BEYOND THE NUMBERS: UNDERSTANDING CALIFORNIA'S HIGH SCHOOL DROPOUTS

PARTNERSHIP FOR URBAN
EDUCATION RESEARCH (PUER)
JULY 2008

POLICY ANALYSIS FOR
CALIFORNIA EDUCATION

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Executive Summary

Six of California's largest urban school districts have joined together in the Partnership for Urban Education Research (PUER), to address the most pressing issues in urban education. The six PUER districts have agreed to work together to increase data availability, enhance internal research capacity, and promote collaboration and information sharing across district lines for the benefit of their students. PUER seeks to build a partnership in which participating districts can use their collective research capacity to carefully evaluate their own instructional programs and practices. In this study, six PUER school districts—Fresno Unified School District (FUSD), Long Beach Unified School District (LBUSD), Los Angeles Unified School District (LAUSD), Sacramento City Unified School District (SCUSD), San Diego Unified School District (SDUSD), and San Francisco Unified School District (SFUSD)—joined efforts to identify opportunities for improving the current dropout reporting system. The PUER districts are working with Policy Analysis for California Education (PACE) to review and publish their research.

The six PUER school districts recommend adoption of the Longitudinal Four-Year Dropout Rate (L4YDR) as the most reliable dropout calculation formula for estimating the number of dropouts in each entering cohort of high school students. (See Box.) This report includes L4YDR estimates of dropout rates in all six districts. In order to increase data transparency, the PUER districts also recommend the publication of sub-categorical data that would allow school districts and the state to distinguish between students who have in fact left school from students who remain engaged with the educational system. The report also includes data that tracks the various paths students follow as they move toward the goal of high school graduation.

The Longitudinal Four-Year Dropout Rate (L4YDR) measures the percentage of students from an entering cohort of ninth-grade students who drop out of school within four years of initial enrollment. Calculation of the L4YDR requires longitudinal data on individual students covering four years. The formula used to calculate the L4YDR is:

$$\frac{D_{y=01,g=9c} + D_{y=02,g=9c} + D_{y=03,g=9c} + D_{y=04,g=9c}}{E_{y=01,g=9c}}$$

where

D_{yg} = **High School Dropouts:** Students who were enrolled in grade g during the fall survey in year y and left the educational system without graduating from high school or completing an approved secondary education program.

and

E_{yg} = **Enrollment:** Students enrolled in grade g during the fall survey in year y.

This report also reviews dropout intervention strategies in use in the six districts that seek to decrease the number of dropouts and increase the integrity of dropout data. Finally, the report provides recommendations to the California Department of Education as it moves forward with the implementation of a student-level longitudinal data system.

BEYOND THE NUMBERS:

UNDERSTANDING CALIFORNIA'S DROPOUTS

PARTNERSHIP FOR URBAN EDUCATION RESEARCH (PUER)

Dropout rates are a major cause for concern among parents, educators, and policymakers. Recent research suggests that almost one third of students and one half of California's Latino and African-American students will never graduate from high school.[1] High school dropouts often lack basic career skills to be successful in the workplace and are more prone to experience unemployment in today's global economy. Failing to complete high school not only produces negative outcomes for the individual; it also leads to serious economic and social consequences for California.

In order to address the dropout problem, policymakers must work with school districts to produce more accurate dropout measures and better understand why students drop out of school. There have been numerous efforts to bring attention to the issue. The bipartisan National Governors Association, signed a Graduation Counts Compact in 2005, and made an unprecedented commitment to rely on a common method for calculating each state's high school graduation rate.[2] In California the California Dropout Research Project has worked to synthesize existing research and undertake new research to inform policymakers and the larger public about the nature of—and potential solutions to—the dropout problem.[3]

California has taken a significant step toward accurate measurement of dropout rates with the establishment of the California Longitudinal Pupil Achievement Data System (CALPADS). This system has the potential to help schools make significant strides in tracking students. CALPADS maintains longitudinal, individual-level data on student demographics, program participation, grade level, enrollment, course enrollment and completion, discipline, state assignment, teacher assignment, and other information required to meet state and federal reporting requirements. The data is linked longitudinally using a unique, anonymous Statewide Student Identifier (SSID) that is maintained by local educational agencies.[4] The implementation of CALPADS is a unique opportunity to improve dropout documentation and measurement through a more transparent and less complicated process.

Recently six of California's urban school districts have joined together in the Partnership for Urban Education Research (PUER), in collaboration with Policy Analysis for California Education (PACE), to address the dropout issue by 1) identifying the problems with dropout documentation, 2) offering a standardized method of computing cohort survival rates, and 3) presenting current strategies for preventing dropouts. The participating districts include Fresno Unified School District (FUSD), Long Beach Unified School District (LBUSD), Los Angeles Unified School District (LAUSD), Sacramento City Unified School District (SCUSD), San Diego Unified School District (SDUSD), and San Francisco Unified School District (SFUSD). This report is the product of their collaboration.

DROPOUT DATA SYSTEM

The current system of documenting dropout rates is outlined in the California Basic Educational Data System (CBEDS) Manual. One day each year (called Information Day), personnel in schools, districts, and county offices of education are requested to provide information regarding school staff, enrollment, and accountability indicators. On this day, students are considered dropouts if they fall into any of the following categories: 1) they were enrolled at some time during the school year and left school prior to completing that school year, 2) they completed the previous school year but did not begin attending the next grade level, or 3) they remain enrolled but are no longer attending school.[5]

The current system is subject to many threats to the validity of published district-level dropout rates. These threats to validity may lead districts to overestimate or underestimate local dropout rates, and they may also produce an inaccurate picture of student enrollment status. The following are examples of threats to validity that are commonly experienced in large urban school districts.

Dropout measures are in essence a snapshot of student enrollment status on a given day in the school year. Therefore, one major shortcoming of annually published dropout rates is their inability to capture student migration. Since school districts are required to report dropout rates on Information Day each year, students who drop out of the same school multiple times may be double-counted in dropout calculations. For example, students who are reported as dropouts on Information Day in a given year may return to the same school, move to another school or school district, or enroll in an alternative program to continue their education and then subsequently drop out before Information Day the following year. For this reason, published dropout rates are problematic measures of actual student status particularly in urban districts, which tend to have higher rates of student mobility..

Further complicating the district-level data system are students who are counted as dropouts on Information Day, but later enroll in private schools, in charter schools, or in another school district. Districts are responsible for providing adequate documentation on whether these "no-show" students are indeed dropouts or are instead merely attending a school other than the school they were expected to attend. This, of course, is particularly challenging considering the fact that the process of navigating different data systems to fulfill reporting requirements is very labor-intensive. In some cases dropout rates are also inflated when students move out of the country and enroll in school elsewhere without notifying the district. In other cases dropout rates are underestimated when students report enrolling in another school district but do not actually attend school.

The number of students pursuing alternative education programs presents additional complications in tracking student enrollment, as these students may not be fully incorporated in school district data systems. Within each school district there are also students who do not finish high school in the traditional 4-year period, opting to leave high school early by passing the California High School Proficiency Examination (CHSPE) or receiving a California High School Equivalency Certificate by passing the General Educational Development (GED) Test. In

addition, districts are also responsible for tracking the progress of students who are under the age of 21 and enrolled in an adult education program.

DROPOUT CALCULATION METHODS

In principle, the dropout rate for a cohort of students is simple to define and measure—it is the proportion of students in a cohort who leave school without obtaining a high school diploma or its equivalent. For example, the simple cohort survival rate measures the ratio of the number of high school graduates in a given year to the number of high school freshman in the high school four years before.[6] In practice, however, the computation of dropout rates at the district level is complicated by high rates of mobility of students among schools, districts, and states. At the district level, it is sometimes unclear which school district is responsible for counting students who switch between districts within a four-year period. As a result, mobile students may be counted as a dropout from neither, either, or both districts. Existing data systems do not enable district officials to track these highly mobile students.

There are several measures for calculating dropout rates and tracking the enrollment status of students. These methods, though imperfect measures of the actual dropout rate, are nonetheless useful as long as those seeking to make use of the data understand the formulas and definitions that define each measure. It is also important to keep in mind that dropout and graduation figures are not perfectly complementary. A high school student continuing in the education system beyond the traditional four-year period may be counted as either a dropout or a graduate—or neither--depending on how dropout and graduation rates are defined. It is therefore important to present the drawbacks and benefits of various published methods of documenting dropouts in order to evaluate the advantages and disadvantages of each.

The National Center for Education Statistics publishes event, status, and cohort dropout rates to provide different perspectives on the student dropout population.[7] *Event rates* describe the proportion of students in a given age range who leave school each year without completing a high school program. This annual measure provides information on recent dropout and provides important information about how effective educators are in keeping students enrolled in school. *Status rates* provide cumulative data on dropouts among all young adults within a specified age range regardless of when they last attended schools. Status rates reveal the extent of the dropout problem in the population but are higher than event rates because they include all dropouts in a given age range. Finally, the National Center for Education Statistics (NCES) also publishes *cohort rates* to track a group of students over a period of time and reveal how many students starting in a specific grade drop out over time.[8]

In California, school districts report the dropout rate data they obtain from CBEDS to the California Department of Education (CDE). The CDE calculates a one-year dropout rate based on the percent of dropouts during a single year, calculated from actual data submitted.[9] This method of calculation is the equivalent of the NCES event rate. The CDE also calculates a four-year derived dropout rate, which is an estimate of the percent of students who would drop out in a four-year period based on data collected in a single year.[10]

LONGITUDINAL FOUR-YEAR DROPOUT RATE (L4YDR)

The longitudinal four-year dropout rate is the percent of students from an entering 9th grade cohort who drop out within four years, based on individual data covering four years.[11] No measure is perfect, but from the perspective of the six PUER districts the longitudinal four-year dropout rate is the most accurate measure of actual dropouts given currently available data systems and resources to track the progress of high school students in each district. This method of calculation ties students to the first institution they entered as 9th graders, and does not account for the subsequent inflow of students. Therefore, the district graduation and dropout rates will likely sum to be greater than 100%.

The PUER school districts calculated dropout rates for each of the participating districts using longitudinal data on students who entered the 9th grade for the first time in the fall of 2003. The status of these students was then captured in the winter of 2008 for the purposes of this study, and for reporting to the California Department of Education.

Dropouts have been defined as students who choose to leave school before graduating, although they are intellectually capable of doing the work required for obtaining a secondary education diploma. Excluded from this definition are students with learning disabilities, students who have completed high school requirements for graduation but have not passed the California High School Exit Exam (CAHSEE), students who have been expelled, students who have been unable to continue due to medical reasons, and students who are deceased.

DROPOUT SUBCATEGORIES

It is important for school districts to break down the dropout numbers into subcategories, in order to present a fuller account of the different reasons why students may be counted as dropouts, and to create targeted programs tailored to district-level and student-level situations. **Figure A** illustrates how school districts have tracked the movement of students in and out of the school system.

The first category, *Graduate*, includes students who have fulfilled both unit and California High School Exit Exam (CAHSEE) requirements for graduating in 2007. The second category, *Special Ed Completer*, includes special education completers as a separate category in order to correct for the upward bias of traditional cohort survival dropout rates, which include special education students in the non-completers category. The *Continuer* category includes high school students who do not graduate in the traditional four-year period, but are continuing to pursue that goal. Including this category is important because it does not penalize school districts that have eliminated social promotion policies.

As shown by the *Leaver* category in **Figure B**, many students leave high school for various reasons to continue their education at other institutions including community colleges and adult education programs. These students typically account for 15-20% of the cohort survival population and districts expend an ample amount of resources to ensure that the status of these students is recorded accurately.

The *Dropout* subcategory breaks down the different types of dropout students in a given district. Those students who have completed 12th grade but did not graduate, did not return, and did not transfer are typically students who either have not passed the CAHSEE exam or have not met school graduation requirements. This subcategory of dropout students typically accounts for around 1% of the district dropout rate. Within school districts there is also a small number of students who are no longer in school due to disciplinary action, home-schooling, or medical reasons. These students require additional reporting and documentation under CBEDS manual rules. Finally, the *Left, no known enrollment* and *Other* subcategories account for the bulk of the district dropout figures. The first category includes students whom the school district has documented as not being enrolled in any educational institution. The second category includes students whom the district either has been unable to document, or who are unable to attend school, such as those in the juvenile justice system.

Distinguishing subcategories of student status within the population of student dropouts is important, because it provides a more accurate understanding of actual dropouts versus students who are wrongly classified as dropouts because of a lack of resources to track student migration. The successful implementation of CALPADS will help districts to track students efficiently and better target dropout prevention programs.

Figure A: Dropout Categories and Subcategories

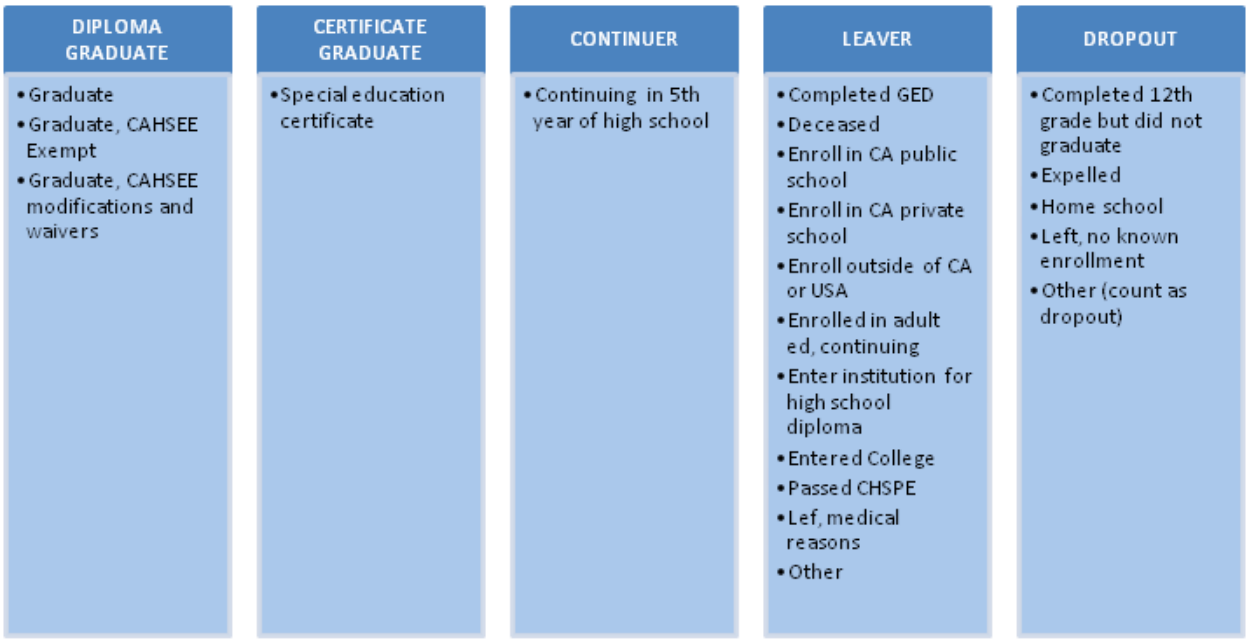

Figure B presents data from the six California school districts participatingin PUER: Fresno Unified School District (FUSD), Long Beach Unified School District (LBUSD), Los Angeles Unified School District (LAUSD),, Sacramento City Unified School District (SCUSD),, San Diego Unified School District (SDUSD),, and San Francisco Unified School District (SFUSD),. Each of these districts has been reporting dropout rates using the CALPADS categories and subcategories in order to draw attention to the different reasons why students do not graduate

high school within the traditional 4-year period. The dropout categories and subcategories below were drawn from cohort survival figures for the entering high school class of 2003. It is important to keep in mind that dropout rates represent a snapshot of student enrollment status but students' circumstances may change at some point in the future. Therefore, each PUER district actively extends efforts to increase student retention and encourage dropouts to re-enroll.

Figure B: Dropout Subcategory Data

CATEGORY/ SUBCATEGORY	FUSD	FUSD	LBUSD	LBUSD	LAUSD	LAUSD	SCUSD	SCUSD	SDUSD	SDUSD	SFUSD	SFUSD
	N	%	N	%	N	%	N	%	N	%	N	%
DIPLOMA												
Graduate	2836	48.2%	4050	55.1%	21256	44.2%	1830	43.5%	5466	54.0%	3189	61.6%
Graduate, CAHSEE exempt	63	1.1%	85	1.2%	737	1.5%	0	0.0%	67	0.7%	*	*
Graduate, CAHSEE mods & waiver	13	0.2%	20	0.3%	18	0.0%	0	0.0%	62	0.6%	*	*
CERTIFICATE												
Special Education certificate	46	0.8%	66	0.9%	101	0.2%	7	0.2%	92	0.9%	*	*
CONTINUER												
Remain in school	172	2.9%	158	2.1%	3131	6.5%	0	0.0%	833	8.2%	293	5.7%
LEAVER												
Completed GED	18	0.3%	7	0.1%	27	0.1%	3	0.1%	199	2.0%	2	0.0%
Deceased	6	0.1%	1	0.0%	36	0.1%	2	0.0%	10	0.1%	4	0.1%
Enroll, other CA public school	1856	31.5%	1105	15.0%	6775	14.1%	1756	41.7%	1711	16.9%	474	9.2%
Enroll in CA private school	2	0.0%	7	0.1%	187	0.4%	2	0.0%	*	*	113	2.2%
Enroll outside of CA or USA	62	1.1%	228	3.1%	2461	5.1%	67	1.6%	276	2.7%	154	3.0%
Enrolled in adult ed, continuing	193	3.3%	297	4.0%	934	1.9%	78	1.9%	356	3.5%	27	0.5%
Enter institution for HS diploma	0	0.0%	14	0.2%	17	0.0%	0	0.0%	10	0.1%	*	*
Entered college	8	0.1%	42	0.6%	15	0.0%	4	0.1%	8	0.0%	*	*
Passed CHSPE	13	0.2%	1	0.0%	0	0.0%	4	0.1%	8	0.1%	10	0.2%
Left, medical reasons	5	0.1%	5	0.1%	1	0.0%	3	0.1%	*	*	6	0.1%
Other (leaver)	37	*	*	*	*	*	1	0.0%	*	*	26	0.5%
DROPOUT												
Completed grade 12, did not graduate	120	2.0%	44	0.6%	609	1.3%	35	0.8%	*	*	149	2.9%
Expelled	11	0.2%	8	0.1%	5	0.0%	0	0.0%	*	*	*	*
Home school	4	0.1%	1	0.0%	0	0.0%	2	0.0%	*	*	*	*
Left, no known enroll	401	6.8%	314	4.3%	6798	14.1%	196	4.7%	*	*	566	10.9%
Other (count as dropout)	17	0.3%	897	12.2%	4961	10.3%	216	5.1%	1033	10.2%	165	3.2%
TOTAL	5883	100.0%	7350	100.0%	48069	100.0%	4206	100.0%	10131	100.0%	5178	100.0%
LONGITUDINAL 4-YEAR DROPOUT RATE		**9.40%**		**17.20%**		**25.74%**		**10.68%**		**10.20%**		**16.99%**

*Other leavers in FUSD entered programs not for high school diplomas, and leavers in SFUSD entered a juvenile detention charter school.

DROPOUT REDUCTION PROGRAMS

Currently school districts employ a variety of strategies to increase the accuracy of dropout data and prevent at-risk students from dropping out of schools.

The **Fresno Unified School District** has its school social workers, attendance staff, and community liaisons make phone calls and conduct home visits for students who were pre-enrolled but have not showed up within the first two or three weeks of the school year. The main goals of this program are to encourage students to re-enroll at their home school and to update drop codes to accurately document where "no show" students are attending school.

The **Long Beach Unified School District** also makes phone calls and home visits in order to improve the accuracy of dropout rates. The district begins the dropout recovery process by checking with the statewide CSIS database, local adult school databases, and city college enrollment files to see if the "no-show" students have chosen to continue their education in other institutions. Since not all schools report to the CSIS database, the district negotiated data sharing with local adult schools and city colleges through a memorandum of understanding. This is an important practice, because even with the implementation of CALPADS the student identification numbers that school districts assign to students still need to be linked to post-secondary educational institutions.

In order to help the large number of Spanish-speaking families in the district, bilingual staff are recruited to call families. Roughly 10% of "no-show" students are removed from the dropout list as a result of these phone calls. LBUSD also works with at-risk counselors in their Project TEAM (Teaching and Encouraging Academic Minds) group to visit students at their homes. These staff members are paid for with funds from the AB 1802 counseling grant initiative, and they make home visits to help reduce dropout rates. At-risk counselors discuss with students their reasons for dropping out and offer alternatives so they can complete their high school education.

In the **Los Angeles Unified School District,** multiple services and funding sources are leveraged to help address the needs of potential dropouts and their families. The Dropout Prevention and Recovery Program employs proactive and personalized approaches to reaching students. LAUSD employs 80 Diploma Project Advisors (DPA) and 300 Pupil Service and Attendance (PSA) Counselors at schools that have the most students at-risk for dropping out. These DPA and PSA counselors work directly with students and community agencies to develop and implement individualized educational blueprints to ensure that every student has the opportunity to earn a high school diploma. In addition to this effort to encourage students to stay in school, the district has also launched a multimedia "My Future, My Decision" campaign, which pairs recovered dropout students with current students to encourage them to take increased personal responsibility for their education.
The summer between school years is a period in which many students lose focus on their school objectives. LAUSD developed a strategy to keep students engaged during the summer and also during after-school hours. For example, the Youth Development Program launched in the summer of 2007, links high school students to employment opportunities that provide educational experiences.

The **San Diego Unified School District** has a number of district-wide and site-specific programs in place to reduce dropout rates and promote increased rates of graduation. The three-pronged approach provides multiple pathways for student success, improving student achievement and increasing graduation rates, and reducing dropouts by offering individual learning options and support to at-risk students.

The **San Francisco Unified School District** has formed a unique coalition of support professionals from education, health, and social services to target habitual and chronic truants and develop a comprehensive attendance improvement plan. Knowing that high school students

who have not attended school for an extended period often have trouble successfully reentering regular classes and finding immediate academic success, the district offers a transitional six-week study skills program for these students. During the reentry program, school staff conduct a full academic and community assessment that is used to help students make a more effective transition back to a regular comprehensive high school. This study skills elective class is tailored to each student, and parents are contacted about being partners in a long-term plan leading to graduation. Students earn five credits for completing the study skills class, which includes a reorientation to school life, homework assistance, and exposure to electronic media.

Table C summarizes the dropout intervention strategies that the PUER districts engage in during the school year. It is important to note that with the implementation of a more accurate data system to track students at the state level, districts will have the kind of detailed information they need to help keep young people in school.

Figure C: Dropout Intervention Strategies

STRATEGY	FUSD	LBUSD	LAUSD	SCUSD	SDUSD	SFUSD
STUDENT TRACKING	x	x	x	x	x	x
Phone Calls	x	x	x	x	x	x
Home Visits	x	x	x	x		x
Multidisciplinary Teams	x		x	x		x
Case Management	x		x	x	x	x
MULTIMEDIA OUTREACH			x			
SCHOOL RE-ENTRY PROGRAM					x	x
COLLABORATION WITH NON-DISTRICT AGENCIES	x		x	x	x	x
INCREASE DROPOUT RECOVERY STAFF		x	x			
OUTREACH AND EDUCATION		x	x	x		x
ALTERNATIVE EDUCATION PROGRAMS	x	x	x	x	x	
PROFESSIONAL STAFF DEVELOPMENT			x	x		

POLICY RECOMMENDATIONS

According to the California Department of Education, the CALPADS system will be fully implemented by 2010. The successful implementation of the CALPADS system will empower local districts to track students more accurately and to target strategies to reduce dropout rates. However, in order to maximize the impact of an accurate student data system, students, parents, administrators, and policymakers need to coordinate technical know-how and resources. To that end, the six PUER school districts put forth the following recommendations:

1. **Work with school districts to address the issue of duplicate SSIDs.**
   School districts should work together towards uniformity in staff training, data management, and data reporting policies. If school districts in California employ varying degrees of scrutiny in issuing SSIDs, this may result in duplicate SSIDs, which over time will significantly compromise the accuracy and dependability of the CALPADS database.

2. **Include school districts in the process of revising dropout documentation policies.**
   Locally, school districts face an array of unique situations that may have a significant impact on the accuracy of dropout reporting. For example, some school districts have encountered a number of students who enroll in multiple schools or school districts within a short period of time, which can both compromise the accuracy of SSIDs and the annual reporting dropout counts. Therefore, it is important for school districts to be involved in the process of formalizing dropout reporting parameters.

3. **Break down student data into subcategories.**
   In the past, CBEDS reporting did not create a separate category for students who have passed school graduation requirements but did not successfully pass the CAHSEE. It is important to establish dropout subcategories in order to accurately report dropout data, and to adequately target programs to help students successfully graduate. Further research could focus on a deeper explanation of why students drop out of school, as well as take advantage of the subcategory data to learn whether students have truly dropped out, or are still pursuing their education elsewhere.

4. **Establish a statewide forum for districts to address issues related to dropouts.**
   The successes and failures of different districts should be shared in order to share information about promising practices for dropout prevention. In addition, school districts should also have a means of communicating problems with the CALPADS system to the CDE and to one another.

5. **Address the issue of dropout data for charter schools and private schools.**
   Currently charter schools within school districts, as well as private schools in surrounding areas, are not directly connected to the data systems of the local public high schools. This can cause problems in districts with highly mobile student populations who transfer between public, private and charter high schools. Therefore it is imperative to increase data coverage and transparency so that all high school youth are served.

6. **Conduct empirical research on programs to reduce dropout rates.**
   School districts are engaged in multiple efforts to address the dropout problem, but very little research has been conducted on promising practices and the impact of different policy interventions. It is important that evaluation data on dropout prevention programs and dropout data systems are shared among districts.

Solving California's dropout problem will require better information and effective interventions, along with regular communication across districts to keep track of students and to identify successful approaches to the dropout issue. The implementation of CALPADS will support state and local efforts to reduce dropouts by providing more accurate information on enrollment and mobility, allowing students to be tracked as they move among districts and schools over time. In addition to better data, though, reducing California' s dropout rates will lso require interventions of the kinds described in this report to keep students engaged in school and to help.

The Partnership for Urban Education Research represents a promising initiative by some of California's largest school districts to work together to better understand the challenges they

face, by sharing information about innovations in policy and practice, and making better use of data and their own research capacity to address those challenges. Their continued cooperation offers the promise of real progress on the task of reducing dropout rates and ensuring that all of California's students have the knowledge and skills they need to contribute effectively to the state's economy and society

FOOTNOTES

[1] Swanson, Christopher. *Cities in Crisis: A Special Analytic Report on High School Graduation*. Editorial Projects in Education Research Center. 1 April 2008.
[1] *Graduation Counts: A Report of the National Governors Association Task Force on State High School Graduation Data*. Redesigning the American High School.
[1] California Department of Education, 2007; de Cos, 2005; Swanson, 2005.
[1] National Governors Association. *Implementing Graduation Counts: State Progress to Date*.
[1] Rumberger, Russell W. *Solving California's Dropout Crisis*. California Dropout Research Project: Policy Committee Report. February 2008.
[1] California Department of Education (2008). *California School Information Systems (CSIS)*, available at www.cde.ca.gov.
[1] California Department of Education (2006). *California Basic Educational Data System (CBEDS)*, available at www.cde.ca.gov.
[1] Specifically: $\frac{G_t}{N_{t-3}^9}$ where N_t^y is enrollment in grade *y*, year *t*.
[1] www.nces.ed.gov
[1] Specifically, the NCES graduation rate is calculated as: $\frac{G_t}{(G_t + D_{t-1}^{11} + D_{t-2}^{10} + D_{t-3}^9)}$ where G_t is 12th grade graduates in year *t*, and D_t^y is dropouts in grade *y*, year *t*.
[1] California Department of Education 1-Year Rate Formula: (Grades 9-12 Dropouts/ Grades 9-12 Enrollment)*100
[1] California Department of Education 4-year Derived Rate Formula: (1-((1-(drop grade 9/enroll grade 9))*(1-(drop grade 10/enroll grade 10))*(1-(drop grade 11/enroll grade 11))*(1-(drop grade 12/enroll grade 12))))*100
[1] Longitudinal Four-Year Dropout Rate calculation:
$$\frac{D_{y=01,g=9c} + D_{y=02,g=9c} + D_{y=03,g=9c} + D_{y=04,g=9c}}{E_{y=01,g=9c}}$$

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[1] California Department of Education, 2007; de Cos, 2005; Swanson, 2005.
[2] National Governors Association. *Implementing Graduation Counts: State Progress to Date*.
[3] Rumberger, Russell W. *Solving California's Dropout Crisis*. California Dropout Research Project: Policy Committee Report. February 2008.
[4] California Department of Education (2008). *California School Information Systems (CSIS)*, available at www.cde.ca.gov.
[5] California Department of Education (2006). *California Basic Educational Data System (CBEDS)*, available at www.cde.ca.gov.
[6] Specifically: $\frac{G_t}{N_{t-3}^9}$ where N_t^y is enrollment in grade *y*, year *t*.
[7] www.nces.ed.gov
[8] Specifically, the NCES graduation rate is calculated as: $\frac{G_t}{(G_t + D_{t-1}^{11} + D_{t-2}^{10} + D_{t-3}^9)}$ where G_t is 12th grade graduates in year *t*, and D_t^y is dropouts in grade *y*, year *t*.
[9] California Department of Education 1-Year Rate Formula: (Grades 9-12 Dropouts/ Grades 9-12 Enrollment)*100

[10] California Department of Education 4-year Derived Rate Formula: (1-((1-(drop grade 9/enroll grade 9))*(1-(drop grade 10/enroll grade 10))*(1-(drop grade 11/enroll grade 11))*(1-(drop grade 12/enroll grade 12))))*100

$$\frac{D_{y=01,g=9c} + D_{y=02,g=9c} + D_{y=03,g=9c} + D_{y=04,g=9c}}{E_{y=01,g=9c}}$$

[11] Longitudinal Four-Year Dropout Rate calculation:

Notations used in Mathematical Definitions

Notation	Description
A_{yg} =	*Alternative High School Completers*: students in grade *g* receiving a non-diploma credential for completion of a public secondary education program in year *y*. Excludes equivalency credentials (e.g., GED).
D_{yg} =	*High School Dropouts*: students who were enrolled in grade *g* during the fall survey in year *y* and left the educational system without graduating from high school or completing an approved secondary education program. Excludes students who legitimately left the educational system. For additional details on dropout definition see "Dropout Guidelines for October 2004 CBEDS," California Department of Education (http://www.cde.ca.gov/ds/sd/cb/dropoutguide.asp).
E_{yg} =	*Enrollment*: students enrolled in grade *g* during the fall survey in year *y*.
G_{yg} =	*High School Graduates*: students in grade *g* who received a standard diploma for completion of a public secondary education program in year *y*. Excludes students who receive high school equivalency certificates or GED.
I_{yg} =	*Inflow to Cohort*: students who joined an original grade *g* cohort by transferring into the local school system at cohort grade-level in year *y*.
O_{yg} =	*Outflow from Cohort*: students who leave an original grade *g* cohort due to transfer from the local school system in year *y*. Excludes dropouts.
Example	
$\frac{G_{y=04}}{E_{y=01,g=9}}$ =	*Number of graduates in the 2003-04 school year* divided by *Number of students enrolled in 9th grade during the 2000-01 school year*