the district's nine-month and year-round schools that house grades two through six.

The section on instrumentation described the norm-referenced test series used to collect achievement measures in reading, mathematics, and language; the criterion-referenced test series used to achieve additional measures of reading and mathematics achievement; the Teacher Opinionnaire; and the attendance data collected.

Chapter 3 concluded with a description of the statistical procedures used in data analysis.

CHAPTER 4

Data Analysis and Discussion

Chapter 4 presented the findings of the study, which was designed to answer the following questions:

1. Are there significant differences in student achievement scores in reading, mathematics, and language at year-round schools compared with those at nine-month schools which cannot be accounted for by differences in student ethnic distribution, student socio-economic status, and student "school ability"?

2. What are the attendance patterns of year-round school students compared with those of nine-month school students?

3. How do teachers at year-round schools evaluate their respective schools compared to teachers at nine-month schools?

The findings were presented in three sections. The first section provided findings relative to the first question--that is, the results of an analysis of covariance (using student socioeconomic status, percent of minority students, and student "school ability" as covariates) to determine if significant differences existed in achievement between year-round schools and nine-month schools. The second section reported the findings relative to the second question, and displayed comparative attendance data for the two types of schools. Attendance data for year-round schools, both before and after adjustments were made for changes in summer enrollment, were

presented. In the third section, the findings relative to the third question--how do teachers at the two types of schools rate their respective programs?--were presented.

Achievement Effects

This section of the study dealt with the effects of school structure, as represented by the nine-month schedule or the year-round schedule, on student achievement. The study "sample" consisted of fifteen year-round K-5 or K-6 elementary schools, forty-six nine-month K-5 or K-6 elementary schools, eight nine-month sixth-grade centers (schools housing only students in grade six), and six nine-month middle schools housing students in grades six through eight. The mean scaled scores on the Stanford Achievement Test (SAT) or the mean percent correct on the Criterion-Referenced Tests (CRTs) for all schools housing students at the grade level in question were averaged for nine-month schools and for year-round schools. Thus, the unit of analysis was the school rather than the student. In each table that presents the results of an analysis of covariance, results that were found to be statistically significantly different at the .05 level of confidence were indicated with an asterisk.

In order to provide a framework for analyzing the effect of the year-round schedule on achievement, three null hypotheses were proposed.

For the dependent or outcome variable, reading achievement, as measured by the Total Reading scaled score on the appropriate level of the SAT for students at grades three and six and by the percent correct on the appropriate level of the district-developed Reading

CRT for students in grades two through six, the following null hypothesis was tested:

> There is no statistically significant difference ($p \leq .05$) between student achievement scores in reading at year-round and nine-month schools when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

For the dependent or outcome variable, mathematics achievement, as measured by the Total Mathematics scaled score on the appropriate level of the SAT for students at grades three and six and by the percent correct on the appropriate level of the district-developed Mathematics CRT for students in grades two through six, the following null hypothesis was tested:

> There is no statistically significant difference ($p \leq .05$) between student achievement scores in mathematics at year-round and nine-month schools when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

For the dependent or outcome variable, language achievement, as measured by the Total Language scaled score on the appropriate level of the SAT for students at grades three and six, the following null hypothesis was tested:

> There is no statistically significant difference ($p \leq .05$) between student achievement scores in language at year-round and nine-month schools when student ethnic distribution, student socioeconomic status, and student "school ability" are accounted for.

Presentation and analysis of the data. An analysis of covariance was used to analyze the data for the three dependent variables--reading, mathematics, and language achievement. In all, fourteen comparisons of reading achievement in year-round and nine-month schools were made, one each at grades two through six involving outcomes

of criterion-referenced testing in reading, for both 1984-85 and 1985-86, and one each at grades three and six involving outcomes of norm-referenced testing in reading, for both 1984-85 and 1985-86. In mathematics, also, a total of fourteen comparisons were made, involving the same measures, grade levels, and years as the reading comparisons. In language, comparisons were limited to outcomes on norm-referenced testing at grades three and six for both 1984-85 and 1985-86, thus amounting to a total of four comparisons.

Subprogram ANOVA (Analysis of Variance) from the Statistical Package for the Social Sciences (SPSS) (Nie et al., 1975) was used to make all comparisons, with school structure (nine-month or year-round) being the only independent variable or the "main effect." The covariates were the percent of students at each school receiving Aid to Families with Dependent Children (AFDC), the percent of students at a particular grade level at each school who were of minority status (called "MIN"), and the average "school ability" (called "SA") of students at a particular grade level at each school. These three variables for each school were used to "equate" the schools in both groups, since schools were not randomly assigned either to the year-round or to the nine-month group. The initial and apparent differences in outcome measures, then, were "corrected" or "adjusted" (Nie et al., p. 409) to take into account pre-existing differences in these three variables--ethnicity, socioeconomic status (SES), and "school ability"--that are known to be related to school achievement. Since the curriculum is the same at all district schools and the teaching methods do not vary systematically from one

school to the next, no attempt was made to account for outcome differences in terms of other variables than those identified. In the subprogram ANOVA, regression procedures were used to adjust for existing differences between the nine-month and year-round schools in regard to the covariates (Nie et al., 1975).

Reading achievement: Stanford Achievement Test, grades three and six, 1984-85. Table 7 presents the unadjusted mean scaled scores in Total Reading for the third-grade and sixth-grade populations at year-round and nine-month schools for 1984-85. In 1984-85, the mean scaled score in reading for all sixty-one schools housing third grades was 626.59. The mean scaled score for the forty-six nine-month schools was 627.89, while for the fifteen year-round schools it was 622.60. In grade six, the mean for all schools was 662.59, with a mean of 662.22 for the twenty-three nine-month schools, and a mean of 664.00 for the six year-round schools.

Table 7

Unadjusted Reading Scores (SAT), Grades Three and Six
Mean Scaled Scores
1984-85

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	626.59	61	627.89	46	622.60	15
6	662.59	29	662.22	23	664.00	6

The results shown in Table 7 indicated that reading achievement at grade three was higher in the nine-month schools than in the

year-round schools, while the reverse was true at grade six. However, after adjusting for the effects of differences in ethnic distribution, socioeconomic status, and "school ability" through an analysis of covariance, only the grade three difference was statistically significant. The results of the analyses of covariance for grades three and six SAT reading scores for 1984-85 are shown in Tables 8 and 9, respectively.

Table 8

Analysis of Covariance for SAT Reading, Grade Three
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	3228.610	3	1076.203	11.559	0.000
AFDC	47.997	1	47.997	0.516	0.476
MIN3	462.653	1	462.653	4.969	0.030
SA3	247.644	1	247.644	2.660	0.109
Main Effects	636.249	1	636.249	6.834	0.011*
STR	636.249	1	636.249	6.834	0.011*
Explained	3864.859	4	966.215	10.378	0.000
Residual	5213.844	56	93.104		
Total	9078.703	60	151.312		

Covariate	Raw Regression Coefficient
AFDC	-0.241
MIN3	-0.258
SA3	0.698

Table 9

Analysis of Covariance for SAT Reading, Grade Six
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	751.823	3	250.608	7.010	0.002
AFDC	7.466	1	7.466	0.209	0.652
MIN6	95.743	1	95.743	2.678	0.115
SA6	205.963	1	205.963	5.761	0.024
Main Effects	35.236	1	35.236	0.986	0.331
STR	35.236	1	35.236	0.986	0.331
Explained	787.060	4	196.765	5.504	0.003
Residual	857.972	24	35.749		
Total	1645.031	28	58.751		

Covariate	Raw Regression Coefficient
AFDC	0.169
MIN6	-0.223
SA6	0.996

Reading achievement: Stanford Achievement Test, grades three and six, 1985-86. Table 10 presents the mean scaled scores in Total Reading for the third- and sixth-grade populations at year-round and nine-month schools for 1985-86. The mean scaled score in reading for all schools with third grades was 629.10, with a mean for the nine-month schools of 630.04 and a mean for the year-round schools of 626.20. The mean scaled score in reading at grade six was 662.00. For the twenty-four nine-month schools it was 662.04, while for the five year-round schools it was 661.80.

Table 10

Unadjusted Reading Scores (SAT), Grades Three and Six
Mean Scaled Scores
1985-86

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	629.10	61	630.04	46	626.20	15
6	662.00	29	662.04	24	661.80	5

The results shown in Table 10 indicated that in 1985-86, reading scores in the nine-month schools were higher than at the year-round schools at both grades three and six. However, after adjusting for the effects of the covariates--AFDC, percent minority students, and "school ability"--neither difference was found to be significant at the .05 level of confidence. The results of the analyses of covariance for grades three and six SAT reading scores for 1985-86 are shown in Tables 11 and 12, respectively.

Table 11

Analysis of Covariance for SAT Reading, Grade Three
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	5929.480	3	1976.493	14.207	0.000
AFDC	56.838	1	56.838	0.409	0.525
MIN3	138.280	1	138.280	0.994	0.323
SA3	967.229	1	967.229	6.953	0.011
Main Effects	391.242	1	391.242	2.812	0.099
STR	391.242	1	391.242	2.812	0.099
Explained	6320.723	4	1580.181	11.359	0.000
Residual	7790.621	56	139.118		
Total	14111.344	60	235.189		

Covariate	Raw Regression Coefficient
AFDC	-0.268
MIN3	-0.171
SA3	1.558

Table 12

Analysis of Covariance for SAT Reading, Grade Six
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	2620.035	3	873.345	16.096	0.000
AFDC	0.048	1	0.048	0.001	0.977
MIN6	0.066	1	0.066	0.001	0.973
SA6	465.212	1	465.212	8.574	0.007
Main Effects	25.727	1	25.727	0.474	0.498
STR	25.727	1	25.727	0.474	0.498
Explained	2645.762	4	661.440	12.190	0.000
Residual	1302.235	24	54.260		
Total	3947.998	28	141.000		

Covariate	Raw Regression Coefficient
AFDC	-0.012
MIN6	-0.006
SA6	2.321

Reading achievement: Reading criterion-referenced tests, grades two through six, 1984-85. Table 13 shows the mean percent correct for grades two through six on the district-deveoped reading criterion-referenced tests in 1984-85. At grade two, the mean percent correct for all sixty-one schools was 89.10, with the nine-month mean being 89.26 percent, and the year-round mean being 88.60 percent. At grade three, the mean for all schools was 85.48 percent correct, with a nine-month mean of 85.85 percent and a year-round mean of 84.33 percent. The higher results for nine-month schools at grade three replicated outcomes of norm-referenced testing (SAT) at that grade level. At grade four, the mean for all schools was 85.03 percent correct, with a nine-month mean of 85.17, and a year-round mean of 84.60. At grade five, the mean for all schools was 81.13 percent correct, with the nine-month schools' mean equal to 81.30 percent, and the year-round schools' mean equal to 80.60 percent. At grade six, the total population mean was 75.24 percent correct, with the mean for nine-month schools equal to 74.61 percent, and the mean for year-round schools equal to 77.67 percent. Results for reading criterion-referenced testing at grade six were consonant with those for norm-referenced testing at this grade level.

However, when an analysis of covariance was performed on data at each grade level, only the difference at grade three was found to be statistically significant at the .05 level of confidence. Thus, of five comparisons, four of which appeared to favor nine-month schools, only one was found to represent statistically significantly higher achievement by the nine-month schools. This difference reflected the

statistically significant difference in achievement on the SAT at grade three.

Table 13

Unadjusted Reading Scores (CRT), Grades Two through Six
Mean Percent Correct
1984-85

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
2	89.10	61	89.26	46	88.60	15
3	85.48	61	85.85	46	84.33	15
4	85.03	61	85.17	46	84.60	15
5	81.13	61	81.30	46	80.60	15
6	75.24	29	74.61	23	77.67	6

The results of the analyses of covariance for reading criterion-referenced test scores at grades two through six for 1984-85 are presented in Tables 14-18, respectively.

Table 14

Analysis of Covariance for CRT Reading, Grade Two
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	503.311	3	167.770	20.291	0.000
AFDC	6.969	1	6.969	0.843	0.362
MIN2	16.625	1	16.625	2.011	0.162
SA2	72.159	1	72.159	8.727	0.005
Main Effects	15.082	1	15.082	1.824	0.182
STR	15.082	1	15.082	1.824	0.182
Explained	518.393	4	129.598	15.675	0.000
Residual	463.010	56	8.268		
Total	981.403	60	16.357		

Covariate	Raw Regression Coefficient
AFDC	-0.093
MIN2	-0.059
SA2	0.374

Table 15

Analysis of Covariance for CRT Reading, Grade Three
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	458.253	3	152.751	17.188	0.000
AFDC	4.810	1	4.810	0.541	0.465
MIN3	28.319	1	28.319	3.187	0.080
SA3	84.193	1	84.193	9.474	0.003
Main Effects	57.282	1	57.282	6.446	0.014*
STR	57.282	1	57.282	6.446	0.014*
Explained	515.535	4	128.884	14.502	0.000
Residual	497.673	56	8.887		
Total	1013.208	60	16.887		

Covariate	Raw Regression Coefficient
AFDC	-0.076
MIN3	-0.064
SA3	0.407

Table 16

Analysis of Covariance for CRT Reading, Grade Four
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	383.254	3	127.751	12.389	0.000
AFDC	0.388	1	0.388	0.038	0.847
MIN4	41.193	1	41.193	3.995	0.051
SA4	57.101	1	57.101	5.538	0.022
Main Effects	5.238	1	5.238	0.508	0.479
STR	5.238	1	5.238	0.508	0.479
Explained	388.492	4	97.123	9.419	0.000
Residual	577.437	56	10.311		
Total	965.929	60	16.099		

Covariate	Raw Regression Coefficient
AFDC	-0.019
MIN4	-0.082
SA4	0.349

Table 17

Analysis of Covariance for CRT Reading, Grade Five
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	541.469	3	180.490	12.339	0.000
AFDC	1.230	1	1.230	0.084	0.773
MIN5	11.603	1	11.603	0.793	0.377
SA5	159.150	1	159.150	10.880	0.002
Main Effects	0.331	1	0.331	0.023	0.881
STR	0.331	1	0.331	0.023	0.881
Explained	541.800	4	135.450	9.260	0.000
Residual	819.145	56	14.628		
Total	1360.945	60	22.682		

Covariate	Raw Regression Coefficient
AFDC	0.035
MIN5	-0.048
SA5	0.674

Table 18

Analysis of Covariance for CRT Reading, Grade Six
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	79.864	3	26.621	1.602	0.215
AFDC	25.255	1	25.255	1.519	0.230
MIN6	33.282	1	33.282	2.002	0.170
SA6	33.342	1	33.342	2.006	0.170
Main Effects	62.510	1	62.510	3.761	0.064
STR	62.510	1	62.510	3.761	0.064
Explained	142.374	4	35.594	2.141	0.107
Residual	398.934	24	16.622		
Total	541.308	28	19.332		

Covariate	Raw Regression Coefficient
AFDC	0.310
MIN6	-0.132
SA6	0.401

Reading achievement: Reading criterion-referenced tests, grades two through six, 1985-86. Table 19 shows the mean percent correct for grades two through six on the district-developed reading criterion-referenced tests in 1985-86. In that year, the total number of schools included in the reading criterion-referenced test data analysis at grades two through five declined to fifty-six. Five elementary schools--three on TCS and two on YRS--participated in a pilot program for the revision of the reading management system and thus administered different end-of-the-year tests. At grade six, one nine-month school and two year-round schools participated in the pilot program.

The data in Table 19 showed mean percent correct scores from criterion-referenced testing that were very similar to those for

1984-85. However, while in 1984-85, results in nine-month schools were higher than those in year-round schools at grades two through five, in 1985-86, nine-month schools achieved higher results than year-round schools only at grades three and five.

Table 19

Unadjusted Reading Scores (CRT), Grades Two through Six
Mean Percnt Correct
1985-86

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
2	88.13	56	87.98	43	88.62	13
3	84.77	56	85.16	43	83.46	13
4	85.38	56	85.23	43	85.85	13
5	81.88	56	81.95	43	81.62	13
6	74.27	26	73.70	23	78.67	3

Results of the analysis of covariance performed on data at each grade level showed that while year-round schools initially achieved higher results at grades two, four, and six, and nine-month schools initially achieved higher results at grades three and five, only the difference at grade three was statistically significant at the .05 level of confidence after an analysis of covariance was conducted.

Tables 20-24 present the results of the analyses of covariance for grades two through six, respectively.

Table 20

Analysis of Covariance for CRT Reading, Grade Two
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	700.744	3	233.581	26.401	0.000
AFDC	10.266	1	10.266	1.160	0.286
MIN2	40.513	1	40.513	4.579	0.037
SA2	89.381	1	89.381	10.102	0.003
Main Effects	0.151	1	0.151	0.017	0.897
STR	0.151	1	0.151	0.017	0.897
Explained	700.895	4	175.224	19.805	0.000
Residual	451.225	51	8.848		
Total	1152.120	55	20.948		

Covariate	Raw Regression Coefficient
AFDC	-0.100
MIN2	-0.091
SA2	0.483

Table 21

Analysis of Covariance for CRT Reading, Grade Three
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	525.655	3	175.218	16.781	0.000
AFDC	0.637	1	0.637	0.061	0.806
MIN3	54.035	1	54.035	5.175	0.027
SA3	45.538	1	45.538	4.361	0.042
Main Effects	95.792	1	95.792	9.174	0.004*
STR	95.792	1	95.792	9.174	0.004*
Explained	621.447	4	155.362	14.879	0.000
Residual	532.530	51	10.442		
Total	1153.977	55	20.981		

Covariate	Raw Regression Coefficient
AFDC	-0.029
MIN3	-0.110
SA3	0.346

Table 22

Analysis of Covariance for CRT Reading, Grade Four
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	497.566	3	165.855	19.308	0.000
AFDC	19.583	1	19.583	2.280	0.137
MIN4	9.414	1	9.414	1.096	0.300
SA4	75.107	1	75.017	8.743	0.005
Main Effects	3.457	1	3.457	0.402	0.529
STR	3.457	1	3.457	0.402	0.529
Explained	501.023	4	125.256	14.581	0.000
Residual	438.098	51	8.590		
Total	939.120	55	17.075		

Covariate	Raw Regression Coefficient
AFDC	-0.149
MIN4	-0.042
SA4	0.432

Table 23

Analysis of Covariance for CRT Reading, Grade Five
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	624.060	3	208.020	15.158	0.000
AFDC	3.004	1	3.004	0.219	0.642
MIN5	32.526	1	32.526	2.370	0.130
SA5	150.511	1	150.511	10.968	0.002
Main Effects	0.182	1	0.182	0.013	0.909
STR	0.182	1	0.182	0.013	0.909
Explained	624.242	4	156.060	11.372	0.000
Residual	699.877	51	13.723		
Total	1324.119	55	24.075		

Covariate	Raw Regression Coefficient
AFDC	0.058
MIN5	-0.085
SA5	0.653

Table 24

Analysis of Covariance for CRT Reading, Grade Six
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	227.655	3	75.885	3.851	0.024
AFDC	1.055	1	1.055	0.054	0.819
MIN6	0.834	1	0.834	0.042	0.839
SA6	45.833	1	45.833	2.326	0.142
Main Effects	59.648	1	59.648	3.027	0.097
STR	59.649	1	59.649	3.027	0.097
Explained	287.303	4	71.826	3.645	0.021
Residual	413.809	21	19.705		
Total	701.112	25	28.044		

Covariate	Raw Regression Coefficient
AFDC	-0.058
MIN6	0.023
SA6	0.750

In summary, of fourteen initial, unadjusted comparisons in reading, nine showed achievement to be higher in the nine-month schools, while five showed higher achievement in the year-round schools. However, when an analyis of covariance was used to "adjust" or account for (Nie et al., 1975) the effects of percent minority, socioeconomic status, and "school ability," only three comparisons showed statistically significant differences ($p \leq .05$). All of those were in favor of TCS, and all three were at grade three. While these outcomes did seem to provide some indication that there was a statistically significant difference in reading achievement at grade three in favor of traditional-calendar schools, there was no evidence that this difference was replicated at the other grade levels. Since the finding of statistically significant differences existed at

only one grade level, and in only three out of fourteen comparisons overall, no consistent evidence was found to warrant rejection of the null hypothesis that no statistically significant differences in reading achievement existed between the two types of schools.

Mathematics achievement: Stanford Achievement Test, grades three and six, 1984-85. Table 25 presents the unadjusted mean scaled scores in Total Math for the third-grade and sixth-grade populations at year-round and nine-month schools for 1984-85. In 1984-85, the mean scaled score in mathematics for all sixty-one schools housing third grades was 623.85. The mean scaled score for the forty-six nine-month schools was 625.50, while for the fifteen year-round schools it was 618.80. In grade six, the mean for all schools was 685.45, with a mean of 684.61 for the twenty-three nine-month schools, and a mean of 688.67 for the six year-round schools.

Table 25

Unadjusted Math Scores (SAT), Grades Three and Six
Mean Scaled Scores
1984-85

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	623.85	61	625.50	46	618.80	15
6	685.45	29	684.61	23	688.67	6

The results shown in Table 25 indicated that mathematics achievement in grade three was initially higher in the nine-month schools than in the year-round schools, while the reverse was true at

grade six. However, after adjusting for the effects of differences in ethnic distribution, socioeconomic status, and "school ability" through an analysis of covariance, the differences were statistically significant only for grade three. The results of the analyses of covariance for grades three and six SAT mathematics scores for 1984-85 are shown in Tables 26 and 27, respectively.

Table 26

Analysis of Covariance for SAT Mathematics, Grade Three
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	3577.252	3	1192.427	8.975	0.000
AFDC	3.294	1	3.294	0.025	0.875
MIN3	375.252	1	375.252	2.824	0.098
SA3	683.580	1	683.580	5.145	0.027
Main Effects	838.213	1	838.213	6.309	0.015*
STR	838.215	1	838.215	6.309	0.015*
Explained	4415.465	4	1103.866	8.309	0.000
Residual	7440.141	56	132.860		
Total	11855.605	60	197.593		

Covariate	Raw Regression Coefficient
AFDC	-0.063
MIN3	-0.232
SA3	1.159

Table 27

Analysis of Covariance for SAT Mathematics, Grade Six
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	1061.023	3	353.674	4.667	0.010
AFDC	81.358	1	81.358	1.076	0.310
MIN6	160.745	1	160.745	2.126	0.158
SA6	494.934	1	494.934	6.545	0.017
Main Effects	127.356	1	127.356	1.684	0.207
STR	127.356	1	127.356	1.684	0.207
Explained	1188.379	4	297.095	3.929	0.014
Residual	1814.790	24	75.616		
Total	3003.169	28	107.256		

Covariate	Raw Regression Coefficient
AFDC	0.557
MIN6	-0.289
SA6	1.543

Mathematics achievement: Stanford Achievement Test, grades three and six, 1985-86. Table 28 presents the mean scaled scores in mathematics for the third- and sixth-grade populations at year-round and nine-month schools for 1985-86. The mean scaled score for all schools with third grades was 627.26, with a mean for the nine-month schools of 628.61 and a mean for the year-round schools of 623.13. The mean scaled score in mathematics for grade six was 685.86. For the twenty-four nine-month schools it was 685.17, while for the five year-round schools it was 689.20.

The results shown in Table 28 indicated that in 1985-86, "unadjusted" mathematics scores in the nine-month schools were higher at grade three than those at the year-round schools, but lower than year-round scores at grade six. However, after adjusting for the

effects of the covariates--AFDC, percent minority students, and "school ability"--neither difference was found to be significant at the .05 level of confidence.

Table 28

Unadjusted Math Scores (SAT), Grades Three and Six
Mean Scaled Scores
1985-86

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	627.26	61	628.61	46	623.13	15
6	685.86	29	685.17	24	689.20	5

The results of the analyses of covariance for grades three and six SAT mathematics scores for 1985-86 are shown in Tables 29 and 30, respectively.

Table 29

Analysis of Covariance for SAT Mathematics, Grade Three
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	5240.402	3	1746.801	9.235	0.000
AFDC	30.134	1	30.134	0.159	0.691
MIN3	52.072	1	52.072	0.275	0.602
SA3	1183.125	1	1183.125	6.255	0.015
Main Effects	578.461	1	578.461	3.058	0.086
STR	578.458	1	578.458	3.058	0.086
Explained	5818.863	4	1454.716	7.690	0.000
Residual	10592.859	56	189.158		
Total	16411.723	60	273.529		

Covariate	Raw Regression Coefficient
AFDC	-0.195
MIN3	-0.105
SA3	1.723

Table 30

Analysis of Covariance for SAT Mathematics, Grade Six
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	2670.507	3	890.169	10.907	0.000
AFDC	33.858	1	33.858	0.415	0.526
MIN6	5.701	1	5.701	0.070	0.794
SA6	415.746	1	415.746	5.094	0.033
Main Effects	202.234	1	202.234	2.478	0.129
STR	202.234	1	202.234	2.478	0.129
Explained	2872.741	4	718.185	8.800	0.000
Residual	1958.693	24	81.612		
Total	4831.434	28	172.551		

Covariate	Raw Regression Coefficient
AFDC	-0.320
MIN6	0.057
SA6	2.194

Mathematics achievement: Mathematics criterion-referenced tests, grades two through six, 1984-85. Table 31 shows the mean percent correct for grades two through six on the district-developed mathematics criterion-referenced tests in 1984-85. At grade two, the mean percent for sixty-one schools was 87.39, with the nine-month mean being 87.52 percent, and the year-round mean being 87.00 percent. At grade three, the mean for all schools was 85.43 percent correct, with a nine-month mean of 85.70 percent and a year-round mean of 84.60. At grade four, the mean for all schools was 85.20 percent correct, with a nine-month mean of 85.61, and a year-round mean of 83.93. At grade five, the mean for all schools was 76.52 percent correct, with the nine-month schools' mean equal to 77.41, and the year-round schools' mean equal to 73.80. At grade six, the total population mean was 65.83 percent correct, with the mean for nine-month schools equal to 64.61 percent and the mean for year-round schools equal to 70.50 percent.

Table 31

Unadjusted Math Scores (CRT), Grades Two through Six
Mean Percent Correct
1984-85

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
2	87.39	61	87.52	46	87.00	15
3	85.43	61	85.70	46	84.60	15
4	85.20	61	85.61	46	83.93	15
5	76.52	61	77.41	46	73.80	15
6	65.83	29	64.61	23	70.50	6

However, analyses of covariance performed on data at each grade level showed that none of the apparent differences was statistically

significant at the .05 level of confidence. Thus, of five comparisons, four of which initially favored nine-month schools, none was statistically significant after adjusting for the effect of the covariates. The results of the analyses of covariance for mathematics criterion-referenced test scores at grades two through six for 1984-85 are presented in Tables 32-36, respectively.

Table 32

Analysis of Covariance for CRT Mathematics, Grade Two
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	412.355	3	137.452	14.316	0.000
AFDC	0.267	1	0.267	0.028	0.868
MIN2	7.274	1	7.274	0.758	0.388
SA2	127.311	1	127.311	13.260	0.001
Main Effects	4.526	1	4.526	0.471	0.495
STR	4.526	1	4.526	0.471	0.495
Explained	416.881	4	104.220	10.855	0.000
Residual	537.670	56	9.601		
Total	954.551	60	15.909		

Covariate	Raw Regression Coefficient
AFDC	0.018
MIN2	-0.039
SA2	0.497

Table 33

Analysis of Covariance for CRT Mathematics, Grade Three
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	342.723	3	114.241	9.885	0.000
AFDC	0.017	1	0.017	0.001	0.970
MIN3	30.963	1	30.963	2.679	0.107
SA3	84.625	1	84.625	7.322	0.009
Main Effects	28.977	1	28.977	2.507	0.119
STR	28.977	1	28.977	2.507	0.119
Explained	371.700	4	92.925	8.040	0.000
Residual	647.212	56	11.557		
Total	1018.912	60	16.982		

Covariate	Raw Regression Coefficient
AFDC	0.004
MIN3	-0.067
SA3	0.408

Table 34

Analysis of Covariance for CRT Mathematics, Grade Four
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	212.725	3	70.908	4.180	0.010
AFDC	10.429	1	10.429	0.615	0.436
MIN4	35.534	1	35.534	2.095	0.153
SA4	51.503	1	51.503	3.036	0.087
Main Effects	25.047	1	25.047	1.477	0.229
STR	25.047	1	25.047	1.477	0.229
Explained	237.772	4	59.443	3.505	0.013
Residual	949.862	56	16.962		
Total	1187.634	60	19.794		

Covariate	Raw Regression Coefficient
AFDC	0.100
MIN4	-0.077
SA4	0.331

Table 35

Analysis of Covariance for CRT Mathematics, Grade Five
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	681.115	3	227.038	5.250	0.003
AFDC	26.035	1	26.035	0.602	0.441
MIN5	162.022	1	162.022	3.746	0.058
SA5	61.038	1	61.038	1.411	0.240
Main Effects	140.134	1	140.134	3.240	0.077
STR	140.134	1	140.134	3.240	0.077
Explained	821.249	4	205.312	4.747	0.002
Residual	2421.957	56	43.249		
Total	3243.207	60	54.053		

Covariate	Raw Regression Coefficient
AFDC	0.163
MIN5	-0.180
SA5	0.417

Table 36

Analysis of Covariance for CRT Mathematics, Grade Six
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	137.737	3	45.912	0.699	0.562
AFDC	10.038	1	10.038	0.153	0.699
MIN6	57.493	1	57.493	0.875	0.359
SA6	14.964	1	14.964	0.228	0.638
Main Effects	219.142	1	219.142	3.335	0.080
STR	219.143	1	219.143	3.335	0.080
Explained	356.879	4	89.220	1.358	0.278
Residual	1577.256	24	65.719		
Total	1934.135	28	69.076		

Covariate	Raw Regression Coefficient
AFDC	0.196
MIN6	-0.173
SA6	0.268

Mathematics achievement: Mathematics criterion-referenced tests, grades two through six, 1985-86. Table 37 shows the mean percent correct for grades two through six on the district-developed mathematics criterion-referenced tests in 1985-86.

Table 37

Unadjusted Math Scores (CRT), Grades Two through Six
Mean Percent Correct
1985-86

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
2	85.54	61	85.74	46	84.93	15
3	81.61	61	82.00	46	80.40	15
4	80.89	61	80.93	46	80.73	15
5	77.15	61	77.46	46	76.20	15
6	67.52	29	66.71	24	71.40	5

Results of the analysis of covariance performed on data at each grade level showed that while year-round schools scored lower than nine-month schools at all grade levels except grade six, none of the differences was statistically significant at the .05 level of confidence, when the effects of the covariates were taken into account. Tables 38-42 present the results of the analyses of covariance for grades two through six, respectively.

Table 38

Analysis of Covariance for CRT Mathematics, Grade Two
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	798.999	3	266.333	18.276	0.000
AFDC	36.484	1	36.484	2.504	0.119
MIN2	0.156	1	0.156	0.011	0.918
SA2	198.667	1	198.667	13.633	0.001
Main Effects	2.078	1	2.078	0.143	0.707
STR	2.078	1	2.078	0.143	0.707
Explained	801.077	4	200.269	13.743	0.000
Residual	816.066	56	14.573		
Total	1617.143	60	26.952		

Covariate	Raw Regression Coefficient
AFDC	-0.187
MIN2	0.006
SA2	0.683

Table 39

Analysis of Covariance for CRT Mathematics, Grade Three
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	701.696	3	233.899	10.697	0.000
AFDC	2.874	1	2.874	0.131	0.718
MIN3	14.147	1	14.147	0.647	0.425
SA3	139.363	1	139.363	6.374	0.014
Main Effects	56.380	1	56.380	2.578	0.114
STR	56.380	1	56.380	2.578	0.114
Explained	758.076	4	189.519	8.667	0.000
Residual	1224.475	56	21.866		
Total	1982.551	60	33.042		

Covariate	Raw Regression Coefficient
AFDC	-0.060
MIN3	-0.055
SA3	0.592

Table 40

Analysis of Covariance for CRT Mathematics, Grade Four
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	1001.776	3	333.925	16.191	0.000
AFDC	47.790	1	47.790	2.317	0.134
MIN4	32.141	1	32.141	1.558	0.217
SA4	105.831	1	105.831	5.131	0.027
Main Effects	13.454	1	13.454	0.652	0.423
STR	13.454	1	13.454	0.652	0.423
Explained	1015.231	4	253.808	12.306	0.000
Residual	1154.960	56	20.624		
Total	2170.191	60	36.170		

Covariate	Raw Regression Coefficient
AFDC	-0.231
MIN4	-0.075
SA4	0.492

Table 41

Analysis of Covariance for CRT Mathematics, Grade Five
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	1244.026	3	414.675	13.979	0.000
AFDC	25.571	1	25.571	0.862	0.357
MIN5	173.443	1	173.443	5.847	0.019
SA5	181.787	1	181.787	6.128	0.016
Main Effects	0.450	1	0.450	0.015	0.902
STR	0.450	1	0.450	0.015	0.902
Explained	1244.476	4	311.119	10.488	0.000
Residual	1661.189	56	29.664		
Total	2905.666	60	48.428		

Covariate	Raw Regression Coefficient
AFDC	0.167
MIN5	-0.194
SA5	0.653

Table 42

Analysis of Covariance for CRT Mathematics, Grade Six
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	343.935	3	114.645	1.983	0.143
AFDC	16.618	1	16.618	0.287	0.597
MIN6	14.067	1	14.067	0.243	0.626
SA6	47.358	1	47.358	0.819	0.374
Main Effects	129.652	1	129.652	2.242	0.147
STR	129.652	1	129.652	2.242	0.147
Explained	473.587	4	118.397	2.048	0.120
Residual	1387.652	24	57.819		
Total	1861.239	28	66.473		

Covariate	Raw Regression Coefficient
AFDC	0.224
MIN6	-0.090
SA6	0.740

In summary, of fourteen unadjusted comparisons in mathematics, ten showed achievement to be higher in the nine-month schools, while the other four--all at grade six--showed higher achievement in the year-round schools. However, when adjusted by means of an analysis of covariance for the effects of percent minority students, socioeconomic status, and "school ability," only one comparison showed a statistically significant difference ($p \leq .05$), and that was in favor of the nine-month schools. That difference was registered in third grade on the SAT in 1984-85. The finding of a single statistically significant difference in fourteen comparisons did not provide evidence to support rejection of the null hypothesis that no statistically significant achievement difference in mathematics existed between the two types of schools.

Language achievement: Stanford Achievement Test, grades three and six, 1984-85. Table 43 presents the unadjusted mean scaled scores in Total Language for the third-grade and sixth-grade populations at year-round and nine-month schools for 1984-85. In 1984-85, the mean scaled score in language for all sixty-one schools housing third graders was 637.23. The mean scaled score for the forty-six nine-month schools was 638.89, while for the fifteen year-round schools it was 632.13. At grade six, the mean for all schools was 671.97, with a mean of 671.39 for the twenty-three nine-month schools, and a mean of 674.17 for the six year-round schools.

Table 43

Unadjusted Language Scores (SAT), Grades Three and Six
Mean Scaled Scores
1984-85

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	637.23	61	638.89	46	632.13	15
6	671.97	29	671.39	23	674.17	6

The results in Table 43 indicated that unadjusted language scores at grade three were higher in the nine-month schools than in the year-round schools, while the reverse was true at grade six. However, after adjusting for the effects of the covariates, the difference was statistically significant only at grade three. The results of the analyses of covariance for grades three and six SAT language scores for 1984-85 are shown in Tables 44 and 45, respectively.

Table 44

Analysis of Covariance for SAT Language, Grade Three
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	2874.668	3	958.223	11.287	0.000
AFDC	62.798	1	62.798	0.740	0.393
MIN3	128.930	1	128.930	1.519	0.223
SA3	486.154	1	486.154	5.726	0.020
Main Effects	877.756	1	877.756	10.339	0.002*
STR	877.756	1	877.756	10.339	0.002*
Explained	3752.426	4	938.106	11.050	0.000
Residual	4754.293	56	84.898		
Total	8506.719	60	141.779		

Covariate	Raw Regression Coefficient
AFDC	-0.275
MIN3	-0.136
SA3	0.977

Table 45

Analysis of Covariance for SAT Language, Grade Six
1984-85

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	808.106	3	269.369	5.550	0.005
AFDC	25.516	1	25.516	0.526	0.475
MIN6	28.292	1	28.292	0.583	0.453
SA6	487.685	1	487.685	10.048	0.004
Main Effects	45.948	1	45.948	0.947	0.340
STR	45.948	1	45.948	0.947	0.340
Explained	854.054	4	213.513	4.399	0.008
Residual	1164.909	24	48.538		
Total	2018.963	28	72.106		

Covariate	Raw Regression Coefficient
AFDC	0.312
MIN6	-0.121
SA6	1.532

Language achievement: Stanford Achievement Test, grades three and six, 1985-86. Table 46 presents the unadjusted mean scaled scores in language for the third- and sixth-grade populations at year-round and nine-month schools for 1985-86. The mean scaled score in language for all schools with third grades was 640.05, with a mean for the nine-month schools of 641.63 and a mean for the year-round schools of 635.20. The mean scaled score in language for grade six was 671.97 for all schools. For the twenty-four nine-month schools it was 671.88, while for the five year-round schools it was 672.40.

Table 46

Unadjusted Language Scores (SAT), Grades Three and Six
Mean Scaled Scores
1985-86

Grade Level	All Schools	N	Nine-Month Schools	N	Year-Round Schools	N
3	640.05	61	641.63	46	635.20	15
6	671.97	29	671.88	24	672.40	5

The results of Table 46 indicated that unadjusted language scores in grade three were higher in the nine-month schools than in the year-round schools, while the reverse was true at grade six. However, after adjusting for the effects of covariates, the difference was statistically significant only at grade three. The results of the analyses of covariance for grades three and six SAT language scores for 1985-86 are shown in Tables 47 and 48, respectively.

Table 47

Analysis of Covariance for SAT Language, Grade Three
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	4795.887	3	1598.629	13.163	0.000
AFDC	75.593	1	75.593	0.622	0.433
MIN3	52.466	1	52.466	0.432	0.514
SA3	865.636	1	865.636	7.128	0.010
Main Effects	781.766	1	781.766	6.437	0.014*
STR	781.768	1	781.768	6.437	0.014*
Explained	5577.652	4	1394.413	11.481	0.000
Residual	6801.133	56	121.449		
Total	12378.785	60	206.313		

Covariate	Raw Regression Coefficient
AFDC	-0.310
MIN3	-0.105
SA3	1.474

Table 48

Analysis of Covariance for SAT Language, Grade Six
1985-86

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Covariates	1788.912	3	596.304	12.216	0.000
AFDC	19.448	1	19.448	0.398	0.534
MIN6	7.716	1	7.716	0.158	0.694
SA6	313.813	1	313.813	6.429	0.018
Main Effects	36.524	1	36.524	0.748	0.396
STR	36.524	1	36.524	0.748	0.396
Explained	1825.437	4	456.359	9.349	0.000
Residual	1171.526	24	48.814		
Total	2996.962	28	107.034		

Covariate	Raw Regression Coefficient
AFDC	-0.242
MIN6	0.067
SA6	1.906

In summary, of four unadjusted comparisons in language, two (both at grade three) showed achievement to be higher in nine-month schools, while the other two (both at grade six) showed higher achievement in the year-round schools. However, when adjusted by means of an analysis of covariance for the effects of percent minority students, socioeconomic status, and "school ability," only the two comparisons at grade three showed a statistically significant difference ($p \leq .05$); those were both in favor of the nine-month schools. Thus, these findings provided some evidence that there may be statistically significant differences in language achievement at grade three in favor of nine-month schools. However, again, because the finding of statistical significance is limited to a single grade level, the data cannot be said to provide consistent evidence that would warrant rejection of the null hypothesis of no statistically significant achievement differences in language between the two types of schools.

Summary of achievement findings. Achievement comparisons on both norm-referenced and criterion-referenced tests for 1984-85 and 1985-86 are summarized in Table 49. The group of schools (nine-month [TCS] or year-round [YRS]) that recorded higher initial, "unadjusted" mean scores on the test in question is noted, with an asterisk indicating differences that were statistically significant ($p \leq .05$) after adjustment for the effects of covariates.

Table 49

Summary of Achievement Comparisons

	Instrument				
		SAT		CCSD CRT	
Grade	Reading	Math	Language	Reading	Math
Year = 1984-85					
2				TCS	TCS
3	TCS*	TCS*	TCS*	TCS*	TCS
4				TCS	TCS
5				TCS	TCS
6	YRS	YRS	YRS	YRS	YRS
Year = 1985-86					
2				YRS	TCS
3	TCS	TCS	TCS*	TCS*	TCS
4				YRS	TCS
5				TCS	TCS
6	TCS	YRS	YRS	YRS	YRS

In summary, of thirty-two comparisons, only six were found to be statistically significant ($p \leq .05$). All of those were in favor of the traditional-calendar schedule, and all were at grade three. Three were in the area of reading (on one norm-referenced and two criterion-referenced measures), two were in the area of language (on norm-referenced measures), and the last was in the area of mathematics (on a norm-referenced measure). The outcomes of these comparisons provide some evidence that achievement at grade three may have been statistically significantly higher in the nine-month schools than in the year-round schools: six out of ten comparisons at grade three showed statistically significant differences in

favor of the nine-month schools, after adjustment was made for the effects of the covariates. However, no statistically significant differences in achievement were found in favor of either type of school at any grade level other than grade three. Thus, the data did not provide consistent evidence that statistically significant achievement differences in favor of either type of school existed in any one of the the three subject areas, and none of the three null hypotheses was rejected.

Attendance Data

A finding of previous studies was that attendance at year-round schools was lower than that at traditional-calendar schools. It was also found that reduced summer enrollment had the effect of obscuring reduced summer attendance (Costa, 1981; Bundren, 1985). Comparative attendance data for 1984-85 and 1985-86 at both grades three and six for traditional-calendar and year-round schools are presented in Table 50. Annual percent attendance for TCS and YRS was calculated by dividing the average daily attendance (ADA) for each school by the average daily membership (ADM) and then averaging the results for each group of schools. Adjusted percent attendance for the year-round schools was calculated in the manner detailed in Chapter 3. Briefly, the reported ADA was retained in the numerator of the ratio, but the ADM was recalculated to equal the average ADM for the seven September-through-May attendance periods, multiplied by a factor of 10. This recalculation had the effect of revealing reduced summer enrollment, if that, in fact, existed.

Table 50

Annual Percent Attendance Comparisons
YRS and TCS

	1984-85		1985-86	
	Grade 3	Grade 6	Grade 3	Grade 6
TCS	94.8	93.7	94.5	93.6
YRS	94.2	93.5	94.0	92.4
YRS Adjusted	93.0	92.0	92.7	90.6

It can be seen from Table 50 that there was very little difference in the annual average percent attendance between year-round and nine-month schools at either grade for either year. Mean percent attendance for 1984-85 at grade three was 94.8 percent for TCS and 94.2 percent for YRS. At grade six for 1984-85, it was 93.7 percent for TCS and 93.5 percent for YRS. Thus, at both grades, mean attendance was very slightly lower at the year-round than at the traditional-calendar schools. Examination of the 1985-86 attendance figures revealed the same pattern, with an average attendance of 94.5 percent for the nine-month schools and an average of 94.0 percent for the year-round schools at grade three. Grade six figures showed an average attendance of 93.6 percent for the nine-month schools and 92.4 percent for the year-round schools. However, adjustment of attendance percentages to reflect changes in summer enrollment showed substantially reduced attendance for year-round schools and differences ranging from 1.8 percent (at grade six in 1984-85) to 3.2 percent (at grade six in 1985-86) between nine-month and year-round schools.

Table 51 shows the difference between unadjusted attendance rates reported for year-round schools and attendance rates adjusted for the effects of reduced summer enrollment.

Table 51

Unadjusted versus Adjusted Mean Percent Attendance
Year-Round Schools
1984-85

	Grade 3		Grade 6	
Site	Unadjusted	Adjusted	Unadjusted	Adjusted
1	94.1	92.8	93.5	91.4
2	93.9	91.4		
3	94.4	93.3	93.9	93.1
4	93.1	91.5		
5	94.4	93.5		
6	92.2	90.7	92.2	90.4
7	93.9	90.8	93.7	90.7
8	93.9	92.8		
9	93.8	92.2	94.2	92.6
10	94.6	94.1		
11	95.8	95.4	93.6	93.5
12	94.0	93.1		
13	95.4	94.9		
14	95.0	94.6		
15	94.5	93.6		
Averages	94.2	93.0	93.5	92.0

Examination of the data presented in Table 51 revealed that in every case, adjusted attendance rates were lower than unadjusted rates. The differences ranged from a decline of 0.4 percent at grade three and 0.1 percent at grade six at the school (Site 11) with the least difference between unadjusted and adjusted rates, up to 3.3 percent at grade three and 3.2 percent at grade six at the school (Site 7) with the greatest difference between unadjusted

and adjusted rates. Thus, in all cases, a decline in summer attendance was obscured by reduced summer enrollment.

Table 52 presents similar data for 1985-86.

Table 52

Unadjusted versus Adjusted Mean Percent Attendance
Year-Round Schools
1985-86

	Grade 3		Grade 6	
Site	Unadjusted	Adjusted	Unadjusted	Adjusted
1	92.8	89.8	92.5	89.2
2	93.9	93.2		
3	93.4	91.3	92.7	91.6
4	93.7	92.5		
5	95.1	94.8		
6	92.3	89.5	90.3	87.8
7	93.5	92.1		
8	94.4	93.6		
9	93.4	91.0	92.3	90.8
10	94.0	93.3		
11	95.5	94.3	94.1	93.4
12	95.1	94.6		
13	94.6	93.6		
14	93.4	92.8		
15	94.8	94.6		
Averages	94.0	92.7	92.4	90.6

Examination of the data in Table 52 revealed the same attendance patterns evident for 1984-85. In all cases, adjustment of attendance rates for the effects of summer enrollment resulted in a reduced attendance rate. The rate of decline ranged from 0.2 percent (Site 15) to 3.2 percent (Site 1) at grade three, and from 0.7 percent (Site 11) to 3.6 percent (Site 1) at grade six.

Teacher Opinionnaire Data

Teacher opinionnaire data for 1984-85 are presented in Tables 53 and 54. Mean response to the group of items constituting each Element of Quality is shown for both groups of schools. In addition, the mean response for all items is shown for both groups of schools. So that some idea of how the means for one group of schools compare with those for the other group could be gained, the standard errors of the mean, and the minimum and the maximum score in each distribution are also shown.

Table 53

Mean Response to Elements of Quality
Year-Round and Nine-Month Schools
1984-85

TCS N = 53 YRS N = 15		Mean	S.E.	Minimum	Maximum
EQ #6	Nine-Month	3.525	0.034	2.720	3.870
	Year-Round	3.581	0.041	3.160	3.810
EQ #7	Nine-Month	3.532	0.033	2.910	3.870
	Year-Round	3.557	0.039	3.140	3.800
EQ #8	Nine-Month	3.424	0.037	2.710	3.860
	Year-Round	3.459	0.070	2.770	3.860
EQ #9	Nine-Month	3.466	0.036	2.710	3.920
	Year-Round	3.537	0.050	3.160	3.900
EQ #10	Nine-Month	3.401	0.032	2.790	3.810
	Year-Round	3.431	0.045	3.160	3.750
All Items	Nine-Month	3.456	0.033	2.840	3.835
	Year-Round	3.495	0.047	3.068	3.808

Table 54

Mean Response to Elements of Quality
Year-Round and Nine-Month Schools
1985-86

TCS N = 52 YRS N = 13		Mean	S.E.	Minimum	Maximum
EQ #6	Nine-Month	3.515	0.031	2.800	3.890
	Year-Round	3.602	0.037	3.390	3.790
EQ #7	Nine-Month	3.509	0.031	2.790	3.870
	Year-Round	3.600	0.029	3.380	3.740
EQ #8	Nine-Month	3.411	0.042	2.450	3.780
	Year-Round	3.558	0.047	3.290	3.760
EQ #9	Nine-Month	3.416	0.044	2.240	3.860
	Year-Round	3.539	0.064	2.950	3.810
EQ #10	Nine-Month	3.387	0.036	2.520	3.760
	Year-Round	3.488	0.043	3.210	3.680
All Items	Nine-Month	3.444	0.034	2.575	3.795
	Year-Round	3.552	0.040	3.293	3.742

As can be seen in Tables 53 and 54, means for each Element of Quality were uniformly lower for nine-month schools than for year-round schools. However, when the scores are presented in confidence intervals encompassing a range of two standard errors above and below the mean, thus representing intervals which encompass the true means in 95 percent of the cases (Shavelson, 1981), it can be seen that no substantive differences existed between the means of each Element of Quality for nine-month and year-round schools. This statement is based on the fact that in all cases, there was overlap between the 95 percent confidence interval for the nine-month schools on a particular Element of Quality and the

95 percent confidence interval for the year-round schools on that same Element of Quality. Confidence interval representations for Teacher Opinionnaire data from 1984-85 are shown in Table 55. Table 56 presents the same data for 1985-86.

Table 55

95 Percent Confidence Intervals
Mean ± 2 Standard Errors
Nine-Month versus Year-Round Schools
1984-85

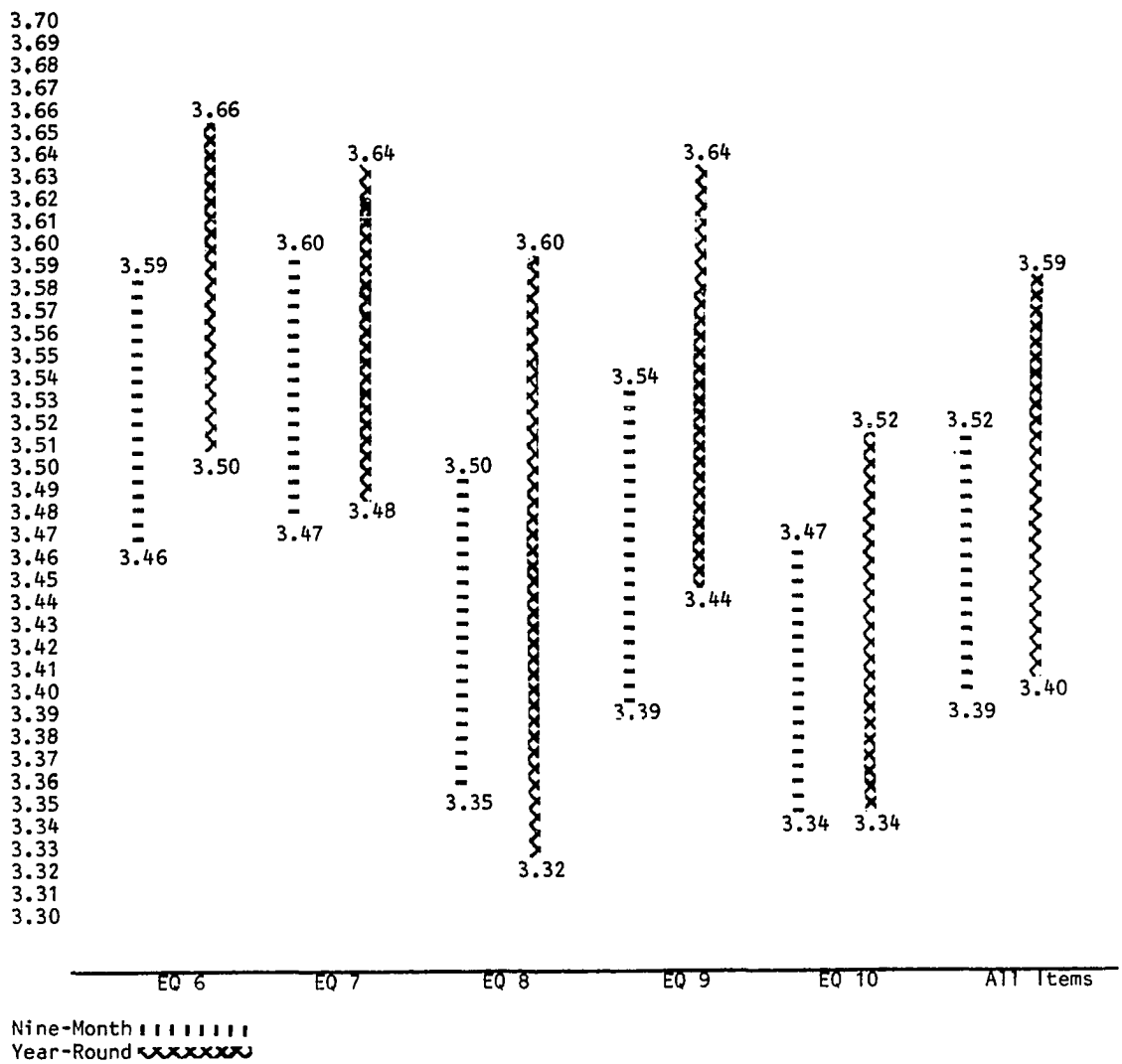
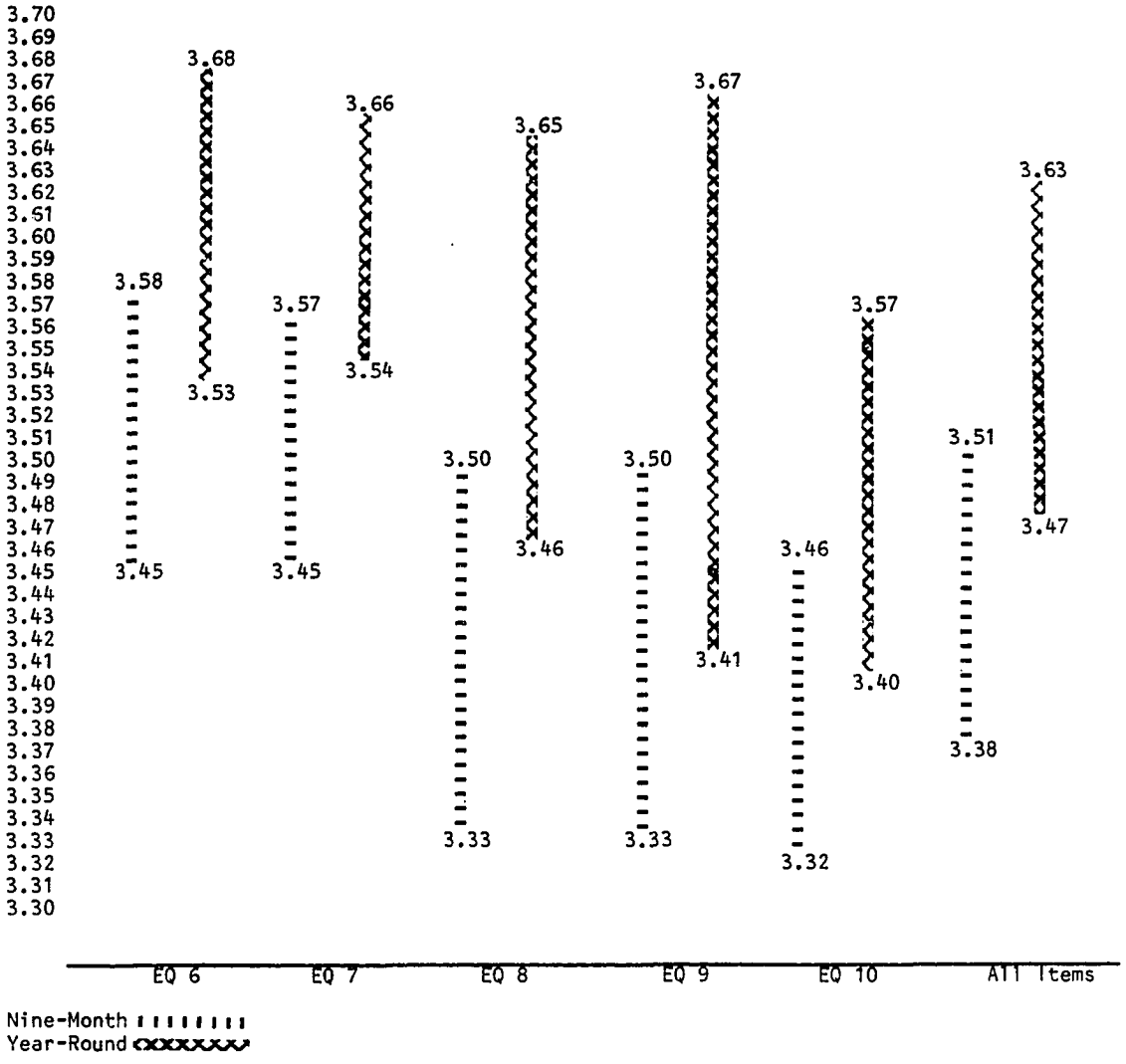


Table 56

95 Percent Confidence Intervals
Mean ± 2 Standard Errors
Nine-Month versus Year-Round Schools
1985-86



Inspection of the data presented in Tables 55 and 56 showed that although the means for year-round schools were uniformly higher than for nine-month schools, they did not represent substantive differences, as indicated by the fact that in all cases, there was overlap between the confidence band for the two kinds of schools.

Summary

Chapter 4 presented the findings of this study in three sections. The first section reported the differences in outcomes on norm-referenced and criterion-referenced achievement tests. The second section reported attendance data for the two types of school structure. The third section reported comparative results of the Teacher Opinionnaire.

In achievement comparisons which involved conducting an analysis of covariance, using student socioeconomic status, percent minority students, and student "school ability" as the covariates, statistically significant differences at the .05 level of confidence were found in favor of traditional-calendar schools in only six of the thirty-two comparisons. Statistically significant differences ($p \leq .05$) in favor of the year-round schools were not found in any of the thirty-two comparisons. The data did not provide consistent evidence that would support rejection of the null hypothesis that no significant differences existed in achievement based on school structure.

Attendance data comparisons showed that unadjusted attendance rates for the year-round schools were only slightly lower than attendance rates for nine-month schools. However, attendance rates

adjusted to account for summer enrollment changes showed overall reduced attendance at year-round schools.

On the Teacher Opinionnaire, no substantive differences were evident between responses from nine-month and year-round teachers.

CHAPTER 5

Summary, Findings, Conclusions, and Recommendations

Summary

Over the past century, the year-round school calendar, particularly the 45-15 staggered schedule, has been adopted by many school districts throughout the nation as a means of dealing with rapid growth in school-aged populations. Other school districts have turned to some variant of year-round schooling in the hopes of increasing educational opportunities and alternatives for students or as a means of enhancing teacher professionalism (Helton, 1975).

In those areas of the country where the growth of the school-aged population has continued to outstrip the growth of a district's financial capacity or willingness to provide new schools to house that population, the year-round schedule has continued to be a popular educational alternative, despite the fact that its effects on student learning have more often been conjectured than studied. In the Clark County School District (CCSD), fifteen elementary schools have been converted to the year-round schedule in the last fifteen years--nine of these in the last three years, and the success of a recent bond issue has not alleviated the need for conversion of even more elementary schools to year-round schooling (YRS). In addition, preliminary examination of achievement scores and attendance data for

YRS and traditional calendar schools (TCS) indicated some evidence of lower achievement and attendance for students at YRS.

Therefore, this study was initiated to examine more closely the effects of the year-round calendar on student achievement, student attendance, and teacher attitude. To examine the effects of the year-round calendar on student achievement, mean scaled scores on norm-referenced tests in reading, mathematics, and language at grades three and six, and mean percent correct scores on criterion-referenced tests in reading and mathematics in grades two through six were compared for schools on the year-round and nine-month schedules.

Statement of problem. The main problem of the study was the following: Did year-round students in the CCSD elementary schools have lower achievement scores than students at district nine-month schools after the effects of student socioeconomic status, percent minority students, and student "school ability" were taken into account? Did year-round students record lower attendance rates than students at nine-month schools? Were teacher attitudes toward their respective schools similar at both groups of schools?

Purpose. The major purpose of this study was to determine if statistically significant differences in achievement existed in reading, mathematics, and language scores for elementary students in fifteen year-round schools and sixty nine-month schools in the CCSD, after differences in student socioeconomic status, percent minority students, and student "school ability" were taken into account. Two

additional purposes were to determine if attendance percentages and enrollment were similar at year-round schools and nine-month schools, and to determine if teacher attitudes toward their own schools were similar at both groups of schools.

Review of literature. A review of the literature revealed that evaluations of most year-round programs have reflected the confusion of purposes of these programs. Indeed, most early evaluations reported outcomes related to savings in operational and capital costs, attendance, and client attitude. Evaluations that reported achievement outcomes did not show significantly higher outcomes for either year-round or traditional-calendar schools (Helton, 1975). Most of the evaluations conducted lacked clarity of purpose and rigor of design (Muzio et al., 1977). Only in about the past ten years have some evaluations been conducted that have used comparison or control groups and that have taken into account the effects of other important variables than school calendar. Two such studies (Matty, 1978; Johnson, 1984) used an analysis of covariance to take into account pre-existing differences in variables that are known to affect student achievement and the effects of which should, therefore, be analyzed separately from the effects of school structure.

Procedures. The schools in the study included seventy-five large elementary schools, sixth-grade centers, and middle schools in the CCSD. Fifteen of these schools operated on the 45-15 staggered year-round schedule, while the remainder operated on the traditional nine-month calendar schedule.

Using the school as the unit of analysis, mean scaled scores on the Stanford Achievement Test (SAT) 7 in Total Reading, Total Mathematics, and Total Language for students at grades three and six, for both 1984-85 and 1985-86, were compared for traditional-calendar and nine-month schedules. In addition, again using the school as the unit of analysis, the mean percent correct on district-developed criterion-referenced tests in reading and mathematics for students in grades two through six, for 1984-85 and 1985-86, was compared for the two groups of schools.

Attendance data collected were the annual average percent attendance (average number of students present daily divided by the average number of students enrolled daily) for each school, with a comparison being made for TCS and YRS. Further comparisons were drawn by incorporating the effect of changes in enrollment during the summer months at year-round schools in the calculation of average annual percent attendance.

Teacher opinionnaire data were drawn from a thirty-six-item opinionnaire administered to all teachers in the district's elementary schools, eliciting response to various elements of the school's environment/climate on a 1-4 continuum. Again, the school was the unit of analysis, and the comparison was between mean response to each Element of Quality for the two groups of schools.

This study was of a non-experimental, ex post facto criterion-group design, with the two criterion groups being the year-round elementary schools and the nine-month elementary schools.

All data were collected from the various departments and

divisions in the Central Office of the CCSD. Data were initially recorded by the researcher on a spreadsheet, then entered into a series of computer data files. Data analysis of test scores and teacher opinionnaire response was conducted via the Statistical Package for the Social Sciences (SPSS), using subprograms ANOVA and FREQUENCIES, respectively. Analysis of attendance data was conducted manually. The results of the analysis were presented in Chapter 4 and are summarized below.

Findings

Using school calendar as the independent (nonmetric) variable, student socioeconomic status, percent minority students, and student "school ability" as the covariates, and norm-referenced test scores at grades three and six and criterion-referenced test scores at grades two through six as the dependent variables, analysis of achievement test data revealed the following:

1. Out of fourteen reading comparisons, statistically significant differences were noted only in three, these being all at the third-grade level and all in favor of nine-month schools. However, since no statistically significant differences in favor of either group of schools was found at any other grade level, these three differences cannot be said to provide consistent evidence of a statistically significant achievement difference in reading for nine-month and year-round schools. Therefore, the null hypothesis was not rejected.

2. Out of fourteen mathematics comparisons, a statistically significant difference was noted in only one, with this being at the third-grade level and in favor of nine-month schools. Since no statistically significant difference in favor of either group of schools was found at any other grade level, this single difference cannot be said to provide consistent evidence of a statistically significant achievement difference in mathematics for nine-month and year-round schools. Therefore, the null hypothesis was not rejected.
3. Out of four language comparisons, a statistically significant difference in achievement was found in only two. Both those differences were found at grade three, and were in favor of the nine-month schools. However, since these differnces were found at only a single grade level, they cannot be said to provide consistent evidence of a statistically significant achievement difference in language for nine-month and year-round schools. Therefore, the null hypothesis was not rejected.
4. Initial unadjusted attendance comparisons showed only slight differences for the two groups of schools, with attendance for year-round schools being between 0.2 percent (at grade six, in 1984-85) and 1.3 percent (at grade six, in 1985-86) lower than attendance for nine-month schools. However, adjustment of year-round school rates to take into consideration changes in summer enrollment revealed

substantially lower overall rates for the year-round schools, with the differences between TCS and adjusted YRS ranging from 1.8 percent (at grade six, in 1984-85) to 3.2 percent (at grade six, in 1985-86). Calculation of unadjusted percent attendance involved dividing average daily attendance (ADA) by average daily membership (ADM) or enrollment. Calculation of adjusted percent attendance involved modifying the denominator of the ratio by changing the ADM to reflect average September-through-May enrollment figures.

5. No substantive difference was found between teacher opinion about their respective school programs at the year-round and nine-month schools. Initial means calculated for each group on each of the five Elements of Quality, as well as for the overall mean, showed slight differences. However, development of confidence intervals of two standard errors above and below the mean to compare ratings on each Element of Quality for the two groups of teachers showed that in every comparison, the confidence intervals on the same item for the two groups of teachers overlapped.

The generalizability of these findings is limited to CCSD elementary schools, or the scope of this study.

Conclusions

This study could not yield firm conclusions about the effects of school calendar on student achievement, since it was not an experimental study. In achievement comparisons which involved conducting

an analysis of covariance with student socioeconomic status, percent minority students, and student "school ability" as the covariates, statistically significant differences were found in favor of traditional-calendar schools in only six of the thirty-two comparisons. All six of these comparisons were found at the third-grade level and represented 60 percent of all the comparisons conducted at grade three. No statistically significant differences ($p \leq .05$) were found in favor of the year-round schools. Thus, while there was some evidence of a statistically significant difference in achievement at grade three in favor of the nine-month schools, the data did not reflect consistent evidence for rejecting the null hypothesis of no statistically significant achievement differences between the two types of schools, since statistically significant differences were found at no other grade levels. The data did provide some evidence that what had appeared--upon cursory review--to be an achievement advantage for district nine-month schools was mainly an artifact of certain other variables known to be closely associated with achievement.

The fact that the year-round schedule has resulted in reduced attendance, at least in some CCSD year-round schools, was evident. However, since attendance was not entered into the calculation of achievement effects as a covariate, the effect of this reduced attendance was not discernible. More investigation of the relationship between attendance and achievement--particularly in the year-round school, where reduced summer attendance may merely reflect the presence of enriching family activities, such as a vacation, rather than truancy--should be conducted. Another avenue for investigation

may be those factors within either year-round or nine-month schools which contribute to high student achievement, and the determination as to whether those factors work similarly in both types of schools.

Recommendations

The following recommendations are made for the CCSD in its continued reliance on the year-round school to accommodate overcrowding.

1. The district may proceed with plans to continue or expand YRS without concern for detrimental achievement effects.
2. The district should analyze carefully summer enrollment patterns for its year-round schools as a group and for each individual school. Possibly measures should be taken that would increase summer enrollment.

Recommendations for further study. The following recommendations have emerged from the study:

1. The study should be expanded over a longer time period. The year-round schools studied had operated on the year-round schedule for only two years, and there was some evidence of differences between outcomes for the first and second years of operation.
2. A similar study, using attendance as a covariate or a main effect, should be conducted. Such a study could reveal that when the effects of attendance are taken into account, achievement at the year-round schools actually exceeded that at the nine-month schools.

3. The effects of absenteeism, including non-enrollment, on TCS and YRS students should be investigated.
4. The factors contributing to a substantial fall-off in summer enrollment and the variability in these factors from school to school should be examined.

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