

A REVIEW OF RECENT STUDIES
RELATING TO THE
ACHIEVEMENT OF STUDENTS
ENROLLED IN YEAR-ROUND
EDUCATION PROGRAMS

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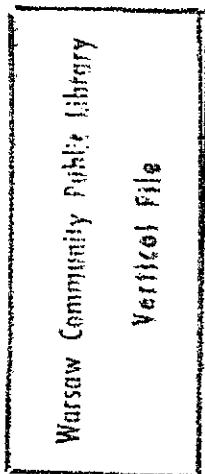
Second Edition

November, 1994

EXCERPT FROM

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Published by:
National Association for Year-Round Education
P. O. Box 711386, San Diego CA 92171-1386
(619) 276-5296 • FAX (619) 571-5754

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ABSTRACT

By way of summary, it may be concluded from this particular review of academic studies that the achievement of students participating in a year-round educational setting performed better on tests than did their counterparts in a traditional calendar setting.

Nineteen studies were reviewed in this 1994 edition (second edition) of "A Review of Recent Studies Relating to the Achievement of Students Enrolled in Year-Round Education Programs." All have been completed or reported since 1991.

In the nineteen studies there were 58 possible categories or areas that compared year-round education with nine-month calendar programs. The categories were given plus, minus, or mixed-result grades. Of the 58, 48 or 83% of the categories were rated plus (+), meaning that in those categories year-round education students outperformed their nine-month calendar counterparts. Three of the 58 (5%) were rated minus (-). Seven of the 58 (12%) were mixed results (+).

Tests utilized in the various studies included the Texas Assessment of Academic Skills (TAAS); Tests of Achievement and Proficiency (TAP); California Assessment Program (CAP); Abbreviated Stanford Achievement Test (ASAT); Stanford Achievement Test (SAT); California Achievement Test (CAT); Comprehensive Test of Basic Skills (CTBS); Iowa Test of Basic Skills (ITBS); Sequential Tests of Educational Progress (STEP); Science Research Associates (SRA); and the Gates-MacGintie Reading Tests.

The studies were conducted in the states of California, Texas, Florida, Ohio, Virginia and Georgia.

TABLE I
Comparison of Achievement of Year-Round and Traditional Calendar Schools.

School/District	Calendar Plan *	Population Studied	Comparison Group*	Years of Study	Tests Used	Results **	Comments
Buena Vista City Schools, VA Farrell, J. F. Dr.	Quarter (extended year for those electing extra Q)	Gr. 9-12 Tests for 11th	National & VA Norms/ mean (non-matched)	1974-91	STEP SRA (74-'87) TAP (88-'91)	+	School Board mandated low ach students to YRF;
Carlisle Elem. School Plano Plano, TX McCasland, Charles	45/10 ST	Gr. 3-5	TC-3 similar schools in District and total District	1991-92	TTBS NAFT CogAT	Grade 3 & 4+ in Lang, Soc. Studies and Math/Trado 5	Higher Order Thinking Skills also assessed
College Park Elem, Fulton Co. Schools, GA Russell, Connie Dr.	45/15 ST	Gr. 2-5 all students & Chap. 1 students	Matched SES TC in District	1990-91 and partial data for 1991-92 (new test)	TTBS	±	N's small, especially for Chap. 1 students but cohort data well done
Crockett Interim. Sch. Conroe I.S.D. TX Lloyd, C. R. Dr.	30/10 ST (175 days)	Gr. 6 N=54	TC "matched sample"	1990-91	CAT	+	No follow-up testing done this year
Cypress-Fairbanks ISD Houston, TX Willis, Betty Dr.	60/20 MT	Pre-K thru 5th 3rd to 4th gr. N=72	District & TX normative results	1991-93	NAFT TAAS	±	NAFT = Normative Assessment Performance in TX TAAS = Texas Assessment of Academic Skills
Duval Co. P. S. Jacksonville, FL Thompson, Jon Dr.	60/15 ST & MT	'91-'92--3 elem. sch. N=900 '92-'93--8 elem. N=6000 Gr. 1-7	TC schools in District	1991-92 1992-93	CTBS	±	Participation in YRF voluntary, therefore results not representative of all schools in District
Mueller Elem. Sch. Chula Vista Dist., CA Dixon, Matthew	60/15 MT Orchard Plan (St. of CA)	Gr. 3 - 6. Pre-Orchard Plan: N=480; Post-Orchard Plan: N=690	Castle Park Elem. TC sch. same SES etc., also District averages	1985-89 Pre-Orchard avgs. 1990-93 Post-Orchard avgs.	SAT Read/Math	+	Data analysis also compared Mueller with other Chapter 1 schools in Dist
Orange County P.S. Orlando, FL Fardig, Diane (Eval.) Locker, Dianne (Prog.)	60/15 MT 2 schools ST 1 school	Gr. K-5 Test results for gr. 2-5.	Dist. Averages for TC schools plus cohort & longitudinal data.	1990-93 baseline plus two years im-plementation data.	SAT	+ *	Statistically significant at grades indicated for 1st yr but dropped from 2nd to 3rd year.

Table 1 (continued)
Comparison of achievement of year-round and traditional calendar schools.

School/District Author	Calendar Plan *	Population Studied	Comparison Group*	Years of Study	Tests Used	Results **	Comments
Palmdale School Dist., Palmdale, CA Fish, Judy Dr. & Gandaru, Patricia Dr.	60/15 MT Orchard Plan (St. of CA)	Grades 1-8 N= approx. 1000	TC schools in Dist. with SES, Ethnic & Base- line tests matched	1988-89 to 1991-92	CTBS Read/Math	+ p<.05	Seventy percent participation in the intersession program for Chapter 1 students.
San Diego City Schools, CA Alcorn, Richard Dr. Arm, Elaine Dr.	45/15 ST & MT	Gr. 5 ST 13 FES schools	Gr. 5 TC 13 control schools	20 yrs. over-all, Spring, 1992- Post Test only	ASAT	Read + Math + Lang ±	LEP-Spanish results reported for Grade 5 APRENDA Test.
San Diego City Schools, CA Pass-Holmes, Barry Dr. Gates, Karen E. Dr.	45/15 ST	9 Elem. Sch. Gr. 2-4 1 Mid.Sc.Gr.6 STYR 8yrs.	9 Elem. TC Schools in District matched on SES & other variables	1990-91 1991-92 1992-93	ASAT for FES students; APRENDA for LEP Spanish students; %students above 50th %ile	Read + * Math + * Lang + * (gr. 2/3/4 /6) Significant at p<.05	Authors caution that data is for non-mobile students only & not generalizable to total groups even at those schools
Sweetwater Union High School, National City, CA Chon, Zongshu Dr.	45/15 ST	Gr. 9-12 N= c.2000-- both high schools	Southwest High School (Sweetwater Union HS Dist.) Generally matched on SES factors etc.	1984-93	CTBS 1970-90 SAT 1991-93 SAT(college boards-self selected students) CAP--(Gr 12 Gr. 10 1988-90 (Dates-MacGinitie Reading Test	CTBS all tests + * p<.02 CAP + SAT +	Additional survey data from the Los Angeles City Schools constituted the second half of this study but go beyond the scope of this review
West Carrollton Schools, OH Campbell, Wallace D. Dr.	45/15 ST	"At Risk Students" in gr. 2	Matched pairs at TC schools in District	1991-92	(Dates-MacGinitie Reading Test	+	Raw scores and NCE gains were made on average greater for the YR students but were not statistically significant
West Carrollton Schools, OH Roby, Douglas E. Dr.	45/15 ST	Gr. 6 YR students N=52 (Schnell Elem.)	Gr. 6 TC students N=45 (Russell Elem.)	1991-92	ITBS (CogAT--for holding Ability level constant	+ * Reading & Math (verbal held constant)	ANCOVA statistical test used to control ability levels. With (Quant held constant--not sig

* ST Single-Track Year-Round Education; MT = Multi-Track, TC = Traditional-calendar school

** With the substitution of ± for 0, this grading of results follows a pattern first suggested by Barbara Merino (1983)

+ The overall study favors year-round education

± (now) The overall study indicates a mixed pattern of results, some favoring YRR, some traditional calendar (TC)

- The overall study favors traditional calendar education

* Statistically significant differences

RESULTS, DISCUSSION AND CONCLUSIONS

Thirteen studies of year-round education were reviewed in the 1993 edition of this report.¹ Nineteen studies have been reviewed in this 1994 second edition. It appears that there is considerable interest in and evaluation/research activity concerning the degree of success of the year-round education concept. The studies reviewed here were those readily obtained by the National Association for Year-Round Education. However, an exhaustive review of the professional literature was not undertaken. In the past, the majority of programs reviewed were elementary school applications, often grades two through five. Here, too, the majority of the nineteen studies have included these grades. However, four of the studies include high schools; an additional seven include grades six, seven and eight, which are either in a middle school setting or constitute the upper grades of elementary schools. Together, then, a total of eleven, or 58% of the studies include secondary education, a substantial increase over what has previously been reported.

The difficulties of creating clear evaluative designs, which include serious efforts to control for the many variables which are not of primary interest, has often been emphasized. Among the studies reviewed herein, this is perhaps the most often-noted frustration of the authors. Yet each of them has taken steps to do just that. In all cases the limited populations have been acknowledged, and cautions have been made that generalizations to larger groups are not necessarily warranted. In most, but not all of the studies, some type of comparison or control group has been established. In lieu of such comparable populations -- such as socio-economic status, ethnicity, time in program and the like -- several studies have depended upon national or state norms on standardized instruments to represent another population. For example, many of the Texas studies use as their primary instrumentation and norms, the Texas Assessment of Academic Skills (TAAS) and the Tests of Achievement & Proficiency (TAP). The normed group, then, becomes the comparison base as contrasted with those studies that compare two independent groups. In the normed group, usually the criterion of percentage of pupils meeting the 70% "passing level" score is used for reference. In California, likewise, the California Assessment Program (CAP) results for schools provide one or more of the data points and/or statistics used for determining the degree of "success" of a program. Since 63% of the studies come from California and Texas, several of them include normed comparisons, rather than separate control groups.

Other commercially-developed and standardized instruments were also used in these two states and in the other four states represented in the studies reviewed in this document. Some of the other tests used are the *Abbreviated Stanford Achievement Test (ASAT)*, earlier editions of the *Stanford Achievement Test (SAT)*, the *California Achievement Test (CAT)*, the *Comprehensive Test of Basic Skills (CTBS)*, the *Iowa Test of Basic Skills (ITBS)*, the *Sequential Tests of Educational Progress (STEP)*, *Science Research Associates (SRA)* and the *Gates-MacGinitie Reading Tests*.

What were the results across all of the nineteen studies? As the reader might well expect, the complex array of test results was mixed, though favorable to the year-round concept. First, looking only at Table 1 results (those studies essentially meeting the criteria established for inclusion in the initial review), we find that there were 35 possible categories or areas that could be given plus, minus, or mixed result grades. The 35 are the product of the major test results (not including sub-tests) and the grade levels reported. Fourteen schools/districts contributed to the results of this group.

¹ Les Six, "A Review of Recent Studies Relating to the Achievement of Students Enrolled in Year-Round Education Programs", *National Association for Year-Round Education*, San Diego, CA January, 1993.

**TABLE 2:
COMPARISON OF ACHIEVEMENT OF YEAR-ROUND AND TRADITIONAL CALENDAR SCHOOLS**

School/District Author	Calendar Plan *	Population Studied	Comparison Group*	Years of Study	Tests Used	Results **	Comments
Buena Vista City Schools, VA Bradford, J. C. Dr.	Quarter/Extd. Yr. for volunteers/ students selecting extra Q	Gr. 9-11 McCluer U.S. N=450	State of VA	1976-86	No norm- referenced tests	+ for objectives established	Drop out rates, Subject failures, Enrollment percent
Oxnard School Dist. Oxnard, CA Brekke, N. R., Supt.	60/20 MT	Total Dist. K-8 N=12,000+	(CAP) means Gr. 8/8/8	1981-82 vs. 1990-91	CAP (mandated CA Tests) for Sp. 82 vs Sp. 90 test results	± Read., Math & Writ. Exp (Gr. 3&6+; Gr 8. Read., Math & Sci. +	Scale Scores ranged from 10 to 15 higher @ Gr. 3: 16 to 30 + , @ 6th and 8th grds -3 to + 10
Socorro ISD El Paso, TX Antwine, Kathy (eval) Shook, Sue (prog.)	60/20 ST MT	3 Elem. Schools ST; all other schools. MT; Gr. 3 & 7. 2 High Schools, ST, Gr. 11 & 12	District avg and TX state avg.	1992-93	TAAS both English and Spanish	+ in all areas tested at most schools for Read/Math & Writing	Positive gains, but further analysis needed and district cautions that many factors other than YR schedule were not controlled
Texarkana ISD Texarkana, TX Paslay, Bobbie	60/20 ST	K-1 4 Elem. Sch. 1 K Center N=500 +	TC same grades in same schools but non-matched samples	1991-92 1992-93^ 1993-94^ ^ voluntary participation	CAT Total Reading Total Math	+ YR higher on all sub-tests as well as on Total Read. & Total Math	Same findings for students designated economically dis- advantaged (Chap 1) and for the non- disadvantaged
Waco ISD Waco, TX Barton, Wanda Rowe, Hazel	60/20 ST	7 Elem. Sch. Gr. 3/4/5 1 Middle Sch. Gr. 6/7/8	Non Matched TC Schools 10 at Elem. 4 at Middle	1993-94	TAAS (Median percent passing)	± At gr 3 & 4 + but not at Gr 5 in Read/ Math + at Gr 6/7/8 for all	Results are also available for 1991- 1992 and 1992-1993 but were not analyzed

* ST Single-Track Year-Round Education; MT = Multi-Track, TC = Traditional-calendar school
 ** With the substitution of ± for 0, this grading of results follows a pattern first suggested by Barbara Morino (1983)
 + The overall study favors year-round education
 ± (new) The overall study indicates a mixed pattern of results, some favoring YRE, some traditional calendar (TC)
 - The overall study favors traditional calendar education
 • Statistically significant differences

Results favorable to year-round programs (those designated by a plus (+) in Table I) totaled 30 of the 35 categories, or an 86% favorable finding. There were no fully negative findings. The remaining five qualified as "mixed results" (designated in both Tables I and II as \pm) and represent 14 % of the total.

The studies of five additional schools/districts (those listed in Table 2) resulted in a total of 23 possible categories. Eighteen (78%) of these results were favorable to year-round programs (+). Three of the 23 (13 %) were designated with a minus (-), which meant that traditional calendar schools were favored by these results. Two of the 23 categories (9%) resulted in mixed findings (\pm).

Taking the total data across both tables the composite values are:

+	=	48 of 58 categories	(83%)
-	=	3 of 58 categories	(5%)
\pm	=	7 of 58 categories	(12%)

With respect to achievement results, these figures are the main finding of this review.

Some of the studies did provide statistical tests to determine if any given value was statistically significant. In all cases the alpha level was set at $p < .05$. Those results which were *statistically* significant are marked with a bullet (•) after the + or - in the results column of Tables I and II. Among the most positive findings are those reported in the studies provided by Carlisle Elementary School, TX; Orange County Public Schools, FL; Oxnard School District, CA; San Diego City, CA; Socorro School District, TX; Sweetwater Union High School, CA; West Carrollton Schools, OH and Waco School District, TX.

Although several studies provided break-outs of data for students "at risk", usually Chapter I participants, the numbers were frequently quite small and conclusions were made with great caution by the authors of these reports. Just the same, it is worthy of note that such students do appear to fare better in the year-round setting.

Most studies did not attempt to make comparisons between single-track (ST) and multi-track (MT) year-round programs. The two most popular calendar plans were the 45/15 and the 60/20, or minor variations of these. One school, Crockett Intermediate, had a 30/10 plan with 175 days of schooling. The Orchard Plan in California used a 60/15 plan, as did the programs in Florida. There was almost an even split between those districts reporting MT or MT/ST combinations and those with ST plans solely. Nine of the studies dealt with multi-track or multi-single-track combination, while ten dealt with single-track exclusively. None of these studies attempted to determine whether or not either the MT or ST plans were more efficacious with respect to student achievement. Because of the many differences in curricula and other differences among the multi-state group of plans here reviewed, no attempt was made to judge the superiority of one plan over another.

By way of summary, it may be concluded that in this particular review of academic studies that the achievement of students participating in a year-round educational setting performed better on tests than did their counterparts in a traditional calendar setting.

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INVESTIGATING THE EFFECTS OF SINGLE-TRACK YEAR ROUND
EDUCATION ON ACHIEVEMENT OF AT-RISK STUDENTS

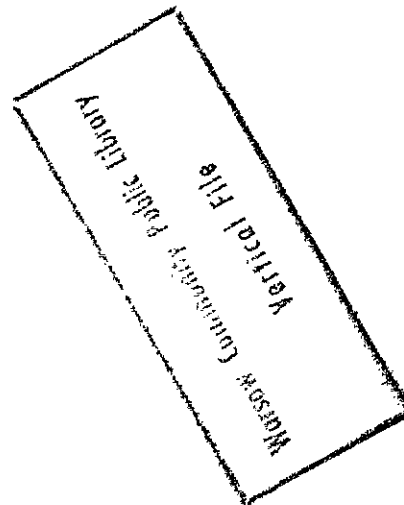
ABSTRACT

This study investigates the impact of the year round calendar on achievement, and the degree to which it differentially affects students. 311 4th, 5th, and 6th grade students enrolled in single-track YRE classes were individually matched with students in TCS classes in the same schools on both reading and math.

There were statistically significant differences in favor of the YRE in both math and reading achievement for all students, and especially in reading for at-risk students. Statistical significance in favor of YRE was also found in both reading and math for low SES schools. The year round school also yielded practically significant results in 17 out of 20 data analysis comparisons, with effect sizes ranging from .21 to .88.

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INVESTIGATING THE EFFECTS OF YEAR ROUND EDUCATION ON STUDENT ACHIEVEMENT

Faced with an increase in student school populations of diverse abilities and needs, and only limited resources to combat associated problems, public education is in a state of crisis (Zykowski, 1991). The traditional organization of American schools may no longer be adequate for meeting present and future needs in public education. One of the major responses to these needs has been the consideration of a change in the school calendar from the traditional nine month format to a year round calendar in order to provide education to the ever increasing student population (Goren & Carriendo, 1986) and as a strategy for improving the achievement of students that are considered at-risk (Morse, 1992). However, the results of studies of effects of year round education have been somewhat mixed and inconclusive. Furthermore, studies have been criticized for inadequate design (Grotjohn & Banks, 1993; Six, 1993).

Considering the sweeping changes influenced by the trend toward excellence in education, this study focused upon the issue of the impact of YRE on academic performance, including the at-risk learner. In order to determine the effects of the year round school calendar on the math and reading achievement of fourth, fifth, and sixth grade students, the following research questions were founded upon key issues in the literature:

1. After matching for initial reading and math achievement, is there a significant difference in the reading and math achievement of YRE and TCS fourth, fifth, and sixth grade students?
2. After matching for initial reading and math achievement, is there a significant difference in the reading and math achievement of at-risk YRE and TCS fourth, fifth, and sixth grade students?
3. After matching for initial reading and math achievement, is there a significant difference in the reading and math achievement of YRE and TCS fourth, fifth, and sixth grade students with respect to whether the school was classified as low, medium, or high socio-economic level?
4. After matching for initial reading and math achievement, is there a significant difference in the reading and math achievement of YRE and TCS fourth, fifth, and sixth grade students with respect to number of years of individual school implementation of YRE?

METHOD

The sample was selected from year round and traditional calendar classes in ten dual track schools in a suburban school district of a major metropolitan area in the Southwest. Dual track refers to a system in which both year round single-track and traditional calendars are employed at one campus. YRE and TCS students were individually matched within each grade level, within each school, on their standardized reading and math subtest percentile scores of the 1992 Norm-referenced Assessment Program for Texas (NAPT), and then compared on their 1993 NAPT NCE scores. When more than one student from the traditional calendar pool qualified, a student was randomly selected from that group. To summarize, there were two samples of matched pairs of students in the study, one sample for math and one for reading, for a total sample of 933 students. One group was matched by their 1992 NAPT reading percentile ranks and the second group was matched by their 1992 NAPT math percentile ranks.

Tests of statistical significance (t-tests for related samples) and practical significance (effect size) were used to compare the mean differences. Since multiple t-tests were performed, the Bonferroni inequality was employed for determining the

critical value of t , using a type-1 error rate based on the family of contrasts (Glass & Hopkins, 1984). Means were compared for significance at the .05 level, simultaneously encompassing all twenty-six comparisons, which yielded a significance level of .002.

Effect size was also calculated to determine if there was practical significance in the difference in achievement between YRE and TCS students. Effect size reflects the magnitude of the difference between the experimental and control group means regardless of the statistical significance (Fraenkel & Wallen, 1990).

RESULTS

All Students

It was initially established that there was statistically significant differences between YRE and TCS in both math ($t=5.87$; $p=.0001$) and reading ($t=6.22$; $p=.0001$) in favor of the YRE. All students in YRE programs scored approximately 1/3 standard deviation (or approximately 5 points) higher in both math ($d=.30$) and reading ($d=.33$) than did their peers on the traditional calendar. Effect sizes in math and reading gradually increased by grade level.

At-Risk Students

Results also yielded statistically significant differences between YRE and TCS reading scores ($t=4.87$; $p=.0001$) for at-risk students, but no statistically significant differences in their math scores ($t=2.11$; $p=.0409$). In reading, YRE at-risk students scored 2/3 of a standard deviation (or approximately 10 points) higher ($d=.67$) than did their peers in the traditional calendar classes. Despite the level of statistical significance, perhaps due to the small sample size ($N=43$) YRE at-risk students scored approximately 1/3 of a standard deviation (or approximately 4 points) higher in math ($d=.29$).

Low, Middle, and High SES Schools

In reading, statistically significant differences were found at the low and high SES schools. In math, statistical significance in favor of the YRE was found at the low SES schools only. Practical significance, on the other hand, was obtained at all SES levels, with varying effects. It is interesting to note that the effect size decreases as the SES level of the school increases, moving from .49 in the low YRE to .28 in the high YRE reading and from .53 in the low YRE to .24 in the high YRE math.

In addition, YRE appears to be more equitable since the mean scores of the lower SES schools more closely approach the mean scores of the higher SES schools. In the YRE the difference between the high and low SES schools is approximately 10-11 points in both reading and math. On the other hand, in the TCS the difference between the high and low SES schools is approximately 14-15 points in both reading and math. Yet in the YRE the high SES mean scores are still higher than those of their peers in the TCS.

Length of Program Implementation

All YRE schools, no matter how long the program had been implemented, outperformed the TCS schools. In reading, statistically significant differences were found in both reading and math at the second and third years of YRE implementation, but not at the fourth. In math, statistically significant differences were found in favor of the YRE at all years of implementation. Effect sizes ranged from .27 to .52. The lowest effect size was found in the third year of implementation. This finding supports previous research of a "dip" in the third year, due to the Hawthorne effect.

To summarize, while the mean scores favored the YRE in all comparisons, the inferential analyses, which are sensitive to cell size, revealed statistically significant differences in 14 out of the 26 comparisons. On the other hand, effect size analyses



revealed practical significance greater than .25 in 23 out of 26 comparisons. The median effect size for the 26 comparisons was .39.

CONCLUSIONS

The findings indicate that there is small to medium positive academic achievement for all students in the single-track year round calendar. YRE appears to be especially effective for at-risk students in reading. A consistent pattern in the study findings is that the higher effect sizes are found for the at-risk students or the students enrolled in the low SES schools. Even though YRE does have a small advantage for students in the higher SES populations, it has less of an effect with this population than with the middle or lower SES populations.

In summary, results from this study reveal that school type can, indeed, affect student achievement. It has been previously believed that only outside factors such as family and background characteristics had a bearing on student achievement (Tomlinson, 1992). Yet in spite of the fact that students come to school disadvantaged, it appears that the YRE program can increase the academic performance of at-risk learners as well as that of the whole student population.

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