Segregation in California's K-12 Public Schools: Biases in Implementation, Assignment, and Achievement with the Multi-Track Year-Round Calendar

Ross E. Mitchell

I. BIOGRAPHICAL INFORMATION

A. Professional Experience.

1. I am a Research Scientist with the Gallaudet Research Institute at Gallaudet University in Washington, D.C. I bring to this writing eight years of research experience and five-and-a-half years of public school teaching experience, among other occupations of a full- or part-time nature.

2. Of the eight years of research experience, the last five-and-a-half years have been spent investigating issues related to educational policy and sociology, with the last year including new research in the area of deaf education and the American deaf population. For four-and-a-half years, I was a Research Fellow with the California Educational Research Cooperative at the University of California, Riverside. Additional details of my work experience may be reviewed in my curriculum vitae, attached as an appendix to this report.

B. Areas of Specialization.

1. My area of specialization in educational research is policy analysis and evaluation, in which I earned my doctorate from the University of California, Riverside. Policy issues relevant to California public schools, particularly class-size reduction and year-round schooling, have received the bulk of my attention.

2. I have related knowledge from credentialed teaching experience in California.

C. Relevant Works.

I have publicly presented and written about my research findings in a number of ways, which are detailed in my curriculum vitae.

1. Pertinent to this report, I presented a paper, "Student Segregation and Achievement Tracking in Year-Round Schools," at the Annual Meeting of the American Sociological Association in August of 1999. This was a case study of an urban California school district.

2. Continued study has contributed to a revised manuscript, bearing the same title, that is currently under review for publication. This paper documents the segregation of students and teachers by attendance track on a multi-track year-round calendar. The pattern of segmentation placed the students with greatest educational need on the tracks with the least experienced teachers, while the most experienced teachers were with the highest performing students. Further, there was a noteworthy consolidation of academic advantage for students remaining on the high performance track, setting those remaining on the lower performing tracks relatively further behind.

3. Further research investigating the relationships among student achievement, segregation, and utilization of the multi-track year-round calendar in additional California school districts is underway.

4. I should also note that regular presentations to the Research Planning Council of the California Educational Research Cooperative provided me with several opportunities to talk directly with a number of school district administrators about their experiences with various policy issues, including multi-track year-round schooling.

II. REPORT ON MULTI-TRACK YEAR-ROUND PUBLIC SCHOOLS IN CALIFORNIA

A. Basis for Report Preparation.

1. In preparing the present report, I have drawn heavily upon my own work and research regarding multi-track year-round schooling. My paper and electronic files include a number of peer-reviewed journal articles, practitioner journal articles, technical reports, ERIC documents,

unpublished manuscripts, monographs, doctoral dissertations, California Education Code excerpts, data sets and documents prepared by the California Department of Education, California Legislative Analyst's Office reports, California Educational Research Cooperative publications, and research data I have collected.

2. I have supplemented my files by obtaining additional documents with the assistance of two graduate students from the University of Maryland, College Park, and plaintiffs' counsel.

3. Plaintiffs' counsel has also provided me with materials I would not necessarily otherwise have had access to or been aware of, which included several declarations, newspaper reports, the deposition of Thomas Payne, and one technical report prepared by the Los Angeles Unified School District.

B. Nature of Report.

1. As requested by plaintiffs' counsel, I have prepared a report focusing on multi-track year-round calendar use in California's K-12 public schools.

2. I first address the allocation of students, teachers, and programs to multi-track year-round schools and across attendance tracks within such schools.

3. Next, I discuss the relationship between the multi-track year-round calendar and academic achievement.

4. Where possible, I attempt to highlight how the Concept 6 and Modified Concept 6 versions of the multi-track year-round calendar are substantially different in important respects from other multi-track year-round calendars. The key point of difference is that both the Concept 6 and Modified Concept 6 calendars *reduce the number of days in attendance* compared to the typical 180-day school year, i.e., 163 instructional days, which is 90.6% of the 180-day year. (On this basis, both the Concept 6 and Modified Concept 6 multi-track year-round

calendars are referred to generically, hereafter, as the Concept 6 calendar.) Differences between Concept 6 and other multi-track year-round calendars, where present, are above and beyond those generally found between multi-track year-round schools and traditional or other single-track calendar schools.

C. Delimiting Assumptions.

Before summarizing my findings from the review of data and documents, I point out some important discussion boundaries for this report.

1. Though I am abundantly familiar with the larger issue of year-round schooling, this is not a report about the larger matter. I explicitly limit this report to the most prevalent form of year-round schooling in California, the multi-track year-round calendar.

2. Because of social, political, and economic circumstances unique to California, I give substantially less weight to, though I do not ignore, findings related to multi-track year-round calendars in other states, of which there are few, and deem experiences outside of the United States as, for the most part, irrelevant. Characteristics that make California clearly different from other places where the multi-track year-round calendar has been studied include dramatically different population demographics (e.g., plurality Hispanic student population, tremendous ethnic diversity, a high proportion of English language learners, a high immigration rate, persistent growth in student population since at least the mid-1980s – more than a 40% increase, and the largest school age population in the United States), significant changes in property tax rates (a common source for school revenue in most states), and more than a decade of directly linking multi-track year-round calendar use to school building funds.

3. I do not entertain the debate about the appropriate cost model for developing finance

projections or fiscal policy related to the multi-track year-round calendar. It is clear that the state has defined its primary interest in the multi-track year-round calendar as a means for reducing construction expenditures on school buildings.

4. Further, I substantially limit my discussion to matters that the State of California has deemed relevant for evaluation purposes as defined by the existence of pupil, program, personnel, and participation data maintained by the various divisions within the California Department of Education and the local education agencies within the State's jurisdiction.

5. As a matter of professional and scientific interest, I adopt a skeptical stance. I do seek to make only those claims that are justified by the evidence available to me.

D. Abstract.

The findings from the comparisons both between California schools on multi-track year-round calendars and on the traditional (or other single-track) calendar, and within schools on multi-track year-round calendars, can be summarized as follows:

1. ***Between Multi-Track Year-Round and Traditional/Single-Track Calendar Schools —*** Racial or ethnic group membership is strongly aligned with the type of calendar under which schools operate in the State of California. This is quite striking for Hispanic students attending schools using a multi-track calendar, especially those attending schools using a Concept 6 calendar (least Hispanic in traditional/single-track schools and most so in multi-track schools). Similarly, the percentage of students from low-income families and the percentage of students who are English language learners (ELL) are dramatically different between multi-track schools, especially Concept 6 schools, and traditional/single-track schools (lowest in traditional/single-track schools and highest in multi-track schools). The same pattern holds true for the access to fully credentialed public school teachers and the presence of emergency credentialed teachers

i.e., fewer fully credentialed and more emergency credentialed teachers in multi-track schools compared to traditional/single-track school).

Finally, the achievement gap between schools utilizing the various attendance calendars is quite large. Traditional/single-track schools are the best off and the Concept 6 schools are worst off. Additionally, multi-track year-round schools remain less likely to be ranked as highly on the State's Academic Performance Index (API) as traditional/single-track schools even after statistically controlling for the dramatic systematic differences observed. State policy designates the multi-track year-round calendar as an indicator of academic performance risk (i.e., it is expected to have a negative impact on achievement). In other words, after accounting for differences in the distribution of individual student and family characteristics, as well as teacher qualifications, between multi-track year-round calendar and traditional/single-track year-round calendar schools, the multi-track year-round calendar is independently associated with an additional achievement penalty; there is a greater negative impact on achievement than was revealed from the analysis of mean achievement differences.

2. ***Within Multi-Track Year-Round Calendar Schools —***

There are also clear racial or ethnic group, family income, and ELL status differences among students across attendance tracks within multi-track year-round schools. Teacher experience levels, which are correlated with teacher credential status, are also far from equally distributed across tracks within multi-track year-round schools. And, similar to the between-schools situation, there are achievement gaps between attendance tracks within multi-track year-round schools, which are not fully accounted for by differences between the groups of students and teachers allocated to the various tracks.

E. Introduction to the Matter of Multi-Track Year-Round Schooling.

There are several points of agreement among researchers, policymakers, and practitioners when it comes to the multi-track year-round calendar.

1. The only clearly compelling reasons for a school or school district to adopt a multi-track year-round calendar are to respond to demographic or fiscal pressures. Single-track calendars, traditional or year-round, do not increase school capacity by themselves. All students are in attendance at the same time on a single-track calendar, whereas some students are not in attendance at any given time on a multi-track year-round calendar.

a. By demographic pressures, I mean the need to keep up with a rapidly growing school-age population that places immediate or short-term time pressures on accommodating burgeoning enrollment with existing school facilities. This is typically referred to as an *overcrowding* problem. According to a California Department of Education Consultant on Year-Round Education, "One of the primary advantages of a multitrack system is that it expands the seating capacity of a school facility."[1]

b. By fiscal pressures, I mean *inadequate or unavailable funding* for new school building construction or expansion projects, or for leasing or purchasing legally acceptable building space, if available, such that enrollment must be accommodated in existing facilities. I should note that though there are a variety of substantiated claims for reduced overall costs associated with implementation of the multi-track year-round calendar, not all sites or districts realize cost savings.

2. Multi-track year-round schools typically do not offer extensive intersession or summer

[1] Payne, Thomas. 25 July 2001. Declaration of Thomas Payne in Support of Defendant State of California's Opposition to Plaintiff's Motion for Class Certification, *Williams, et al. vs. State of California, et al*. Sacramento, CA: Author. (p. 2)

school programs for remediation or enrichment due to a lack of available space; all of the space is in use all of the time on the multi-track year-round calendar. This means that a student's educational program is likely to be restricted to the number of regular school days on the calendar, and cannot readily be supplemented with additional days of instructional programming. Thus, *educational opportunity is curtailed* for most students who are assigned to a multi-track year-round school.

3. *Scheduling classes and assigning students to classes is dramatically constrained* when a school operates on a multi-track year-round calendar.

a. For elementary schools, and schools that operate with the self-contained classroom or core curriculum models, there is a fundamental numbers problem associated with filling classrooms. The division of the student body into subsets, typically three or four, depending on the number of attendance tracks, makes it difficult to assign students uniformly to classrooms with a single grade curriculum. Combination grade classes are frequently required in multi-track year-round schools. The consequence of combination grade classes is *lowered overall student achievement* and difficulty in maintaining teacher morale.

b. For schools with departmental or elective offerings, namely middle schools and junior and senior high schools, already complicated master scheduling becomes exceedingly more difficult. Frequently, these schools are forced to offer certain courses on a limited number of attendance tracks, which could and does lead to *explicit curriculum tracking*. This is among the most compelling reasons why the multi-track year-round calendar is so rare among secondary schools, and why it negatively impacts educational opportunities where it does exist at the secondary level.

4. Special program and service delivery is *not equally accessible* for all students attending a

multi-track year-round school. Students eligible for English Language Learner (ELL) programs, Gifted and Talented Education (GATE), Special Education, and other identifiable programs commonly are *limited to only one attendance track,* independent of other needs or interests, in order to receive the program services for which they have been designated. Thus, "without careful consideration of the implications for curriculum, implementing a [multi-track year-round calendar] may result in … ghettoization of specific student [or teacher] groups on separate tracks."[2]

5. Independent of the allocation of various programs and personnel among the several attendance tracks, parents, students, and teachers have and express preferences for when they would like to have their attendance and vacation periods. As such, *some tracks are more desirable than others* regardless of their contribution to the school's educational mission. "Allocating children [and teachers] to classes needs to be done carefully to avoid ghettoizing any group of students [or teachers] on the tracks that appear the least desirable."[3]

6. The multi-track year-round calendar is often *an unwelcome strategy for managing attendance and enrollment.* As such, the multi-track year-round calendar is neither randomly nor uniformly implemented across school neighborhoods, either within or across school districts. I offer the following observation from an overview of the research literature: "Neighborhoods with less political influence … [had] to follow district policy, while those with more power (and

[2] Shields, Carolyn M., and Steven Lynn Oberg. 2000. *Year-Round Schooling: Promises and Pitfalls*. Lanham, MD: The Scarecrow Press, Inc. (p. 67). Differential assignment of teachers is acknowledged and discussed in the research literature and among education professionals, but is not emphasized nearly so strongly as the matter of differential student assignment.
[3] Shields and Oberg, p. 165.

affluence) were permitted to circumvent it."[4] The multi-track year-round calendar is not sought after by the public and its imposition by state and district policy is resisted, when possible.[5]

7. Maintenance and refurbishment can be difficult to schedule and occasionally require *disruption of the regular instructional day* to accommodate facility and staffing demands.

F. Multi-Track Year-Round Schooling in California.

1. California has, by far, the largest enrollment of students on the multi-track year-round calendar of any state in the nation. Of the more than six million K-12 students in the state, more than one million are enrolled in multi-track year-round schools, of which roughly a third attend a Concept 6 school. *California's multi-track year-round school enrollment accounts for half of the nation's total enrollment on all year-round calendars combined.*

2. The primary driving force for adoption of the multi-track year-round calendar in California, and elsewhere, has been legislatively defined incentives and mandates. In fact, the dominant use of the multi-track year-round calendar in California is directly attributable to "the state's *primary* interest in … its potential for reducing school districts' demands for limited state resources to construct new school facilities."[6] That is, state policy has been a major fiscal pressure strongly influencing schools districts' responses to demographic pressures.

3. The Concept 6 calendar provides the greatest potential enrollment capacity, up to a 50% increase, of any multi-track year-round calendar. This greater capacity is only achieved by *reducing the number of days in attendance* compared to the typical 180-day school year (i.e., 163 instructional days, which is 90.6% of the 180-day year). California law provides for the *addition*

[4] Shields and Oberg, p. 162.

[5] I should note, however, that within a few years after implementation, the majority of parents who have responded to opinion surveys (at least in the limited number of districts from which there is data) have expressed satisfaction with their multi-track year-round schools. At the same time, I must also point out that not all schools or districts are able to introduce or maintain multi-track year-round calendar operation due to strong resistance or persistent dissatisfaction.

of instructional minutes to each day in order to achieve the same number of annual instructional minutes. All other multi-track year-round calendars (hereafter referred to as "Not Concept 6") are generally able to accommodate the 180-day school year.

G. Allocation of students, teachers, and programs to multi-track calendar schools in California.

Current allocation of students, teachers, and programs to schools on a multi-track year-round calendar in California can be understood, in part, by analyzing data files made publicly available by the California Department of Education. The data analyzed herein come from school-level aggregations of student and teacher data contained in the *2001 API Base Data* file and the *2000-2001 California Year-Round Education Directory.* The State catalogs a number of different school calendar configurations, as well as student and teacher characteristics across a wide range of measures, on an annual basis.[7]

1. Graphical and tabular statistical summaries of a relevant subset of the State's data are provided in Exhibit B (attached) and are discussed herein. In order to understand the graphs provided, please alternately examine Figure 1 (Exhibit B) and read the description below:

a. The distribution of schools across various student and teacher measures is divided into calendar groups. There are three calendar groups: 1) single-track calendar schools, both the traditional and year-round varieties, 2) multi-track year-round schools that are **not** Concept 6 calendar schools, and 3) multi-track year-round schools that are Concept 6 calendar schools. The schools included in this descriptive analysis are those for which the California Department of Education provided a 2000-01 Academic Performance Index (API) score.

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[6] Legislative Analyst's Office. April 1990. *Year-Round School Incentive Programs: An Evaluation.* Sacramento, CA: Author. (p. 3).

[7] Additional statewide summary statistics reported herein were prepared by Educational Demographics Office of the California Department of Education (http://www.cde.ca.gov/demographics/reports/statewide/sums00.htm downloaded on February 13, 2002).

b. Figures 1 through 12 contain box plots of the distribution of various aspects of each school's students or teachers for each calendar group. Each box plot has a heavy, horizontal, dark line inside a yellow box, with "whiskers" typically extending from both the top and bottom of the box. This dark line inside the box is the median (also called the value of the 50th percentile of the distribution), usually close to the mean (also called the average), but not always, depending on the symmetry of the distribution. The top and bottom edges of the box mark the values of the 75th and 25th percentiles of the distribution, respectively. The edges of the whiskers mark one of two possibilities: 1) the real end points of the distribution when there are no extreme values, or 2) the expected end points of the distribution beyond which extreme and outlying values are found. Any circles or stars beyond the whiskers are called "outliers" or "extremes" and represent cases that extend far outside the range of values that would be expected for a distribution that is approximately "normal" or Gaussian. Outliers and extremes are most commonly observed when the median value is very high or very low (e.g., close to zero or close to 100 percent for such things as proportion of student body of a given ethnicity, as in Figures 3 through 5), though as in Figure 1, there may simply be exceptional cases (i.e., the distribution has more outlying values than would be expected for a "normal" distribution).

c. Tables 1 through 12 provide the numerical summaries that correspond with their respectively numbered figures. Each table has six rows and four columns of numerical information. The six rows identify the mean, median, 25th percentile, 75th percentile, proportion of schools with extreme values (as a percentage of schools within each respective calendar group), and the number of schools for each of four distributions of values: Traditional/Single-Track calendar schools, Multi-Track Not Concept 6 calendar schools, Multi-Track Concept 6 calendar schools, and the Total Statewide. The rightmost column, the Total Statewide, is

provided for reference purposes, but is not represented in graphical form. Thus, the total statewide distribution of values for all of the schools does not appear in Figures 1 through 12.

2. Though only 16.8% of all California K-12 students are enrolled in a school using a multi-track year-round calendar, Figure 1 and Table 1 (Exhibit B) indicate that the average level of enrollment (in grades 2-11) in multi-track year-round schools is greater than in traditional/single-track calendar schools. Further, Concept 6 schools have the highest average enrollment, as would be expected and was intended given their higher maximum enrollment capacity.

3. Figure 2 and Table 2 present the distribution of Hispanic students in schools on the various calendars. Hispanic/Latino and African American students are often referred to as members of "underrepresented" minority groups because of their low representation in the population of the United States as a whole and their even lower projected representation among those earning higher incomes and having attained higher levels of formal education. In California, however, the Hispanic student population is no longer a minority; it has plurality status (43.2% of K-12 enrollment in 2000-01). As such, if California students are fairly uniformly represented among the various school calendar groups, Hispanic students should, on average, be in the plurality across all calendar types. This is not the case. Hispanic students are relatively more likely to be enrolled in a multi-track year-round calendar school, and the very high level of enrollment in Concept 6 schools is well out of proportion to their representation in the state as a whole (median school enrollment level of 84% for Concept 6 schools compared to 34% statewide).[8] The disparity in enrollment levels is largest when comparing the Concept 6 calendar group with the traditional/single-track group. Seventy-five percent of the Concept 6 schools have a higher Hispanic student enrollment than 75% of the traditional/single-track

schools. Moreover, greater than 50% of the Not Concept 6 schools have a higher Hispanic student enrollment than 75% of the traditional/single-track schools.

4. Figure 3 and Table 3 present the distribution of African American students in schools on the various calendars. This is the second of the two "underrepresented" minority groups. In California, African American students are in the minority among students in the public schools (8.4% statewide), less than a fifth of the Hispanic student enrollment. The representation of African American students among the various calendar groups is also biased. In this case, the bias in enrollment overrepresentation is more striking for the Not Concept 6 schools relative to the traditional/single-track schools than it is for the Concept 6 schools. However, the overwhelmingly large Hispanic enrollment level in the Concept 6 schools precludes all other racial/ethnic groups from also having extreme overrepresentation, whereas there is more room for racial/ethnic representation imbalances for non-Hispanic students among the Not Concept 6 schools.

5. Figure 4 and Table 4 present the distribution of Asian students in schools on the various calendars. This minority group is important because its representation in the California schools is nearly as high as that of African American students (8.0% statewide) and because people of Asian descent are "overrepresented" among the higher income and education groups in the United States. The representation of Asian students among the various calendar groups is biased, but in a manner opposite that for Hispanic and African American students. Enrollment overrepresentation is found in the traditional/single-track schools compared to the multi-track year-round schools. This disparity is most striking when comparing the traditional/single-track schools with the Concept 6 schools. Fully 50% of the Concept 6 schools have lower Asian

[8] The fact that the statewide median and mean Hispanic enrollment levels at the school-level (34% and 40%, respectively) are lower than the statewide enrollment level (43%) indicates that Hispanic students are more heavily

student enrollment levels than 75% of the traditional/single- track schools (and the Not Concept 6 schools, for that matter).

6. Figure 5 and Table 5 present the distribution of white students in schools on the various calendars. Though not the majority in California (35.9% of K-12 enrollment in 2000-01), white students are generally assumed to be the appropriate group against which to compare the educational performance and opportunities of other racial/ethnic groups in the United States. Similar to the situation for Asian students, and in stark contrast to the situation for Hispanic students, white students are relatively more likely to be enrolled in a traditional or single-track year-round calendar school, and the very low level of enrollment in Concept 6 schools is well out of proportion to their representation in the state as a whole (median of 1% compared to 36% statewide). More than half of all Concept 6 schools have (the median) one percent or fewer white students enrolled, whereas half of all traditional/single-track schools have at least a 40% white student enrollment.

7. Figure 6 and Table 6 present the distribution of students identified as participating in the subsidized meal program (free & reduced price or National School Lunch Program [NSLP]) in schools on the various calendars. This is a rough measure of the level of poverty in each school. Over half of the Concept 6 schools have at least (the median) 99% of their students NSLP qualified. The Concept 6 median enrollment level is more than twice the statewide level of 46% of students in a school being qualified for the subsidized meal program. This poignant case evidences a large separation between the kinds of students who find themselves in a Concept 6 and in a traditional/single-track school as well. More than 75% of the Concept 6 schools have a higher poverty rate than more than 75% of the traditional/single-track schools. Further, just

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concentrated in the state's largest schools, which is born out in this analysis.

more than 75% of the Concept 6 schools have a higher poverty rate than 50% of the other multi-track year-round schools.

8. Figure 7 and Table 7 present the distribution of ELL students in schools on the various calendars. ELL students are relatively more likely to be enrolled in a multi-track year-round calendar school, and the high level of enrollment in Concept 6 schools is well out of proportion to their representation in the state as a whole. As with the poverty (NSLP) rate, Concept 6 schools are hardly like the other types of schools in the state (median enrollment level of 53% compared to 17% statewide). More than 75% of the Concept 6 schools have a higher percentage of ELL students than more than 75% of the traditional/single-track schools. Further, 75% of the Concept 6 schools have a higher percentage of ELL students than 50% of the other multi-track year-round schools.

9. Figure 8 and Table 8 turn our attention to the distribution of Full Credential teachers in schools on the various calendars. In over half of the Concept 6 schools, at least one in four teachers does not have a full credential, while the median value for the other multi-track schools is roughly one of every eight teachers, and the median for the traditional/single-track schools is less than one in fourteen teachers without a full credential. The data describe a rather serious situation. More than 75% of the Concept 6 schools have a lower percentage of full credential teachers than more than 75% of the traditional/single-track schools. Further, more than 75% of the Concept 6 schools have a lower percentage of full credential teachers than 50% of the other multi-track year-round schools.

10. Figure 9 and Table 9 provide a complementary, though not entirely redundant, examination of the distribution of Emergency Credential teachers in schools on the various calendars. The key point here is that there is a staggeringly high proportion of adults in the

classrooms of Concept 6 calendar schools who are not fully qualified to occupy the particular teaching assignment in which they have been placed, and that this identifies a situation that can only be characterized as *gross educational inequity.*

11. Publicly available state data do not readily provide any measures of particular programs or services that allow an analysis of their distribution across California schools of various calendar types. With the exception of magnet programs and charter schools, districts rarely provide information that identifies unique or unequal distribution of program and service offerings by school site.

12. However, the State officially acknowledges that multi-track year-round schools are a different type of educational environment than traditional and single-track year-round schools in that the multi-track calendar serves as an indicator for conditions that influence student academic performance.[9] This is evident by the inclusion of a dichotomous (or binary) indicator for whether or not a school is on a multi-track year-round calendar in the calculation of the School Characteristics Index (SCI). What should be inferred from the use of such an indicator is that *schools on traditional/single-track year-round calendars are not otherwise comparable with schools on multi-track year-round calendars* without some compensation for their differences.

13. The multi-track year-round calendar effectively consolidates school differences by race/ethnicity, poverty, and English language ability, as well as teacher qualifications, under what was a seemingly benign label. However, it is now clear that anyone wishing to determine

[9] The official designation of multi-track year-round schools as different from traditional and single-track year-round schools is part of the Public Schools Accountability Act of 1999, which calls for a number of additional school characteristics to be measured when making schools comparable for ranking by API score and includes: average parent education, percent of pupils participating in free or reduced price lunch program, percent of pupils classified as English Learners, percent of pupils by racial/ethnic groups (African American not Hispanic, American Indian or Alaska Native, Asian, Filipino, Hispanic or Latino, Pacific Islander, White not Hispanic, and Multiple or No Responses), percent of teachers by credential status (with Full Credential and with Emergency Credential), and percent of pupils first attending school in the current year.

whether or not they have access to a school with adequate social and educational resources need only ask on which calendar it operates. This is especially the case for the Concept 6 calendar.

H. Allocation of students, teachers, and programs across tracks within multi-track calendar schools in California.

Allocation of students, teachers, and programs to attendance tracks within multi-track year-round schools in California cannot be understood by analyzing data files maintained by the California Department of Education. The issue of structuring the school calendar is only treated as a school-level phenomenon by the State and is not recognized as having direct impacts on the classroom. As such, I must refer to several district case studies that together identify clear patterns of non-uniform allocation of students, teachers, and programs across attendance tracks.

1. From my own review of studies addressing the allocation of students, teachers, and programs among attendance tracks within multi-track year-round schools, I found a clear pattern of segmentation of students and teachers across tracks in response to and reinforcing the tracking of various instructional programs.[10] This situation was clearly structured by state and local policies. The biased distribution of students and teachers within schools is very much like the biased experiences of students across schools. That is, despite the fact that student poverty, race/ethnicity, and English language learning status, as well as credentialed teachers, are already unequally distributed across schools of various calendar types, *within multi-track year-round schools the populations of students and teachers become segmented even further.* Additionally, in my case study, I was able to identify that segmented instructional programming by track was taking place.

2. Since undertaking the aforementioned case study, I have been able to examine data from

[10] Mitchell, Ross E., and Douglas E. Mitchell. August 1999. *Student Segregation and Achievement Tracking in Year-Round Schools.* (Originally submitted as *Organizational Segregation of Student Achievement in Elementary*

two other districts that extensively utilize the multi-track year-round calendar.[11] In both of these cases as well, students, teachers, and programs are segregated by track within schools.

3. Additionally, while maintaining contacts with several other districts, I was able to determine that it is a *practice of some school districts to track certain programs as an incentive for families to register their children on their less preferred attendance track.* This is particularly the case with the GATE program, where GATE classes would be on the tracks that were less popular with the (more affluent) parents of GATE students.

4. In addition to my own work, and that reviewed therein, I am aware of one additional study that has identified within school track-to-track differences.[12] This study focused primarily on difference between schools of various calendar types, but did note within school track-to-track differences.

I. The Relationship between Academic Achievement and Multi-Track Year-Round Schools in California.

As with the question of allocation, academic achievement may differ both between and within schools.

1. For the matter of academic achievement differences between schools of various calendar types in California, I return to my analysis of state data files. All of Figures and Tables 10 through 12, which are discussed here, are identical in construction to those discussed above. Figures 13 and 14 are different from all of the rest. These latter two figures contribute to a more detailed analysis of the distribution of Similar Schools Rank scores across calendar groups, which follows below.

Schools: The Influence of Multi-Track Year-Round Schools.) Paper presented at the Annual Meeting of the American Sociological Association, Chicago, Illinois.

[11] This research remains in progress. Unfortunately, no manuscripts have been prepared for circulation as of this writing.

a. Figure 10 and Table 10 provide a descriptive summary of the academic achievement of California schools by calendar type. The distribution of school API scores from 2001 is shown, in box plot format, for each of the three calendar types being considered: 1) traditional/single-track, 2) Not Concept 6 multi-track, and 3) Concept 6 multi-track. A tremendous disparity in achievement across calendar types is evident. More than 75% of the Concept 6 schools have lower API scores than more than 75% of the traditional/single-track schools. Further, more than 75% of the Concept 6 schools have a lower API scores than 50% of the other multi-track year-round schools. Figure 11 and Table 11 tell the same story in the State Rank metric.

b. Figure 12 and Table 12 depict the distributions for the Similar School Rank scores. The transformation from the State Rank metric to the Similar Schools Rank metric requires a reordering of the schools when comparing API scores. Instead of ranking schools only by their API score, schools are first ranked by their SCI. Schools with similar SCI scores are then ranked by their API scores. The intention here is to produce a ranking system that compare "likes with likes" rather than pretending that all schools are equally composed and equally likely to produce the same level of achievement.

Unlike all other representations offered thus far, there appears to be little difference among the various calendar types. As noted in paragraph G.12, the Similar Schools Rank score takes into account a number of differences in school characteristics, including whether or not a school operates on a multi-track year-round calendar. However, there is a bias in the calculation of the SCI, which is the basis for establishing similarity in order to determine the Similar Schools Rank. The achievement impacts of the multi-track year-round calendar are assigned a negative

[12] White, Jeffrey A., and Steven M. Cantrell. 21 March 2001. *Comparison of Student Outcomes in Multi-Track Year-Round and Single-Track Traditional School Calendars.* Los Angeles, CA: Los Angeles Unified School

weight.[13] A negative weight means that, in the aggregate, on average, and *ceteris paribus, students in a multi-track year-round school would be predicted to achieve at a lower level than students at a traditional or single-track year-round school*. From the standpoint of assigning Similar Schools Rank scores, the consequence of assigning a negative weight is to compare multi-track year-round schools with lower performing traditional/single-track schools. That is, the calendar effect allows multi-track schools to appear higher performing than they might otherwise compare.

What is important here is whether or not differences among calendars are fully accounted for by utilization of the SCI for similarity comparisons. The present representation of the data suggests that there are remaining residual differences, and that they begin somewhere in the lower half of the distributions, such that the multi-track year-round schools have a lower median Similar Schools Rank score than the traditional/single-track year-round schools. Further analysis of this subtle, but important, difference requires a more fine-grained analysis of the Similar Schools Rank score distributions.

c. Figure 13 presents the complete frequency distributions of the Similar Schools Rank scores for the three calendar groups. Since there are many fewer multi-track year-round schools than traditional calendar schools, the frequency count (number of schools) for each possible Similar Schools Rank for the two groups of multi-track year-round schools is plotted on the left-hand scale, which ranges from 10 to 90, while the frequency count for the traditional and single-track year-round schools is plotted on the right-hand scale, which ranges from 540 to 660. Thus,

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District, Program Evaluation and Research Branch, Policy Analysis Unit.

[13] Technical Design Group (Eva Baker, Edward Haertel, Don Barfield, Ted Bartell, Linda Kaminski, Michael E. Martinez, Tej Pandey, Brian Stecher, and Mark Wilson). April 2000. *Construction of California's 1999 School Characteristics Index and Similar Schools Ranks.* [PSAA Technical Report 00-1]. Sacramento, CA: California Department of Education, Office of Policy and Evaluation.

by looking at the left-hand scale, it is possible to see that the most frequent Similar Schools Rank for the Not Concept 6 multi-track schools is a 5 (84 schools at this rank) and the least frequent Similar Schools Rank is a 10 (58 schools at this rank). Similarly, the left-hand scale makes it possible to see that the most frequent Similar Schools Rank for the Concept 6 multi-track schools is a 2 (32 schools at this rank) and the least frequent rank is a 10 (15 schools at this rank).[14] By looking at the right-hand scale, it is possible to see that the most frequent Similar Schools Rank for the traditional/single-track schools is a 10 (648 schools at this rank) and the least frequent rank is a 1 (556 schools at this rank). This means that at any given level of comparability, the traditional calendar schools are more likely to be ranked highest and the Concept 6 schools are more likely to be ranked near the bottom.

Additionally, this graphical representation assists in making two important observations: 1) the frequency of successively higher Similar Schools Rank scores increases more rapidly for the traditional/single-track and Not Concept 6 multi-track schools than it does for the Concept 6 multi-track schools group; and 2) the declining frequency of higher Similar Schools Rank scores is suddenly and substantially reversed for traditional and single-track year-round schools with the highest rank of 10. That is, even after statistically removing measured biases, the highest ranked among the comparable schools are more likely to be traditional/single-track schools than multi-track schools, while the lowest ranked among comparable schools are more likely to be multi-

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Technical Design Group. January 2001. *Descriptive Statistics and Correlations Tables for California's 2000 School Characteristics Index and Similar Schools Ranks*. [2001 Supplement to PSAA Technical Report 00-1]. Sacramento, CA: California Department of Education, Office of Policy and Evaluation.

[14] Inspection of the frequency distributions may suggest to the reader that they are multi-modal, which raises the possibility that each of the calendar groups may have sub-populations of interest (e.g., Not Concept 6 schools may be further sub-divided into 45/15, 60/20, and 90/30 groups identifying the timing of attendance and non-attendance). I do not deny this possibility. However, the current investigation seeks to respond to the question of differences between multi-track year-round schools, with the shorter-year Concept 6 schools as a notably special case, and the traditional/single-track schools. As such, I restrict my analysis to the question originally framed in section II.B.

track schools. The key point here is that even though the middles of the distributions of rank scores are fairly evenly spread, the tails of the distributions have not been equalized.

d. Figure 14 presents a shift function analysis of the same data used to generate Figures 12 and 13. For this analysis, a reference group must be specified. I have chosen to follow the same strategy as the State of California in designating the combined group of traditional and single-track year-round schools as the group against which I compare the two multi-track calendar groups.[15] The two shift functions, one for the Multi-Track Not Concept 6 calendars group and one for the Multi-Track Concept 6 calendars group, were obtained by subtracting the Similar Schools Rank score at each successive 10^{th} percentile (deciles) of the traditional/single-track distribution from the Similar Schools Rank score at every successive 10^{th} percentile, respectively, of the multi-track distributions. This analytical strategy identifies whether or not two distributions have similar shapes and values across all, part, or none of their ranges.

According to Figure 14, the two multi-track calendar schools groups do not initially differ from the traditional/single-track calendar schools group in shape or value at the very lowest Similar Schools Rank. Immediately thereafter, however, the Concept 6 group falls behind in its Similar Schools Rank score distribution by one rank and remains so across the balance of its range. The Not Concept 6 group is identical with the traditional/single-track group across somewhat more of its lower score range before it too falls back and remains one Similar Schools Rank different across the middle and upper end of the score range.

e. The current analysis is consistent with earlier findings reported by the California State

[15] This is perfectly sensible because the traditional calendar schools are the normative standard and outnumber the multi-track calendar schools roughly 7 to 1. Though single-track year-round calendar schools have been included with traditional calendar schools in the current analysis, this does not bias the analysis nor distort the conclusions since single-track schools are far fewer in number and have aggregate characteristics similar to the traditional calendar schools.

Department of Education,[16] where even after accounting for a range of mitigating circumstances, multi-track year-round schools have a residual academic achievement disadvantage. Further, unlike 15 years ago, the State's statistical model has explicitly included the multi-track year-round calendar as one of the many factors that must be accounted for when attempting to remove systematic biases that influence school performance. That is, there remain additional, small, but substantive, residual differences in aggregate academic performance such that multi-track year-round schools are still lower performing schools than traditional/single-track year-round schools. Concept 6 multi-track year-round schools are the most consistently low performing, whereas more than a third of the range of rank scores has been equalized between Not Concept 6 multi-track year-round schools and traditional/single-track schools after accounting for the fact that the calendars (and student and staff composition) are different. Nonetheless, multi-track year-round schools are one full Similar Schools Rank below traditional and single-track year-round schools across just more than half of the range of possible scores.

f. The statistical model employed by the California Department of Education, in compliance with the PSAA of 1999 (see note 9), includes at least a partial account of the negative impact of the multi-track year-round calendar relative to the traditional and single-track calendars; however, residual disadvantages remain for schools on a multi-track year-round calendar. Unfortunately, there does not appear to be great interest on the part of the State in

[16] Quinlan, Claire, Cathy George, and Terry Emmett. 1987. *Year-Round Education: Year-Round Opportunities – A Study of Year-Round Education in California.* Sacramento, CA: California State Department of Education. Similar findings were reported by White and Cantrell for the Los Angeles Unified School District (see note 12). An additional study reporting an academic achievement disadvantage for multi-track year-round schools was reported by the Oakland Unified School District (Resnick, Ana. 28 July 1993. *Year-Round Schools Evaluation.* Oakland, CA: Oakland Unified School District, Department of Research and Evaluation; for studies investigating the link between the school calendar, achievement, and combination grade classes, see Burns, Robert. January 1996. *A Study of Combination Class Achievement.* Riverside, CA: California Educational Research Cooperative, School of Education, University of California, Riverside).

determining why multi-track year-round schools have both generically identifiable and residual achievement disadvantages.

2. Academic achievement differences between tracks within multi-track year-round schools have been examined only in the studies previously discussed for the matter of allocation biases. As such, I continue with a review of the findings related to achievement differences across tracks.

a. The most popular tracks, most like the traditional calendar, have the highest achieving students, while the least popular tracks have the lowest achieving students.

b. After controlling for identifiable differences between attendance tracks, including student, classroom, and teacher differences, a residual achievement advantage remains for the students who continue to attend the most popular and most traditional-like attendance track in the multi-track year-round calendar.

c. Whether the school has three-track or four-track calendars, which do not align perfectly, the "B" track is often the least popular and lowest performing track. Where data are available, it is clear that this least popular track "ghettoizes" the poor and English language-learning students with the least experienced and least qualified teachers in the school. In fact, an Oxnard, California superintendent declared that his district purposefully encouraged Mexican migrant families to enroll on the "B" track (i.e., that which is in session from June through August) in order to increase average daily attendance (ADA) since this sub-population was known to take extended vacations during January (well after the Christmas holidays) when there was little demand for their labor.[17]

[17] Brekke, Norman R. 1986. *Year-Round Education and Academic Achievement in the Oxnard School District.* Paper presented at the Annual Meeting of the National Council on Year-Round Education, Anaheim, California.

J. Summary of Findings.

A number of conditions related to the use of the multi-track year-round calendar in California can now be readily identified, with some important distinctions existing between the Concept 6 calendar, which has fewer total days of instruction, and the Not Concept 6 calendar, which typically has the same number of days of instruction, when compared with the traditional and single-track year-round calendars.

1. Racial or ethnic group membership is strongly aligned with the type of calendar under which schools operate in the State of California. This is particularly striking for Hispanic students attending schools using a multi-track calendar, especially those attending schools using a Concept 6 calendar. Similarly, the percentage of students from low-income families (NSLP eligible) and the percentage of students with ELL status in multi-track year-round schools, especially among those attending schools using a Concept 6 calendar, are greatly different from those attending traditional or single-track calendar schools. Multi-track year-round schools in California, especially Concept 6 schools, have much greater than their representative share of Hispanic, NSLP eligible, and ELL students compared to traditional and single-track year-round schools.

2. The extent of overrepresentation of Hispanic students in Concept 6 schools is so high that it precludes significant overrepresentation by any other racial or ethnic group.

3. The access to fully credentialed public school teachers, and the presence of emergency credential teachers, is strongly associated with the type of calendar under which schools operate. Multi-track year-round schools, especially Concept 6 schools, are much more likely to have teachers who are not fully credentialed to teach in their current teaching assignment.

4. The achievement gap between schools utilizing the various attendance calendars is quite

large, especially that between traditional/single-track year-round schools and Concept 6 multi-track year-round schools.

5. State policy designates the multi-track year-round calendar as an indicator of academic performance risk. In order to make schools comparable, even after accounting for non-education policy related circumstances that include parental education level, family income level, the ethnic composition of the school, and student mobility, an additional correction must be made for the fact that a school is utilizing a multi-track year-round calendar. That is to say, in California, multi-track year-round schools are places with lower academic achievement when compared with traditional/single-track schools, and they are expected to be lower even when all else is equal.

6. The results of the SCI calculation demonstrate that the multi-track year-round calendar remains an academic performance risk even after accounting for the policy related circumstance of the proportion of full and emergency credentialed teachers in the school. That is, even after correcting for whether or not there are proportionately many or few full or emergency credentialed teachers in the school, a multi-track year-round school still requires an additional adjustment due to its lower academic performance level associated with the calendar itself.

7. Though schools are much more comparable after inclusion of both non-education and education policy related variables in a model that attempts to equalize mitigating circumstances, including the calendar itself, multi-track year-round schools are not as likely to be ranked as highly as traditional/single-track schools. Whatever the omitted variable bias is that is present in the State's model, it fails to fully account for the achievement gap between the multi-track year-round schools and the traditional/single-track schools across the full range of Similar Schools

Ranks. This is particularly the case if the multi-track year-round calendar is of the foreshortened Concept 6 variety.

8. On more limited evidence, there are also clear racial or ethnic group, NSLP eligibility, and ELL status differences among students across attendance tracks within multi-track year-round schools. Whereas the tradition of neighborhood schooling may make it quite difficult to control between-school biases in various student characteristics (though court-ordered and voluntary desegregation plans have been utilized to combat this problem), classroom assignment is a well-controlled education policy, which is administratively defined, making within-school differences the unequivocal responsibility of school officials.

9. Teacher experience levels, which are correlated with teacher credential status, are also far from equally distributed across tracks within multi-track year-round schools. Again, this is an education policy related circumstance.

10. There are achievement gaps between attendance tracks within multi-track year-round schools, which are not fully accounted for by differences between the groups of students allocated to the various tracks. However, these track-to-track differences contribute to explaining the difference between multi-track and traditional/single-track school academic performance levels because the lower achievement of multi-track year-round schools is more fully understood as a consequence of the segregation of students and teachers within schools exacerbating the differences due to systematically biased implementation across schools.

K. Caveats or Limitations.

The effort to explain differences associated with attendance calendars among schools in California depends on the conceptual model employed. I should note some important points about my thinking up to this point.

1. Unless otherwise demanded by the patterns present in the data, I have tried to keep the number of categories under consideration to a minimum. That is, as an unhelpful extreme, it would be possible to consider each school in California as sufficiently unique from every other school in the state as to make it impossible to group them in any meaningful categories. I reject this extreme. Nonetheless, there are meaningful variables that deserve differential attention, such as the number of days of instruction that distinguish Concept 6 multi-track schools from Not Concept 6 multi-track schools, which warrant expanding the number of categories under consideration.

2. There are a number of possible interactions among variables that have been ignored. In part, this was to stay in keeping with the State's approach to school comparison. But it was also to keep from producing the aggravating problem of reducing meaningful groups into sub-groups so small that each must be identified as a separate case for study. In particular, I have avoided the problem of interaction with location. That is, school calendar policies are typically situated in particular school districts, such that particular locales contribute variability that cannot analytically be separated from the calendar under which they operate. However, I did investigate the possibility indirectly by comparing district-level characteristics, where the Concept 6 calendar had been implemented, with within-district calendar group characteristics. The Concept 6 schools were noticeably dissimilar from the other schools within the same district, not just across districts. This provides evidence that calendar and locale are not impossibly confounded.

3. The existence of sub-populations within calendar groups, a good possibility considering that not all schools operated on perfectly identical calendars within the three groups, is acknowledged, but their identification was not the purpose of this report. As such, there is room

for additional inquiry into the finer details and distinctions among school calendars and their associated educational impacts.

L. Opinions and Conclusions.

There are a number of findings related to multi-track year-round schooling in California that raise doubts about the efficacy of the multi-track year-round calendar as a means for structuring a system of compulsory schooling in the state.

1. The utilization of the multi-track year-round calendar in California schools results in unequal educational opportunities for some, if not all, students in these schools compared to students who attend traditional/single-track year-round schools. The greatest disparity is for those students attending Concept 6 calendar multi-track year-round schools.

2. The Concept 6 calendar defines an educational environment that experiences greater academic disadvantages than other multi-track year-round calendars, and may be contributing to the continued degradation of educational opportunity by the consolidation of difference through the calendar itself.

3. Similarly, within multi-track year-round calendar schools, students do not have equal access to educational opportunities. The greatest opportunity is typically found on the track most like the traditional calendar, while the most curtailed opportunities are frequently found on the "B" track – the track that has students attending school during the "summer" months. Track assignments do more to determine student *learning opportunities* rather than to respond to academic *performance.*

III. ABILITY TO BE DEPOSED AND TESTIFY AT TRIAL

I have agreed to testify at trial in this matter, and will be able to submit a meaningful deposition on any opinion, and its basis, that I would give at trial.

IV. CONSULTING FEES

A. Compensation Agreement.

1. Plaintiffs' counsel and I agreed that I would be compensated at a rate of $250.00 per hour, with a cap of $10,000.00, plus out-of-pocket expenses, for the preparation of this expert report. After discussion and review of the approved scope of work, we agreed that additional analysis outside the original scope would be required and an additional compensation of $2,000.00 was agreed upon.

2. The same hourly rate would be paid in compensation for time spent preparing any subsequent rebuttal reports that may be required, being deposed, and, if necessary, providing testimony. Out-of-pocket expenses would be reimbursed separately from the hourly rate.

V. CERTIFICATION

I, Ross E. Mitchell, do attest to the fact that I have personally prepared and completed this report and have provided my signature as affirmation thereof on Wednesday, September 25, 2002 in the city of Washington, in the District of Columbia.

EXHIBIT A

Ross Edward Mitchell

10011 Battleridge Place, Montgomery Village, Maryland, 20886-1042, USA
home: [V] 301-869-7591 office: [V/TTY] 202-651-5576 [FAX] 202-651-5746
ross.mitchell@gallaudet.edu

Educational Credentials:

University of California, Riverside, California
- ✧ Doctor of Philosophy, Education, September 2001.
- ✧ Professional Clear Single Subject Teaching Credential, Physical Sciences, June 1993. Awarded by State of California Commission on Teacher Credentialing

The University of Chicago, Chicago, Illinois
- ✧ Master of Science, Physical Chemistry, December 1989.

University of California, Riverside, California
- ✧ Bachelor of Science, Chemistry, June 1986.

Professional Experience:

Research Scientist II, Gallaudet Research Institute, Gallaudet University, Washington, DC, 2001-present.

Research Fellow (Postgraduate Researcher VI), California Educational Research Cooperative, Graduate School of Education, University of California, Riverside, 1997-2001.

Science Teacher, Pacific High School (1992-1994, 1995-1997); Serrano Middle School (1994-1995), San Bernardino City Unified School District, San Bernardino, California, 1992-1997.

Science Teacher, Westbury Senior High School, Houston Independent School District, Houston, Texas, 1991-1992.

Graduate Teaching Assistant, Department of Chemistry, University of Minnesota, Twin Cities, 1990-1991.

Instructor (Long-term substitute), Science Department, Inver Hills Community College, Inver Grove Heights, Minnesota, Fall 1990.

Research Assistant, Department of Chemistry, University of Minnesota, Twin Cities, 1990.

Teaching Assistant, Department of Chemistry, The University of Chicago, Fall 1989.

Research Associate, Physics Division, Argonne National Laboratory, Argonne, Illinois, 1988-1989.

Research Assistant, Department of Biochemistry and Molecular Biology, The University of Chicago, Summer 1987.

Laboratory Assistant, Departments of Physics, Fall 1987; Department of Chemistry, The University of Chicago, Fall 1986-Spring 1987.

Teaching Assistant, Department of Chemistry, University of California, Riverside, Summer 1986.

Scholarly Conference Presentations & Papers:

Mitchell, D. E., & Mitchell, R. E. (2002, April 4). *The political economy of class size reduction.* Paper presented at the annual meeting of the American Educational Research

Association, New Orleans, Louisiana.

———. (2001, April 14). C*ompeting explanations of class size reduction effects: The California case.* Paper presented at the annual meeting of the American Educational Research Association, Seattle, Washington.

Mitchell, R. E. (2000, October 21). *Relational structure and self-similarity: Building a synthetic framework for institutional theories of organization.* Paper presented at the annual meeting of the California Sociological Association, Riverside, California.

———. (2000, August 14). *Early elementary class size reduction: A neo-institutional analysis of the social, political, and economic influences on state-level policymaking.* Paper presented at the annual meeting of the American Sociological Association, Washington, DC.

Mitchell, D. E., & Mitchell, R. E. (2000, April 28). *Class size and achievement: California's massive policy initiative.* Presentation at the annual meeting of the American Educational Research Association, New Orleans, Louisiana.

Mitchell, R. E., & Mitchell, D. E. (1999, August 6). *Student segregation and achievement tracking in year-round schools.* (Originally submitted as: *Organizational segregation of student achievement in elementary schools: The influence of multi-track year-round schools*) Paper presented at the annual meeting of the American Sociological Association, Chicago, Illinois.

Mitchell, D. E., & Mitchell, R. E. (1999, April 20). *Student, teacher, and school factors obscuring the effects of California's class size reduction initiative: An exploratory study of eight school districts.* Presentation at the annual meeting of the American Educational Research Association, Montreal, Quebec, Canada.

Mitchell, R. E., Mitchell, D. E., & Peil C. (1998, October 24). *Evaluating the class size reduction initiative: A preliminary overview.* Presentation at the annual meeting of the California Sociological Association, Riverside, California.

Other Professional Presentations & Workshops:

Mitchell, R. E. (2001, April 24). *A theory-based evaluation of the achievement impacts of California's class size reduction program.* Presentation at the Colloquia on Research in Education Series, Graduate School of Education, University of California, Riverside.

Mitchell, R. E., & Mitchell, D. E. (2000, March 10). *Adoption of class size reduction in other states.* Presentation at the Quarterly Meeting of the Research Planning Council, California Educational Research Cooperative, Riverside, California.

Mitchell, D. E., & R. E. Mitchell. (1999, June 11). *The impact of California's class size reduction initiative on student achievement: Detailed findings from eight school districts.* Presentation at the Quarterly Meeting of the Research Planning Council, California Educational Research Cooperative, Riverside, California.

Mitchell, R. E. (1999, May 25). *Student, teacher, and school factors affecting the impact of class size on student achievement.* Presentation at the Regular Meeting of the Board, Beaumont Unified School District, Beaumont, California.

———. (1998, November 3). *Evaluating the class size reduction initiative: A preliminary overview.* Presentation at a special joint meeting of the Victor Elementary Teachers Association, Victor Elementary School District Administrative Cabinet, and the CTA High Desert Service Center, Victorville, California.

Mitchell, R. E., & Mitchell, D. E. (1998, November 2). *Evaluating the class size reduction initiative: A preliminary overview.* Presentation at the Regular Meeting of the Board,

Palos Verdes Peninsula Unified School District, Palos Verdes Estates, California.

Mitchell, D. E., & Mitchell, R. E. (1998, September 10). C*lass size reduction impact.* Presentation at the Regular Meeting of Riverside County Assessment Network, Riverside, California.

Mitchell, R. E. (1995, October 18). *How can I make my own ice cream in science class?* Workshop presented at the Annual Symposium of the Region Q Consortium of Middle Schools, West Covina, California.

Publications:

Karchmer, M. A. & Mitchell, R. E. (in press). Demographic and achievement characteristics of deaf and hard of hearing students. In M. Marschark & P. Spencer (Eds.), *Oxford handbook of deaf studies, language, and education.* New York: Oxford University Press.

Mitchell, R. E., & Karchmer, M. A. (in press). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies.*

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Zajfman, D., Belkacem, A., Graber, T., Kanter, E. P., Mitchell, R. E., Naaman, R., Vager, Z., & Zabransky, B. J. (1991). Measurement of the distribution of bond angles in H_2O^+. *Journal of Chemical Physics, 94*(4), 2543-2547.

Zajfman, D., Vager, Z., Naaman, R., Mitchell, R. E., Kanter, E. P., Graber, T., & Belkacem, A. (1991). The structures of C_2H^+ and $C_2H_2^+$ as measured by Coulomb explosion imaging. *Journal of Chemical Physics, 94*(10), 6377-6387.

Belkacem, A., Faibis, A., Kanter, E. P., Koenig, W., Mitchell, R. E., Vager, Z., & Zabransky, B. J. (1990). A new type of multiparticle imaging detector. *Review of Scientific Instruments, 61*(3), 945-952.

Belkacem, A., Kanter, E. P., Mitchell, R. E., Vager, Z., & Zabransky, B. J. (1989). Measurement of the ultrashort bond length in He_2^{++}. *Physical Review Letters, 63*(23), 2555-2558.

Technical Reports & Other Writings:

Mitchell, R. E. (2002). *Segregation in California's K-12 public schools: Biases in implementation, assignment, and achievement with the multi-track year-round calendar.* Expert report prepared for counsels for the plaintiffs, *Williams, et al. v. State of California, et al.*, Superior Court, San Francisco, California.

———. (2002). *Pushing the new sociology of childhood: Review of Martha Sheridan's* Inner Lives of Deaf Children*.* Unpublished manuscript, Gallaudet Research Institute, Gallaudet University.

———. (2001). *Class size reduction policy: Evaluating the impact on student achievement in California.* Unpublished doctoral dissertation, University of California, Riverside.

Mitchell, D. E., & Mitchell, R. E. (2002). *A political economy model for school policy with application to class size reduction.* Unpublished manuscript, Graduate School of Education, University of California, Riverside.

———. (2001). *The impact of California's class size reduction initiative on student achievement: Third year evaluation report.* Riverside, CA: University of California, California Educational Research Cooperative.

———. (2000). *Class size: An amendment reflecting further research on state policies.* Riverside, CA: University of California, California Educational Research Cooperative.

———. (1999). *Class size.* Riverside, CA: University of California, California Educational Research Cooperative.

———. (1999). *The impact of California's class size reduction initiative on student achievement: Detailed findings from eight school districts.* Riverside, CA: University of California, California Educational Research Cooperative.

Mitchell, R. E., & Mitchell, D. E. (1999, July 12). *Class size reduction policy and research.* Policy brief prepared for the Appalachia Educational Laboratory, Inc., Charleston, West Virginia.

Manuscripts in Preparation:

Mitchell, D. E., & Mitchell, R. E. (in preparation). *State class size reduction policies in the national context: Institutional effects.* Graduate School of Education, University of California, Riverside.

Mitchell, R. E. (in preparation). *Why are low-performing students concentrated in multi-track year-round schools?* Gallaudet Research Institute, Gallaudet University, Washington, DC.

Mitchell, R. E., & Karchmer, M. A. (in preparation). *The relationship of parental hearing status to the educational experiences of deaf and hard of hearing children and youth.* Gallaudet Research Institute, Gallaudet University, Washington, DC.

Mitchell, R. E., & Mitchell, D. E. (in preparation). *Working the system: Dynamics of stratification in multi-track year-round schools.* Gallaudet Research Institute, Gallaudet University, Washington, DC.

———. (in preparation). C*ompeting explanations of class size reduction effects: The California case.* Gallaudet Research Institute, Gallaudet University, Washington, DC.

Award & Honors:

Rosemary S. J. Schraer Fellow, Graduate School of Education, University of California, Riverside, 1999-2000.

Fellowship Grant, Graduate School of Education, University of California, Riverside, 1997-1998.

Coffman Alumni Scholarship, College of Education, University of Minnesota, 1991.

Letter of Recognition, FIND, Inc., Minneapolis, Minnesota, 1991.

Proctor & Gamble Research Fellowship, Department of Chemistry, University of Minnesota, 1990.

Citation for Volunteer Service, Chicago Hearing Society, Chicago, Illinois, 1989.

Laboratory Graduate Participantship, Division of Educational Programs and Physics Division, Argonne National Laboratory, and Department of Chemistry, The University of Chicago, 1988-1989.

Undergraduate Research Mini-Grant, Department of Chemistry, University of California, Riverside, 1985-1986.

Block C, Water Polo, University of California, Riverside, California, 1985-1986.

All Tournament First Team, Highlander Classic Water Polo Tournament, University of

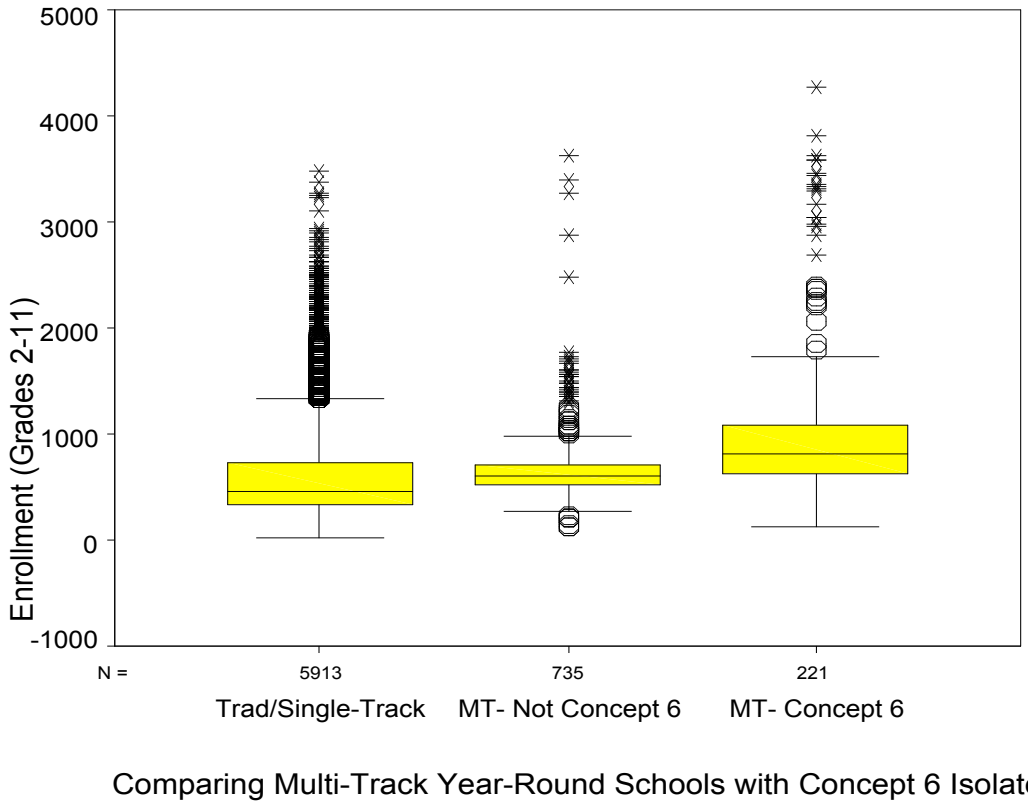
California, Riverside, 1985.
Dean's List, University of California, Riverside, 1985; Riverside City College, 1984.
Naval Reserve Officer Training Corps Scholarship, Rensselaer Polytechnic Institute, Troy, New York, 1982-1983.

Other Professional Education & Teaching Experience:
Teaching Practica: Politics of Education, Educ 206A (Fall 2000); Inquiry and Research Methods, Educ 241A-C (Fall 1999-Spring 2000); Curriculum and Instruction, Educ 230C (Winter 2000); The School as a Social System, Educ 204 (Fall 1999); Role Formation in Educational Organizations, Educ 222 (Spring 1999), Graduate School of Education, University of California, Riverside.
Facilitator, Pathways to Stewardship, Children's Forest, San Bernardino National Forest (Serrano Middle School, San Bernardino, California) 1994-1995.
Curriculum Committee Member, San Bernardino City Unified School District, San Bernardino, California, 1992-1995.

Professional Membership and Service:
American Educational Research Association
Reviewer for Divisions A (Administration [2001-2003]), G (Social Context of Education [2001-2003]), H (School Evaluation & Program Development [2001-2002]), L (Educational Policy & Politics [2001-2003]), and Special Interest Group (Research on the Education of Deaf Persons [2002-2003]) Annual Meeting proposals
American Sociological Association
Journal of Deaf Studies and Deaf Education
Peer Reviewer, 2002
Sociological Theory
Peer Reviewer, 2002
Teachers College Record
Peer Reviewer, 2002

EXHIBIT B

Figure 1. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Grades 2-11 Enrollment by School Calendar



Note: Values marked by the symbols and are extreme values.

Table 1. Distribution Characteristics of California School 2001 Grades 2-11 Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Enrollment (Grades 2-11)	Mean	621.34	667.37	1062.89	640.47
	Median	456	612	809	489
	25th Percentile	326	527	630	345
	75th Percentile	728	718	1083.5	746
	% Extreme Values	9.64%	7.62%	13.12%	9.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 2. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent Hispanic Enrollment by School Calendar

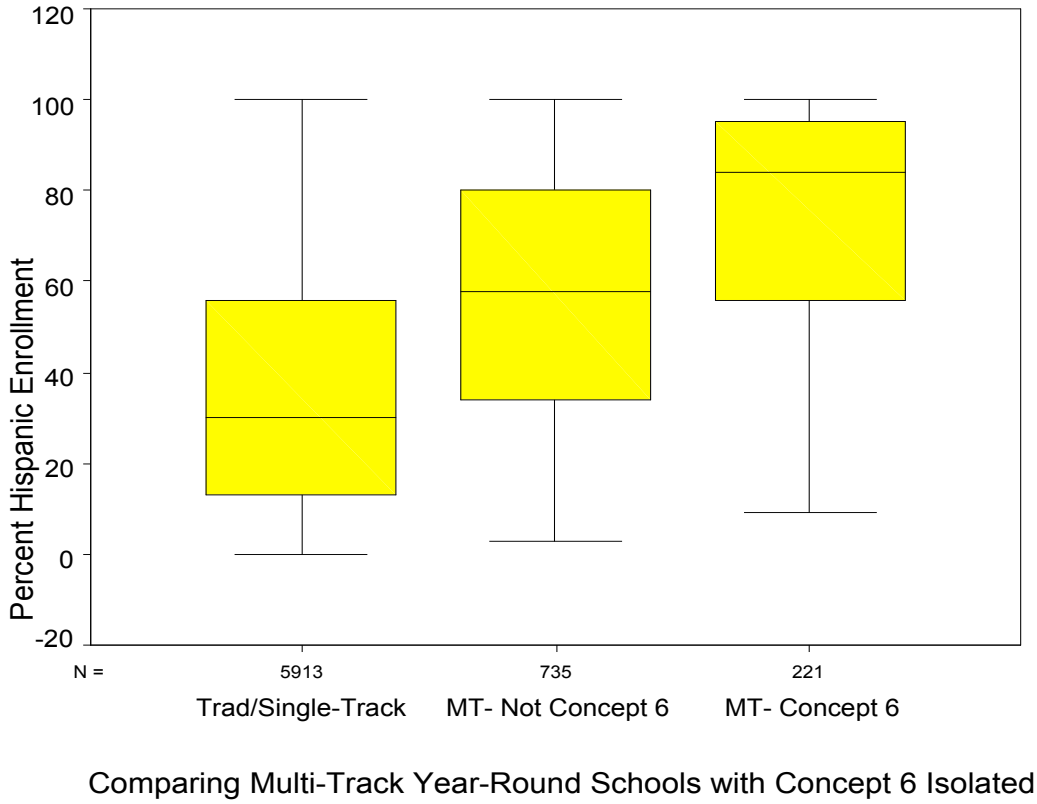
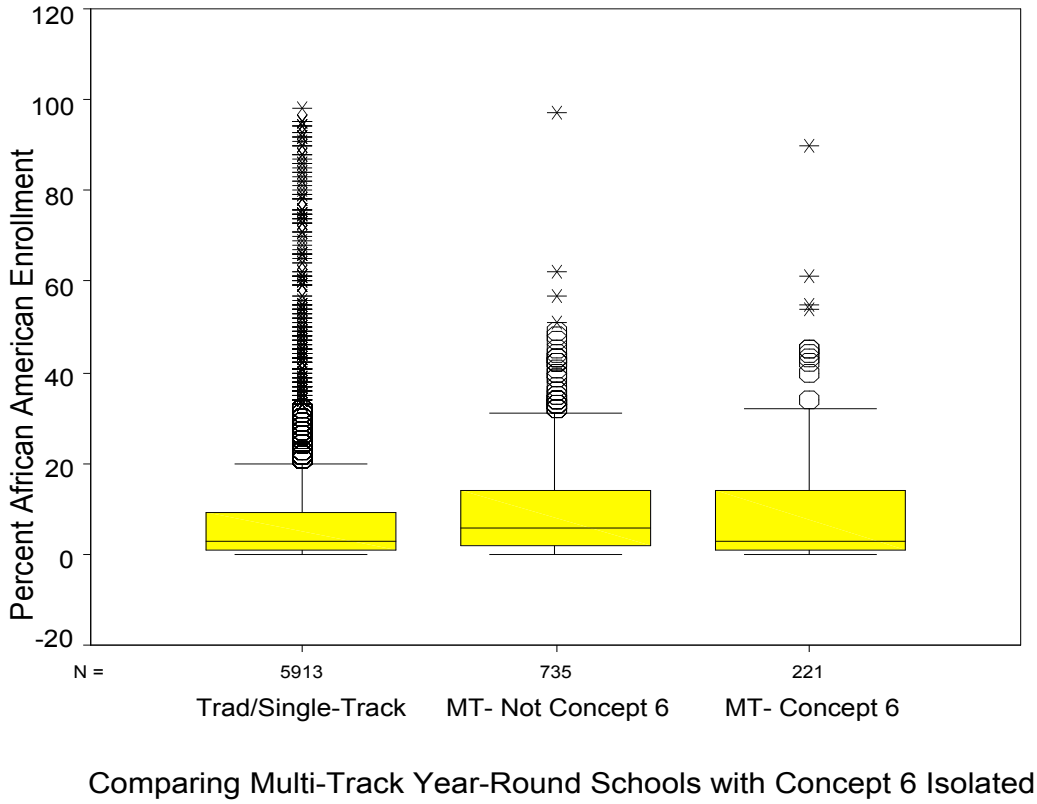


Table 2. Distribution Characteristics of California School 2001 Percent Hispanic Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent Hispanic	Mean	36.49	56.50	73.90	39.83
	Median	30	58	84	34
	25th Percentile	13	34	56	15
	75th Percentile	56	80	95	62
	% Extreme Values	0.00%	0.00%	0.00%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 3. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent African American Enrollment by School Calendar



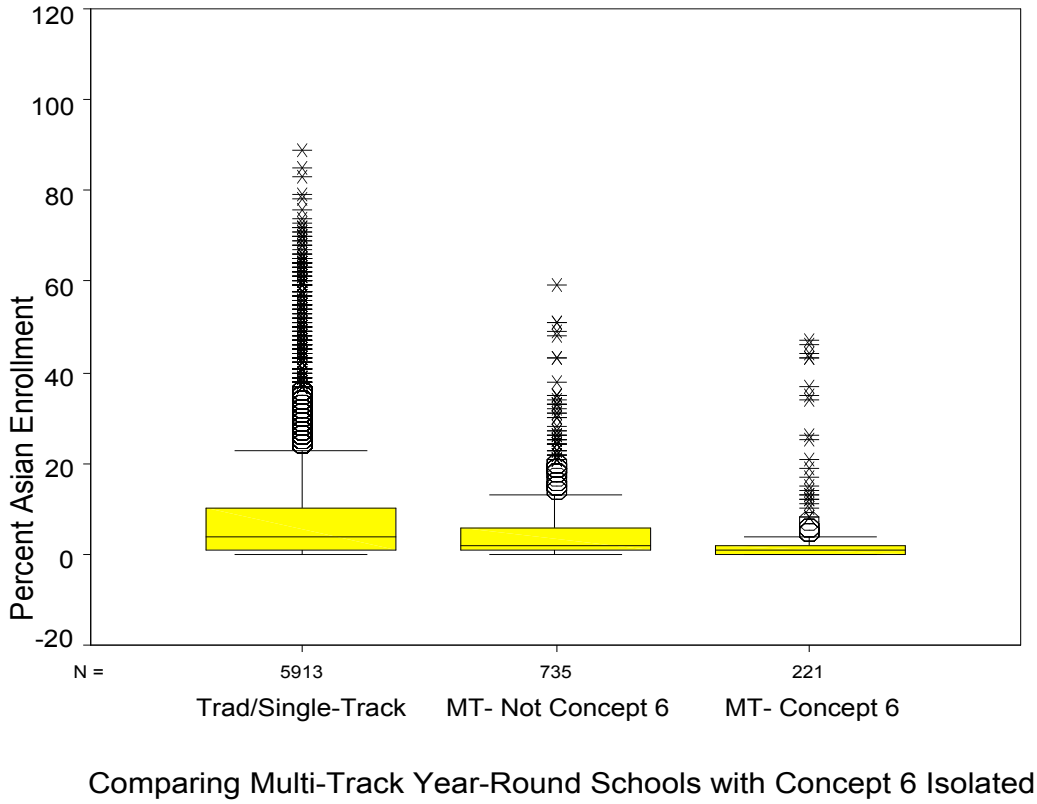
Note: Values marked by the symbols and are extreme values.

Table 3. Distribution Characteristics of California School 2001 Percent African American Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent African American	Mean	7.94	9.89	9.10	8.18
	Median	3	6	3	3
	25th Percentile	1	2	1	1
	75th Percentile	9	14	14	10
	% Extreme Values	10.23%	5.85%	4.98%	8.55%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 4. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent Asian Enrollment by School Calendar



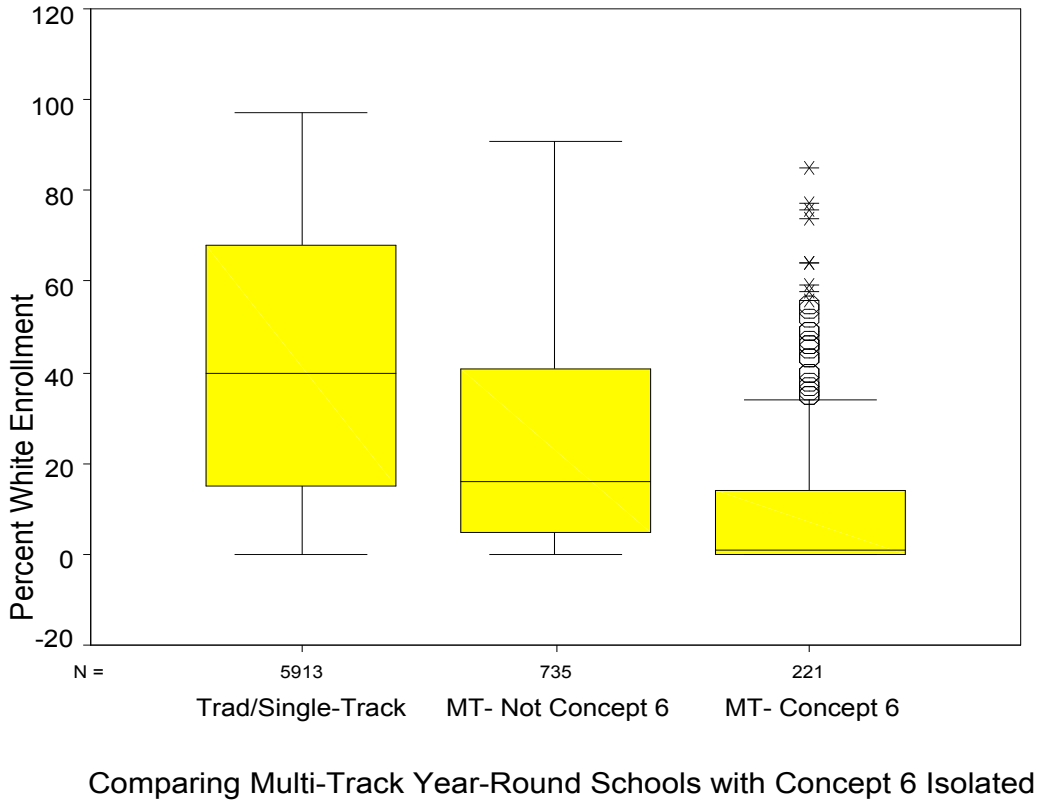
Note: Values marked by the symbols and are extreme values.

Table 4. Distribution Characteristics of California School 2001 Percent Asian Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent Asian	Mean	8.77	5.47	3.51	8.25
	Median	4	2	1	4
	25th Percentile	1	1	0	1
	75th Percentile	10	6	2	10
	% Extreme Values	10.10%	11.56%	15.38%	9.38%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 5. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent White Enrollment by School Calendar



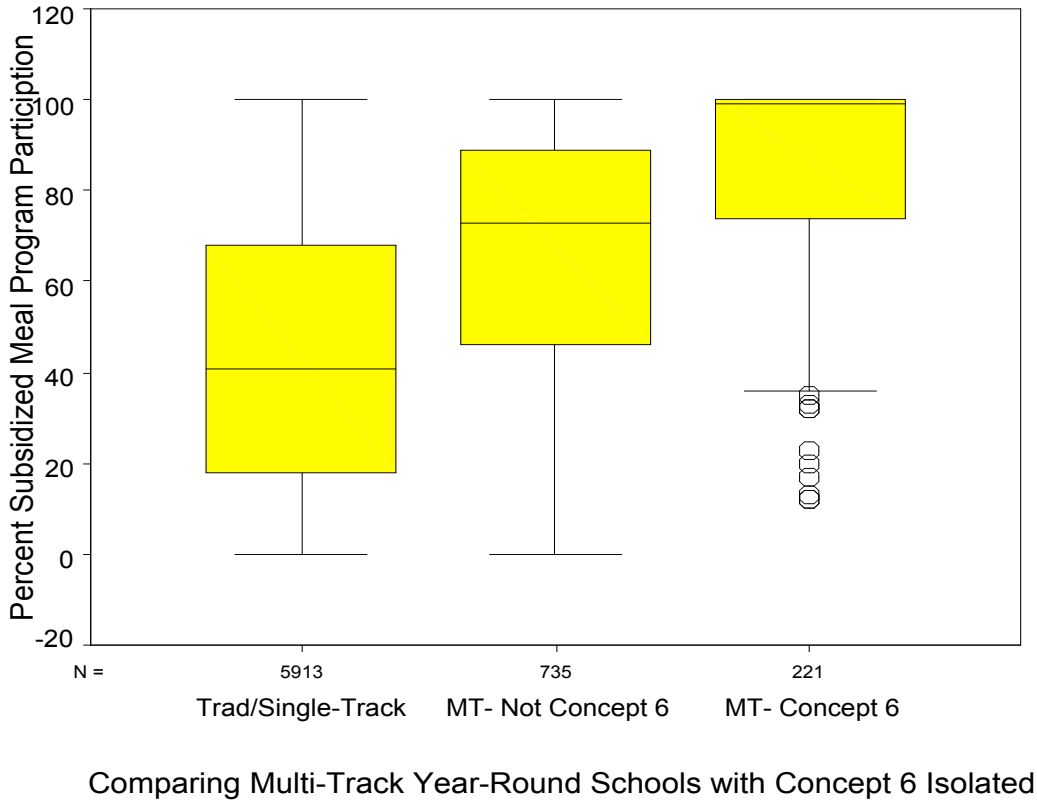
Note: Values marked by the symbols □ and are extreme values.

Table 5. Distribution Characteristics of California School 2001 Percent White Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent White	Mean	41.85	24.40	10.95	38.99
	Median	40	16	1	36
	25th Percentile	15	5	0	12
	75th Percentile	68	41	15.5	74
	% Extreme Values	0.00%	0.00%	12.22%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 6. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent Subsidized Meal Program (NSLP) Participation by School Calendar



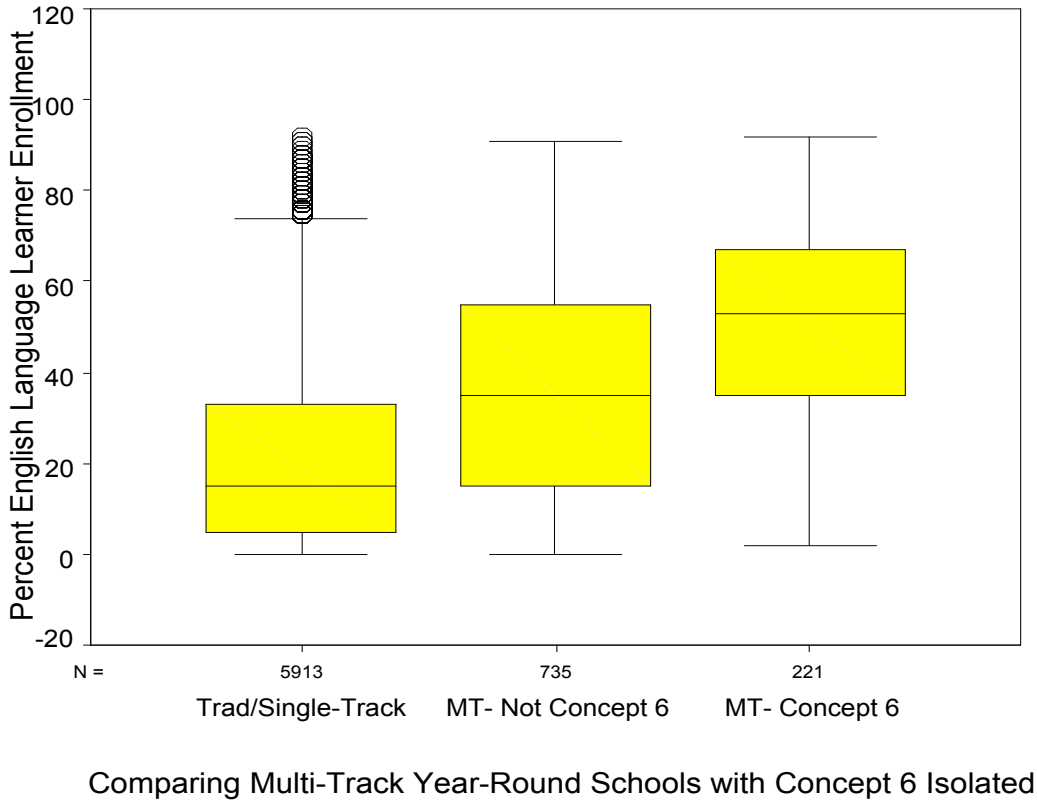
Note: Values marked by the symbols and are extreme values.

Table 6. Distribution Characteristics of California School 2001 Percent Free & Reduced Price Meal Program (NSLP) Participation by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent NSLP Participation	Mean	44.03	65.59	85.10	47.66
	Median	41	73	99	46
	25th Percentile	18	46	74	20
	75th Percentile	68	89	100	74
	% Extreme Values	0.00%	0.00%	4.52%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 7. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent English Language Learner Enrollment by School Calendar



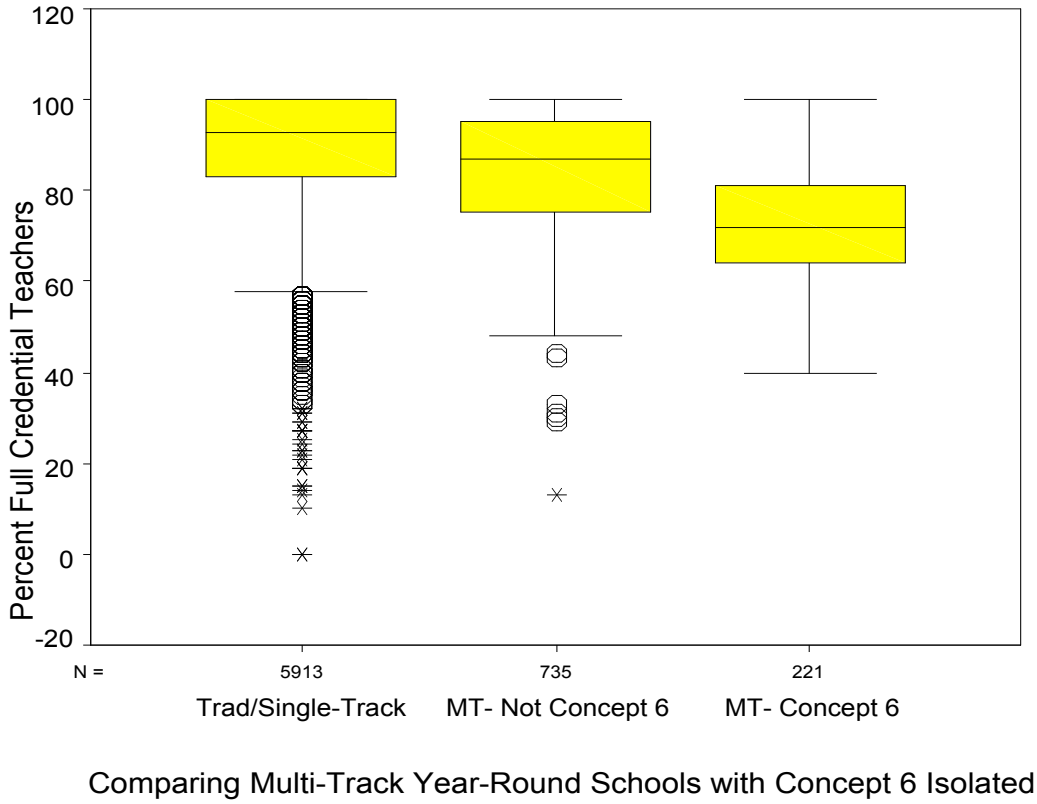
Note: Values marked by the symbols and are extreme values.

Table 7. Distribution Characteristics of California School 2001 Percent English Language Learner Enrollment by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent English Language Learners	Mean	21.06	36.48	50.97	23.67
	Median	15	35	53	17
	25th Percentile	5	15	35	6
	75th Percentile	33	55	67	37
	% Extreme Values	1.78%	0.00%	0.00%	0.74%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 8. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent of Full Credential Teachers by School Calendar



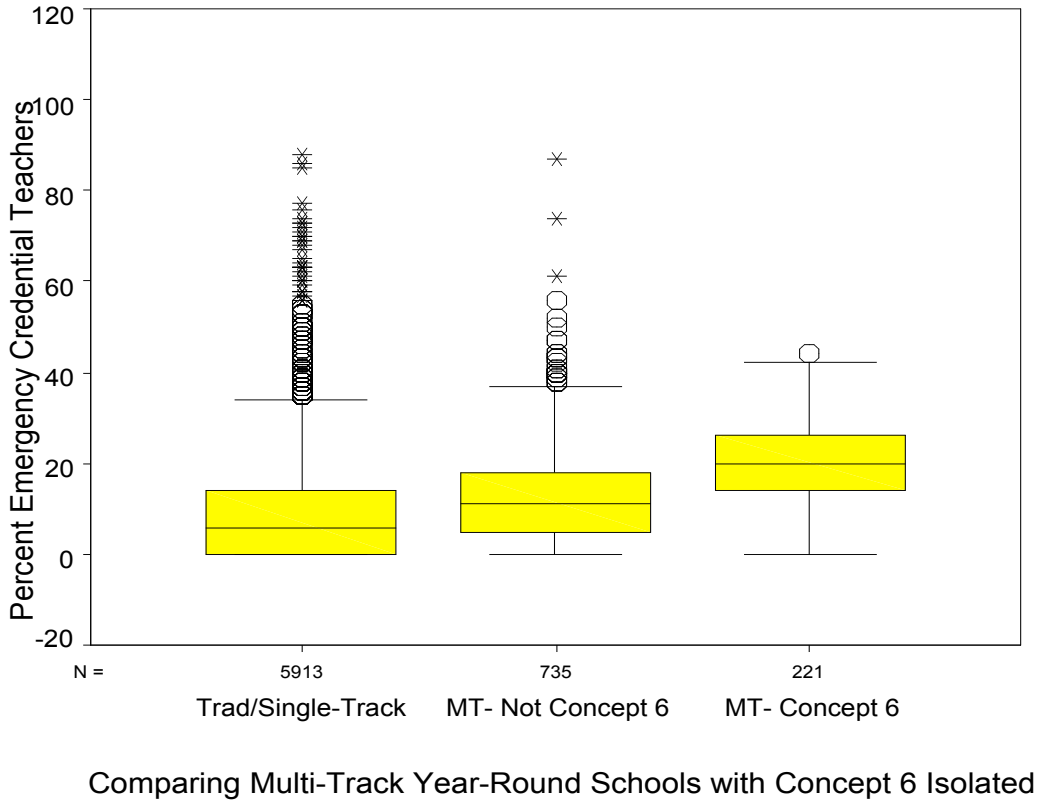
Note: Values marked by the symbols and are extreme values.

Table 8. Distribution Characteristics of California School 2001 Percent of Full Credential Teachers by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent Full Credential Teachers	Mean	88.49	83.46	73.19	87.46
	Median	93	87	72	92
	25th Percentile	83	75	63.5	81
	75th Percentile	100	95	81	98
	% Extreme Values	3.42%	0.95%	0.00%	3.04%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 9. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 Percent of Emergency Credential Teachers by School Calendar



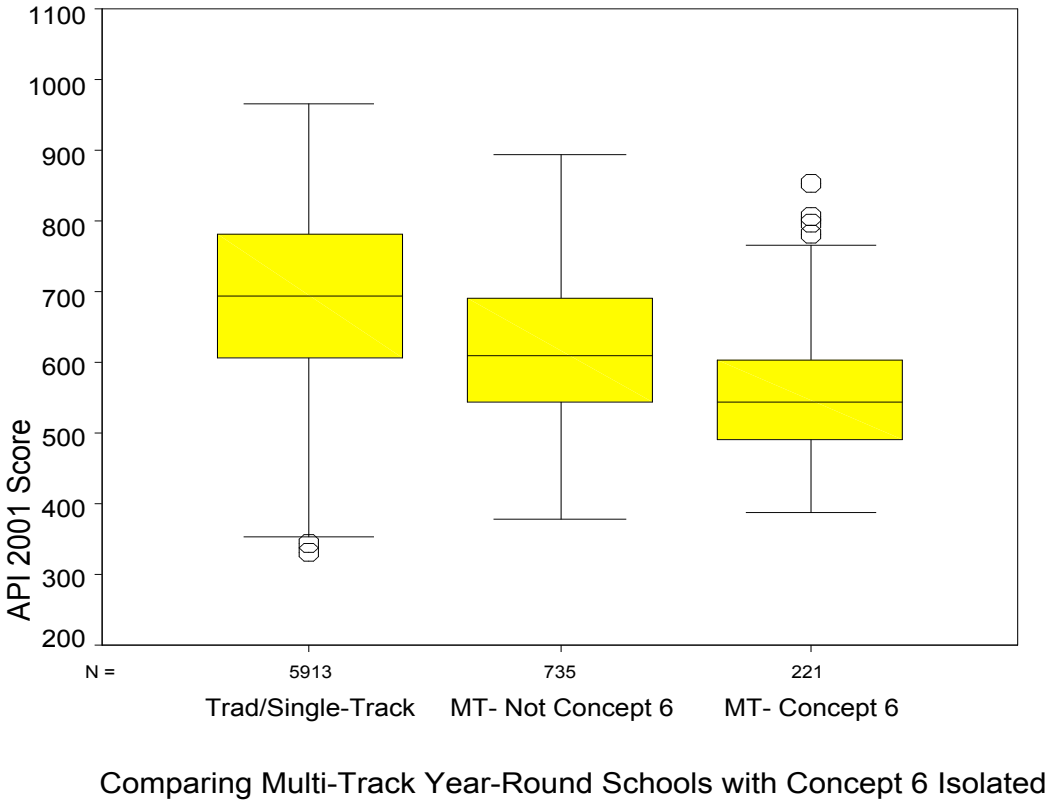
Note: Values marked by the symbols and are extreme values.

Table 9. Distribution Characteristics of California School 2001 Percent of Emergency Credential Teachers by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Percent Emergency Credential Teachers	Mean	9.45	13.03	19.06	10.14
	Median	6	11	20	7
	25th Percentile	0	5	13.5	2
	75th Percentile	14	18	26	15
	% Extreme Values	3.11%	3.95%	0.45%	3.32%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 10. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 API Scores by School Calendar



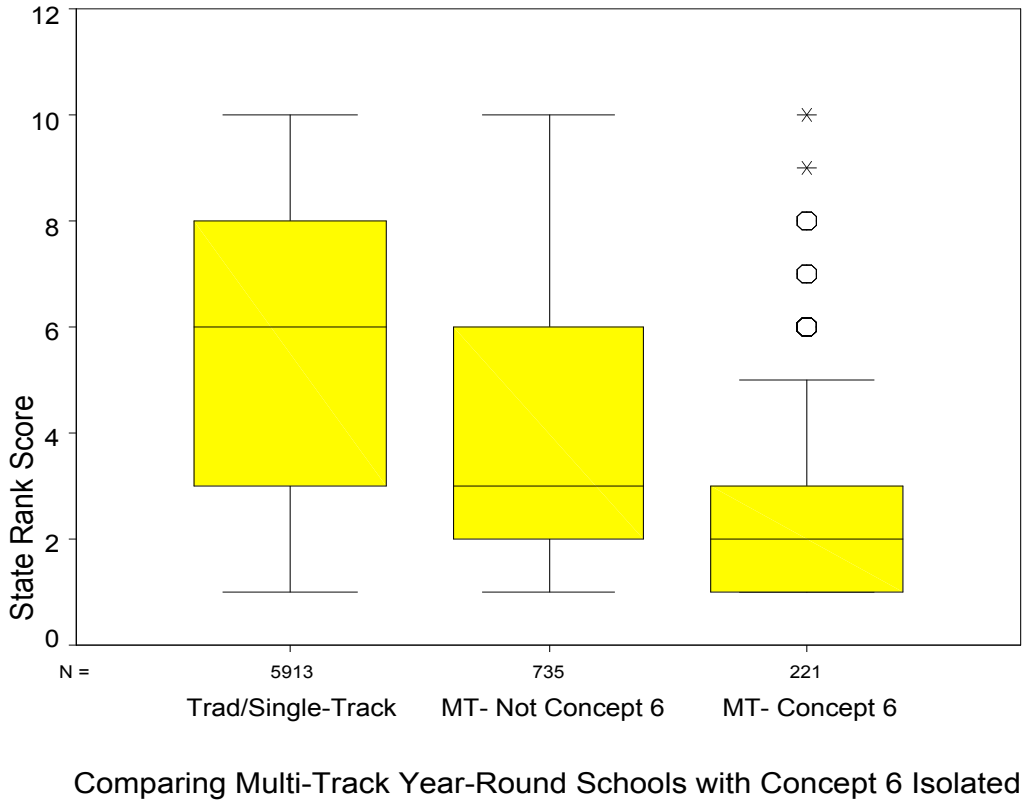
Note: Values marked by the symbols and are extreme values.

Table 10. Distribution Characteristics of California School 2001 API Scores by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
API 2001	Mean	692.05	620.73	552.08	679.92
	Median	694	609	544	679
	25th Percentile	606	545	489.5	590
	75th Percentile	780.5	692	603	770
	% Extreme Values	0.03%	0.00%	1.81%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 11. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 API State Rank Scores by School Calendar



Note: Values marked by the symbols and are extreme values.

Table 11. Distribution Characteristics of California School 2001 API State Rank Scores by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
State Rank	Mean	5.85	3.87	2.44	5.53
	Median	6	3	2	6
	25th Percentile	3	2	1	3
	75th Percentile	8	6	3	8
	% Extreme Values	0.00%	0.00%	8.14%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 12. Box-and-Whiskers Plots of the Distribution Characteristics of California School 2001 API Similar Schools State Rank Scores by School Calendar

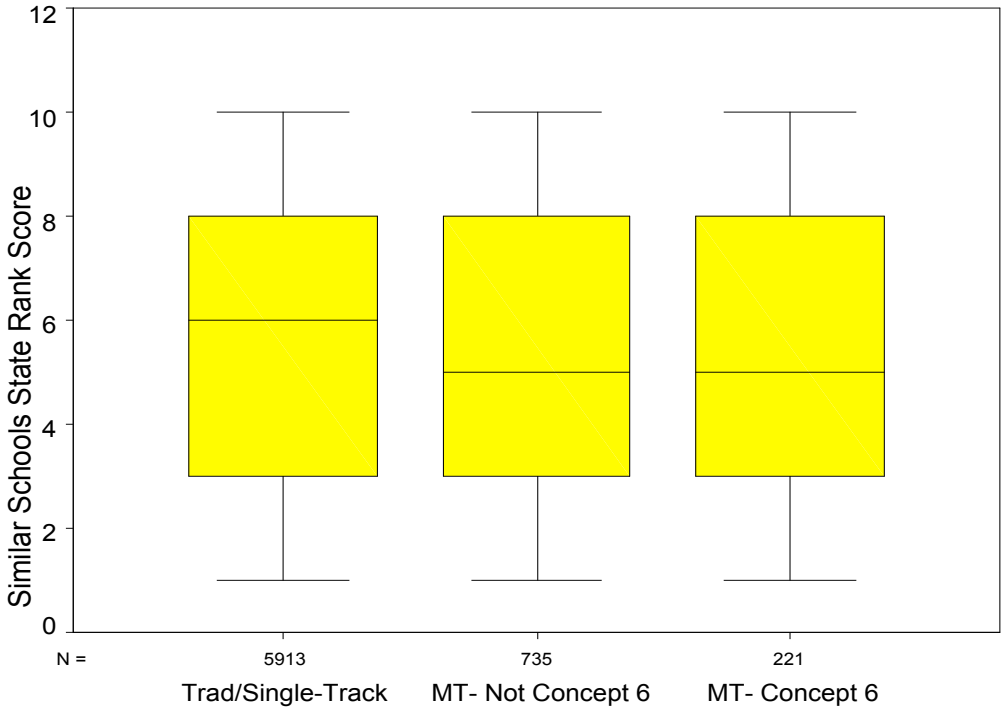


Table 12. Distribution Characteristics of California School 2001 API Similar Schools State Rank Scores by School Calendar

Measure	Statistic	Calendar			Total Statewide
		Traditional/ Single-Track	Multi-Track Not Concept 6	Multi-Track Concept 6	
Similar Schools Rank	Mean	5.58	5.38	5.24	5.55
	Median	6	5	5	6
	25th Percentile	3	3	3	3
	75th Percentile	8	8	8	8
	% Extreme Values	0.00%	0.00%	0.00%	0.00%
	Number of Schools	5913	735	221	6869

Source: California Department of Education, Policy and Evaluation Division (http://cdedata.com.hosting.pacbell.net/api2001base/dbapi01b.zip) and School Facilities Planning Division (http://www.cde.ca.gov/facilities/yearround/direct00.htm)

Figure 13. Number of Schools of Similar Schools Rank by School Calendar Group

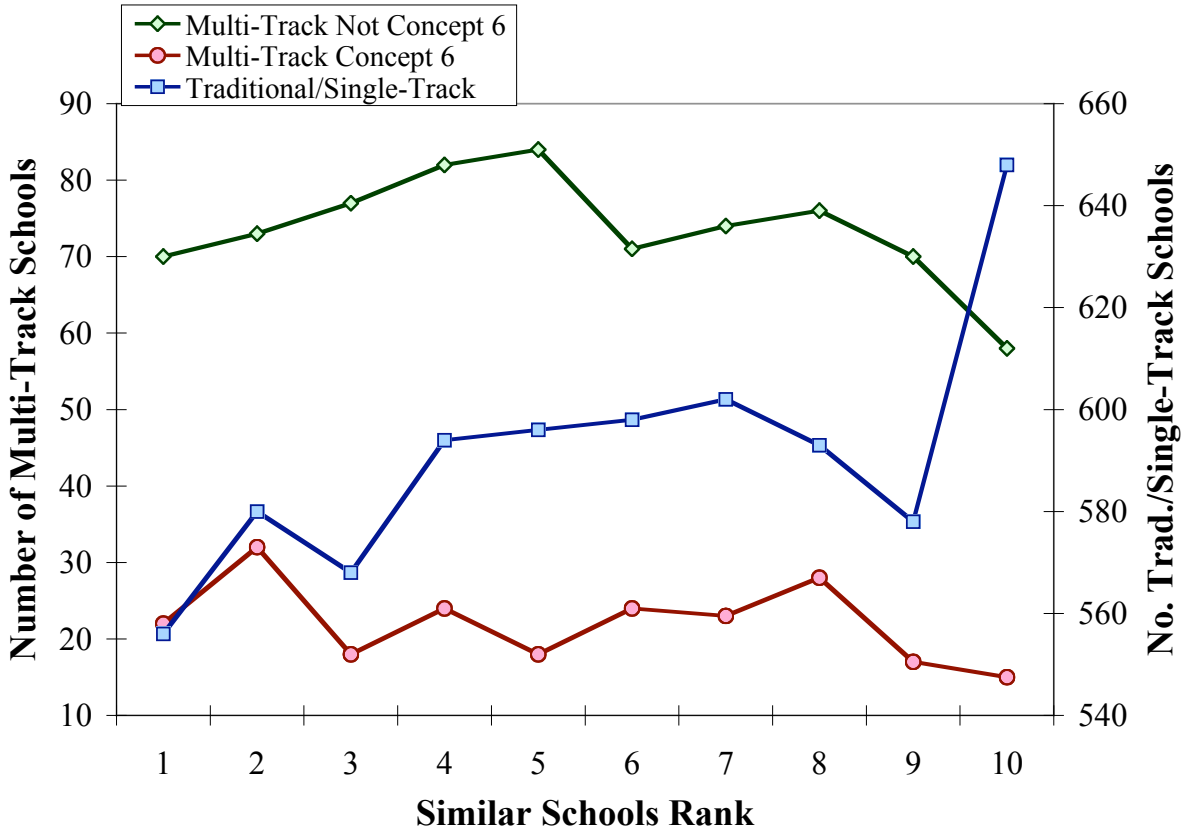


Figure 14. Shift Function Comparison of the Distribution Characteristics of California's 2001 API Similar Schools Rank Scores for the Multi-Track Year-Round Calendar Groups in Reference to the Traditional/Single-Track Year-Round Calendar Group