

EVALUATION REPORT

The Effects of the Career Ladder Program on Student Achievement

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Introduction

This report presents the results of a study conducted by Drs. Jane Dowling, Sheila Murphy, and Baofeng Wang of Sheila Murphy Associates at the request of the Arizona Department of Education (ADE) and the Arizona Career Ladder Network. The study focuses on the impact of the state's Career Ladder program on student achievement as measured by pupil performance on AIMS (Arizona Instrument to Measure Standards) and district student attendance rates. A comparison of student achievement results between Career Ladder (CL) districts and non-Career Ladders (non-CL) districts was conducted.

This report provides a brief overview of the Career Ladder program (as described in ADE literature), discusses the methodology used in the study, summarizes the findings of the study, and presents tabulations and charts of comparative outcome measures.

Overview of Career Ladder Program¹

The Arizona Career Ladder Program is a performance-based compensation plan that provides incentives to teachers in districts around the state who choose to make career advancements without leaving the classroom or the profession. Twenty-eight of the state's 200-plus districts participate in the Career Ladder Program. Approximately 31% of the state's 865,000 students attend schools in Career Ladder districts; approximately 40% of the state's 43,000 teachers are employed in Career Ladder districts; approximately 70% of eligible teachers participate in the Career Ladder Program.

The Career Ladder districts represent diversity in size, location, and student populations. The first fourteen districts were phased in over three years beginning FY 1985-86. Seven districts received approval to budget for a program beginning in FY 1992-93 and seven districts began participation in FY 1993-94. There has been no new funding appropriation for additional district participation since FY 1993-94.

The participating districts are required to comply with requirements established in ARS §15-918. While the state requires that a number of basic elements be included in the local plan, each district may develop specific details that meet its unique needs.

Career Ladder plans are intended to increase student academic achievement by attracting and retaining talented teachers. Teachers are recognized and compensated for their excellence and are motivated to perform at increasingly higher skill levels.

Career Ladder programs promote and support the professional development of teachers. The Career Ladder design requires a completely different way of evaluating and compensating teachers. Rather than advancing on a salary schedule as a result of seniority and educational credits, teachers are paid according to their level of skill attainment and demonstrated student academic progress.

¹ Arizona Department of Education Career Ladder website <http://www.ade.az.gov/asd/CareerLadder/>

The program supports and encourages collaboration and teamwork, and provides opportunities for leadership and professional growth, with Career Ladder teachers participating in higher-level instructional responsibilities within their districts. The program also allows districts to apply to implement an additional incentive program for other personnel at the school district level and provides awards based upon group, team, school or district.

Methodology

Based on conversations with the Arizona Career Ladder Network and members of the Career Ladder Advisory Committee it was determined that the evaluation services requested should include the following elements:

1. A study of the impact of the state's Career Ladder program on student achievement as measured by pupil performance on AIMS (Arizona Instrument to Measure Standards). (The evaluators were informed by the Department's Research and Evaluation Division that the TerraNova data available for the sample were not in a format conducive to the analysis being proposed.)
2. An analysis of AIMS data for two consecutive school years: 2004-2005 and 2005-2006.
3. An analysis of attendance data for two consecutive school years: 2004-2005 and 2005-2006.
4. A comparison of student achievement results and school attendance rates in Career Ladder schools and a matched sample of non-Career Ladder schools. (Because the primary concentration of teacher participation is at the elementary grade levels, the analysis of student achievement was restricted to grades K-8.)
5. Charter schools excluded from the sample.
6. Schools with student populations of fewer than 100 students excluded from the sample. (These schools were eliminated since program implementation quality may differ in small schools. When treated as outliers, the percentage of schools with populations of fewer than 100 was approximately 5%.)
7. The sample of comparisons of Career Ladder and non-Career Ladders schools matched on three factors: size of community (rural, midsize, and urban), school enrollment, and socio-economic status (SES) determined by free/reduced-priced lunch percentage.
8. Aggregated data presented across Career Ladder and non-Career Ladders districts rather than individual school or district outcomes.

Analysis of pupil performance included the following investigations using CL and non-CL data:

- Aggregate and subject-specific student AIMS achievement data (math, reading, writing)
- Aggregate school achievement profile data (failing, underperforming, performing, performing plus, highly performing, and excelling)
- Aggregate school attendance rates

Data Sources

The Department's Research and Evaluation division provided the following data to the evaluators between October 23, 2006 and November 27, 2006:

- County, Town, District, School (CTDS) codes, district names, school names, and school addresses for all Arizona public and charter schools
- AIMS percentage of passing data for all schools for the academic years of 2004-2005 and 2005-2006
- Attendance rates for all schools for the academic years of 2004-2005 and 2005-2006
- Achievement Profile for the academic years of 2004-2005 and 2005-2006
- School size (number of student enrolled) for all schools
- Percentage of free/reduced-priced lunch students for all schools

The Common Core of Data (CCD) Public School Universe file² was used to determine location (census location) of each school district (rural, midsize, and urban). The most recent Arizona School Report Card data were used to determine each school's performance level in the sample of districts. At the time of this report, school report cards for the academic years 2004-2005 and 2005-2006 were available online on ADE's website. These report cards provide attendance data for the 2004-2005 and 2003-2004 academic years respectively.

Using the school code as the link key, data tables were merged into one table containing nine variables: AIMS data for 04-05 and 05-06, attendance rates for 04-05 and 05-06, achievement profiles for 04-05 and 05-06, school enrollment for 05-06, percentage of free/reduced-priced lunch for 05-06, and district location. At the initiation of the analysis, there was a study sample of 1903 schools. These schools represented 322 districts and 280 charter schools. The following decisions were made regarding the exclusion of schools from the initial sample:

1. Charter schools were excluded from the sample;
2. The analysis of student achievement was restricted to grades K-8;
3. Schools with fewer than 100 students were excluded from the sample; these would have been treated as outliers and represented approximately 5% of the total sample;
4. Schools without two consecutive years of complete AIMS datasets were excluded;
5. Schools without two consecutive years of attendance data were excluded;
6. Schools without two consecutive years of achievement profile data were excluded; and
7. Schools missing either school enrollment data and/or FRPL data were excluded from the initial sample.

Sample

The sample of Career Ladder districts was predetermined prior to the initiation of this evaluation study. Therefore a quasi-experimental design was implemented in order to study the impact of

² NCES Common Core of Data Public Elementary/Secondary School Universe Survey: School Year 2003-04, Final Version 1a. <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006324>

the state's Career Ladder program on student achievement. In the absence of extensive longitudinal data (at least five consecutive years of student achievement data), one of the strongest quasi-experimental designs is the matched control design³. By using good proxies or predictors of the outcome variable for matching, the two groups can be assumed to be comparable on the outcome variable prior to the intervention, in this case, the Career Ladder program. The schools in this study's sample were matched on a strong predictor of academic achievement, poverty (percent free/reduced-priced lunch), as well as school size and location. The match was blind to academic achievement.

The proportion of schools falling into the various levels derived within each factor was computed with frequency tests. Based on the distribution of the CL schools within each factor level, randomly selected non-CL schools were deleted from the non-CL sample to obtain equal distributions among CL and non-CL schools. The resulting frequency distribution was examined for both samples, CL and non-CL. For example, this type of examination revealed that although the total number of non-CL schools is double that of CL schools, the number of large-sized schools (>1000) for non-CL is approximately equal to that of CL schools (48 non-CL and 50 CL schools). This determination provided a baseline for the matching and the random deletion of schools in the other two levels of school size. This tactic ensured a similar distribution ratio of non-CL schools to CL schools.

The number of cases to be excluded from the non-CL schools was computed based on the distribution ratio of the CL sample and a CL sample size of 326 schools. For example, in order to achieve the same percentage of cases in the 100-500 school size category (~16%), 215 cases needed to be excluded from the total number of non-CL schools in the 100-500 level. The cases to be removed were randomly selected from the group. This procedure was followed for the next school size category (501-1000). The cases excluded at random in the first matching sequence for school size were placed in an *exclusion* database. In some cases, non-CL schools would need to be retrieved in subsequent matching for location and SES factors.

The next factor used for matching was location. Three location size levels were used in order to maintain a large enough "N" in the various categories: urban, midsize, and rural. The proportion of CL schools represented in each category was calculated. The current sample of non-CL schools was sorted according to location and the frequencies compared to the CL required percentage. A determination was made for each category regarding the exclusion or inclusion of a school based on location and school size. Replacements were made for each location category in order to maintain the CL proportions for each category. The replacements were randomly selected from the exclusion database.

SES was represented by the percentage of free/reduced-priced lunch as reported by the schools. The same procedure used for matching for school size and location was used to match SES. Cases from the exclusion database were used to substitute for those cases that did not match on the third factor and to fulfill the SES proportion determined for the CL cases. The final matched sample is located in Appendix A. (The 649 schools remaining include 326 CL and 323 non-CL schools) A total of 936 non-CL schools were used from which the match was selected.

³ Cook, Thomas D. and Donald T. Campbell, *Quasi-experimentation: Design and analysis issues for field settings*. Boston: Houghton-Mifflin, 1979.

The following chart presents the proportion of cases for each factor.

Chart 1

	Percent (CL N=326) (nonCL N = 323)
School size	
100-500	16%
501-1000	69%
>1000	15%
Location	
Rural	9%
MidSize	15%
Urban	76%
SES (FRPL)	
1 – 33%	45%
34 – 67%	28%
68 – 100%	27%

Statistical Methods and Results

This report contains the results of statistical analyses of the percent of students passing the AIMS in math, reading, and writing. These statistical tests isolate the independent effects of a number of factors on the AIMS percent passing (AIMS%) in order to determine the effect of the Career Ladder program. Because the statistical model includes socioeconomic characteristics and school factors such as school size and location, it controls for the effect of each variable on the AIMS%. Thus, the findings about Career Ladder program and AIMS% apply as much to upper-income as to lower-income students, to schools in rural areas as to urban schools, to small schools as to large schools, because the model isolates the effect of each.

However, even though there is a statistical relationship between each factor and AIMS%, these independent factors do not necessarily cause differences in academic achievement. The model does not include everything that might have an effect on academic achievement, such as the methods used to teach reading or math. Thus, some variable also may be measuring the effect of an unobservable factor. For example, this model does not suggest that children from poor families will do worse on the AIMS because they are poor. Rather, poor families may have some unobservable characteristics or challenges that make it more difficult for their children to succeed in school. Similarly, controls for school size may measure characteristics correlated with school size that make it more difficult for students to score well on the AIMS.

Finally, a finding of “statistically significant” indicates that the effect of the variable/factor is not different than zero. For example, if the relationship between school location and academic achievement is statistically insignificant, students who are in rural schools do not do better than students who are in mid-size or urban schools.

Multiple Regression Models

Multiple regression models were utilized to test the significance of the CL program impact on the percent of students passing AIMS. The basic formula for the regression model is:

$$\text{AIMS}\%_{(\text{model})} = a + b_1\text{CL} + b_2\text{SchSize} + b_3\text{SES} + b_4\text{Location}$$

This analysis considers the effects of the Career Ladder program on the percent of students passing AIMS by analyzing district participation in the CL program, free or reduced-price lunch participation, school size, and school location. The effect of each these factors on AIMS passing rate can be isolated using a regression analysis. Our multiple regression model controls for differences among schools in three areas: location, school size and SES. We assumed educational outcomes are correlated with certain socioeconomic variables such as (1) socioeconomic level, which was measured by the percentage of students on free/reduced-priced lunch program; (2) location of district, rural, urban, or midsize town; and (3) number of students enrolled in a school.

Student Background

Research shows that socioeconomic status and background variables describe the student's economic and family environment, which can influence educational achievement.⁴ Previous studies⁵ call attention to students' health and nutrition, the physical environment of their homes, their family structure, the parenting styles, beliefs, and expectations of the students' parents. These studies lead us to expect that adverse background conditions (such as poverty) lower student academic performance. While the major purpose of research on schools is to identify characteristics of *schools* (such as the presence of the Career Ladder program) that contribute to student achievement, it is essential to take into account background characteristics, because they affect the intercorrelations of school measures. To maintain a distinction among diverse background issues, we focused on one background factor in our study: poverty. Poverty is a major component of the effect of a student's background on his or her academic achievement. Students are at a dramatically higher risk of academic failure when they come from a poor background, or from low SES families.

School Organizational Features

Two organizational features were selected for inclusion in our model for this study: (1) school size and (2) the geographic location of the district. Both may be correlated with achievement. School size has been shown to have a significant effect on the school's performance, yet the direction of the effect is inconsistent. About half the student achievement research finds no difference between the achievement levels of students in large and small schools, including small alternative schools. The other half finds student achievement in small schools to be superior to that in large schools. For purposes of our study, we measure school size as simply the number of students enrolled in the school. Location refers to the geographic location and size of town where

⁴ Hanusheck, E.A., Kain, J.F. & Rivkin, S.G., (2002). New evidence about Brown v Board of Education: the complex effects of school racial composition on achievement. Unpublished manuscript.

⁵ Henderson, A. T., & Mapp, K.L. (2002). A new wave of evidence: The impact of school, family, and community connections on student achievement [Annual synthesis]. Austin, TX: Southwest Educational Development Laboratory, National Center for Family & Community Connections with Schools.

the district is located. The Common Core of Data (CCD) Public School Universe file was used to determine size (census location) of each school district (rural, midsize, and urban).

Four Regression Models

Separate equations were modeled for a composite of math, reading and writing (percentage passing), and each separate subject area: math, reading, and writing. In each model the control variables have the expected effect on school achievement. For purposes of this study, we addressed the following questions through each model:

Model 1: Controlling for school size, school location, and socioeconomic status, is the presence of the Career Ladder Program significantly related to math, reading, and writing achievement, based on a combined percentage passing AIMS?

Model 2: Controlling for school size, school location, and socioeconomic status, is the presence of the Career Ladder Program significantly related to math achievement, based on percentage passing AIMS math?

Model 3: Controlling for school size, school location, and socioeconomic status, is the presence of the Career Ladder Program significantly related to reading achievement, based on percentage passing AIMS reading?

Model 4: Controlling for school size, school location, and socioeconomic status, is the presence of the Career Ladder Program significantly related to writing achievement, based on percentage passing AIMS writing?

The significant relationships are reported for each model in the following section. The asterisk (*) indicates a statistically significant relationship.

Results of the Multiple Regressions

Model 1: Combined

In the first model, factor analysis was employed to obtain a combined score for six items (three subjects [math, reading, and writing] for two consecutive years) after recoding and dummy coding for variables including location, achievement profile, and career ladder involvement. Additional outliers were identified and deleted during the assumption testing process. The final N for Model 1 was 982. The values calculated for each variable are shown in the following regression model:

$$\text{Model 1: AIMS}\%_{\text{combined}} = 1.07 + 0.36\text{CL}^* + 0.0001\text{SchSize} - 0.023\text{SES}^* - 0.04\text{Location}$$

Model 1 examined how student achievement data varied between CL and non-CL schools in the aggregate for all three tested subject areas over two consecutive academic years. The model corrected for any differences among the schools in size, SES, or location by holding these three factors constant. Results of multiple regression indicated a significant difference between CL schools and non-CL schools in the percentage of students passing all three subject areas assessed by the AIMS. The positive coefficient (0.36) in the above model indicates that a positive

relationship exists between the CL program and the AIMS passing rate; in other words, students from CL schools have a higher AIMS passing rate.

In Model 1 (combined AIMS percentage passing), SES was found to be negatively related to the percentage of students passing AIMS; in other words, those students on free/reduced-priced lunch program (low SES) are less likely to pass AIMS (high percentage passing). Location and school size are not significant predictors in Model 1.

Models 2 (Math), 3 (Reading) and 4 (Writing)

In Models 2, 3, and 4, the individual score for each subject area (math, reading, and writing) is calculated. In all three models, the results of regression indicate that CL schools have a higher percentage of students passing math, reading, and writing than do non-CL schools when all three factors (school size, SES, and location) are held constant.

$$\text{Model 2: AIMS\%}_{\text{mathcomb}} = 0.874 + 0.39\text{CL}^* + 0.000\text{SchSize} - 0.02\text{SES}^* + 0.04\text{Location}$$

$$\text{Model 3: AIMS\%}_{\text{readcomb}} = 1.22 + 0.40\text{CL}^* - 0.0001\text{SchSize} - 0.02\text{SES}^* - 0.06\text{Location}^*$$

$$\text{Model 4: AIMS\%}_{\text{writecomb}} = 0.85 + 0.23\text{CL}^* + 0.001\text{SchSize}^* - 0.02\text{SES}^* - 0.11\text{Location}^*$$

The positive coefficients for math (.39), reading (.40), and writing (.23) indicate that there is a positive relationship between the specific subject area and the CL program. Reading has the highest coefficient indicating a somewhat greater relationship with the CL program than math and writing.

As found in Model 1, we also found that SES (% of free/reduced-priced lunch) is negatively related on an individual level to the percentage of students passing AIMS in math, reading and writing; students on free/reduced-priced lunch are less likely to pass AIMS in the individual subject areas.

Location of the school is a predictor of achievement in Models 3 (reading) and 4 (writing); students living in urban areas are less likely to pass the reading and writing portions of AIMS than students living in rural or midsize towns. School size is positive predictor of achievement in writing; in other words students from larger schools are more likely to pass the writing subject area than students from smaller schools.

Model 5: Attendance

A final regression model tested the effect of being in a CL school on school attendance rate. Research shows that there is a direct correlation between school attendance rate and student achievement.⁶ The attendance rates for CL schools and non-CL schools were compared while controlling for location, school size, and SES. There were no significant differences between CL and non-CL schools' attendance rates over a two year period.

⁶ National Center for Education Statistics. (2002). Indicator 17: Students' absence from school. In *The condition of education, 2002* (pp. 40–41, 71, 159–160, 274). Washington DC: U.S. Department of Education.

$$\text{Model 5: AttendanceRate}_{\text{comb}} = - 0.28 + 0.10\text{CL} + 0.000\text{SchSize} - 0.01\text{SES}^* + 0.21\text{Location}^*$$

Additional outcomes for attendance rate indicate that SES was a negative predictor of school attendance; schools with higher percentage of students on free/reduced-priced lunch program had lower attendance rates. Location was also a significant predictor of attendance; those schools located in urban areas had higher attendance rates than schools located in rural areas.

Summary of Multiple Regression Results

The following charts present a summary of the multiple regression results.

Chart 2 Regression Analysis of AIMS % Passing Rates: Results of Five Models

	R ²	F (Overall model significance)
AIMS% _{combined}	56.8%	F _{4, 977} = 321.71, p = .00
AIMS% _{mathcomb}	45.7%	F _{4, 977} = 205.41, p = .00
AIMS% _{readcomb}	57.5%	F _{4, 977} = 329.93, p = .00
AIMS% _{writcomb}	42.4%	F _{4, 977} = 179.70, p = .00
AttendanceRate _{comb}	12.6%	F _{4, 933} = 33.57, p = .00

Chart 3 Regression Analysis of AIMS % Passing Rates: Effects of Independent Variables on Passing Rates

	Coefficient	T-Value	Significance
AIMS% Combined	0.36	8.10	0.00
School size	0.0001	0.94	0.35
SES	-0.023	33.46	0.00
Location	-0.04	1.55	0.12
AIMS% Math	0.39	7.45	0.00
School size	0.00	1.13	0.26
SES	-0.02	26.29	0.00
Location	0.04	1.11	0.27
AIMS% Reading	0.40	8.61	0.00
School size	0.0001	0.84	0.40
SES	-0.02	34.03	0.00
Location	-0.06	2.02	0.04
AIMS% Writing	0.23	4.26	0.00
School size	0.001	5.10	0.00
SES	-0.02	24.78	0.00
Location	-0.11	3.46	0.00
Attendance Rate	0.10	1.52	0.13
School size	0.00	1.73	0.08
SES	-0.01	8.51	0.00
Location	0.21	4.96	0.00

When the three factors of location, size, and SES are held constant, the regression models are very successful in identifying the relationships between the CL program and the AIMS passing rate in three subjects (math, reading, and writing) as well as in the aggregate. The models explained over 40% of the variance ($R^2 > 0.42$) in the outcome variable (percentage of students passing AIMS), which indicates that the model has a moderate level of predictive power and can

be used to identify specific variables (e.g., CL program) in order to improve student achievement.

Analysis of Variance (ANOVA)

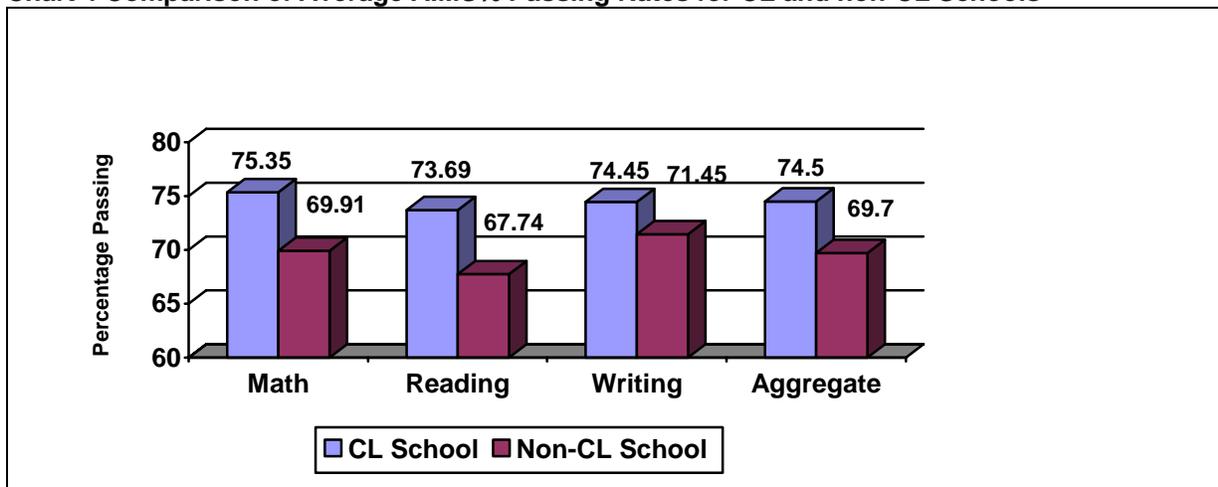
AIMS Percentage Passing

In order to further confirm the results of the regression models, an analysis of variance (ANOVA) was conducted with the matched datasets. ANOVA determines statistical significance of differences in AIMS passing rates across the study time period of two years. In our ANOVA analysis, the output is the average of AIMS passing percentages by subject area and in the aggregate for two consecutive academic years. The analysis was conducted to determine whether the variation of these averages (means) between CL schools and non-CL schools was due to random error (or chance). The results of the ANOVA analysis indicated that CL schools' AIMS passing rate was significantly higher than non-CL schools for the both academic years ($F(1, 647) = 19.98, p < 0.0125 (0.05/4)$). This statistical significance means that the variation was not due to random error, but rather due to the *factor* under investigation: Career Ladder program.

A further look at the individual subject areas yielded the same results: CL schools had higher average percentages of students passing math ($F(1, 647) = 19.73, p < 0.0125$); reading ($F(1, 647) = 23.27, p < 0.0125$); and writing, ($F(1, 647) = 8.74, p < 0.0125$) than did non-CL schools.

The following chart is a comparison of the average percent passing rate for CL and non-CL schools in the individual subject areas and in the aggregate.

Chart 4 Comparison of Average AIMS% Passing Rates for CL and non-CL Schools



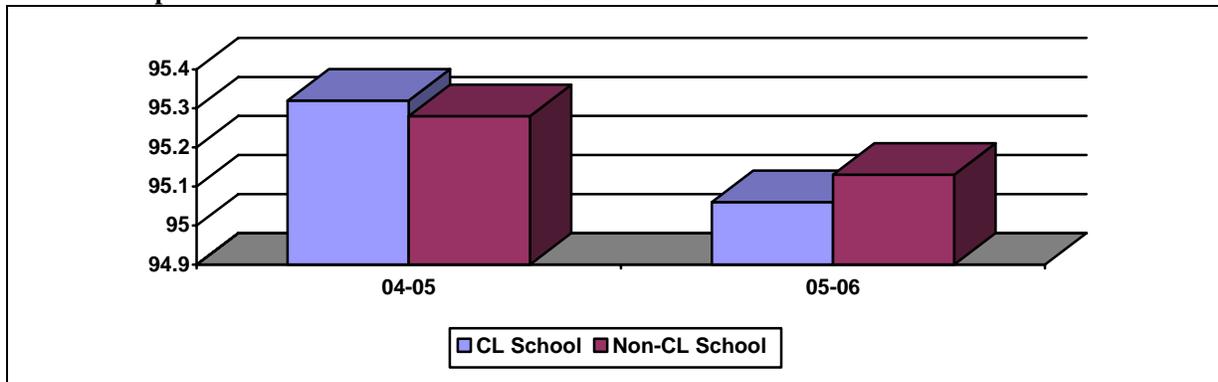
Attendance Rate

Results of ANOVA with the matched data sample revealed no significant difference between CL and non-CL schools in the average attendance rates for the two academic years. This supports the results of the multiple regression model for attendance (Model 5).

The attendance rate means for CL and non-CL schools are shown in the following chart for academic years 2004-2005 and 2005-2006. There were decreases in attendance rates at both CL

and non-CL schools in academic year 2005-2006. However, these differences are not statistically significant. The following chart is a comparison of the attendance rates for CL and non-CL schools for the two year time period.

Chart 5 Comparison of Attendance Rates for CL and Non-CL Schools



Achievement Profile

The achievement profiles for the CL and non-CL schools were compared using the matched sample. The ANOVA analysis found that there is a significant difference between CL and non-CL school achievement profiles over the two year study period ($F(1, 647) = 19.18, p < 0.05$). In other words, the CL schools have higher achievement profiles than do the non-CL schools.

Summary of ANOVA Results

The ANOVA results support the findings of our multiple regression models that CL schools have a significantly higher percentage of students passing AIMS both in the aggregate and in the individual subject areas of math, reading and writing. In addition, the ANOVA found significant differences between CL and non-CL schools in their achievement profiles, with CL schools having significantly higher achievement profiles than non-CL schools. There was no significant difference between CL and non-CL schools in the area of attendance rates. These findings were similar to the results of multiple regressions.

Conclusions

These analyses reveal a number of important findings about the Career Ladder program in certain Arizona schools. First and foremost, the overall results indicate, that on average, students in Career Ladder schools are performing significantly better on AIMS measures than did students in non-career ladder schools, even after adjusting for differences in student and school characteristics. The impact of the Career Ladder program seems to be greater in math and reading with the coefficients for these two subject areas larger than the coefficient for writing. Only two years of AIMS data were available for analysis, which impacted on the ability to determine significant changes in the difference between percentage passing over a period of time.

While this study does provide strong evidence of the effects of the Career Ladder program on student academic achievement, it is not without limitations. First, the Career Ladder schools were not randomly assigned to Career Ladder. Without such an experimental design, we must

rely on statistical models to adjust for pre-existing differences between CL schools and non-CL schools. The methods used in this study are thought to be quite effective in accomplishing this goal, however, the study would be even stronger if Career Ladder schools had been selected at random from a pool of eligible schools.

Second, this study does not attempt to connect student achievement directly to implementation of the Career Ladder program in a district. Therefore, while the study suggests that the program has positive impacts, it does not provide specific evidence of how and why these positive results were achieved.

The biggest strength of this study is that it continues to support the findings of previous Career Ladder evaluations that have been conducted over many years⁷. Although the statistical methods are different and the measures of student performance are different, the outcomes continue to be positive.

Discussion and Implications for Future Research

Research increasingly demonstrates what common sense has long made apparent to educators, parents, and policymakers: Teacher quality matters. Teachers' knowledge and skills are the most vital in-school factors influencing children's learning.⁸ But defining, measuring, and identifying teacher quality is a challenging task. In the current education environment, focused on improving student achievement, the ultimate measure of teacher quality is the impact that the teacher has on student learning.

The CL program rests on a foundation of individual-level accountability. However, in the past, the evaluation of the CL program and the other reform elements has focused solely on achievement scores – absolute levels attained by students in their end-of-year tests. *Growth*, in contrast, describes the progress in test scores made over the school year. If we are predicting student growth – progress made over the year, reports by education researchers Kain, Hanushek, Sanders, and others demonstrate that *good instruction is 15-20 times more powerful than family background and income, race, gender, and other explanatory variables*.

Today, educational researchers have access to data sets and technology capable of linking the progress of individual students over time to the teacher who taught them. A powerful new methodology, *value-added assessment*, makes it possible to measure the impact of instruction on student academic growth. Several different value-added models (VAM) are in use today. VAM furnishes a model for estimating the effectiveness of teachers and schools in supporting student achievement. (Of course, in a balanced accountability system, no educator should ever be evaluated solely on the basis of a single measure.)

The current study on the impact of the Career Ladder program on student achievement provides a basis for beginning a longitudinal study that would follow the changes in students' scores from one test to the next. This approach allows the measurement of *value added* by teachers. Observing student performance across multiple years permits the separation of teacher

⁷ See Appendix B for a summary of previous Career Ladder studies.

⁸ Leigh, A. & Mead, S., *Lifting Teacher Performance*. Progressive Policy Institute, Policy Report. April 2005.

effectiveness from innate student characteristics and systemic differences between schools (such as principal quality or infrastructure). Measuring test score gains from one year to the next allows researchers and administrators to determine to a greater degree than previously those characteristics and conditions that lead to effective teaching. Policymakers are thus able to reward those teachers who perform better than others in the classroom, taking into account the composition of their student body.

Many key elements of reform addressing assessment, educator quality, compensation, professional development and capacity building, are already in place across Arizona. The challenge faced by educational policymakers and administrators is to bring these together along with several striking innovations to replace piecemeal changes and marginal improvement with integrated reform that yields sustainable systemic change. There are also studies currently underway regarding teacher working conditions, alternative certification, and teacher excellence in the State; these studies should be integrated into future research on teacher quality/teacher effectiveness.

Several questions still remain for research to answer. For example, the majority of the effective teacher studies have focused on elementary school. There is also a need to resolve the conflicting findings on the effectiveness of teachers certified by alternative routes. More information is needed about incentives and working conditions that will attract highly effective teachers in our traditionally hard-to-staff schools.

As shown by the current study, districts with plans that address the several characteristics specified below are more successful in improving student achievement than are districts that do not have such plans. Characteristics that support improvements in student achievement include district efforts to:

- Promote teacher excellence by attracting and retaining talented teachers;
- Recognize and compensate teachers for their excellence;
- Promote support the professional development of teachers;
- Pay teachers according to their level of skill attainment and demonstrated student academic progress;
- Support and encourage collaboration and teamwork;
- Provide opportunities for leadership and professional growth; and
- Provide additional incentive programs for other personnel at the school district level and provides awards based upon group, team, school or district

The results of this Career Ladder study support decades of research findings that are unequivocal regarding the connection between teacher quality and student learning. It can be argued that this approach to raise teacher quality through a performance-based pay plan is functioning effectively in selected Arizona districts.

Appendix A: Matched Sample

<u>SchDistName</u>	<u>SchName</u>	<u>CL</u>
Mesa Unified District	Adams Elementary School	CL
Tanque Verde Unified District	Agua Caliente School	CL
Murphy Elementary District	Alfred F Garcia School	Non-CL
Yuma Elementary District	Alice Byrne Elementary School	Non-CL
Mesa Unified District	Alma Elementary School	CL
Isaac Elementary District	Alta E Butler School	Non-CL
Peoria Unified School District	Alta Loma School	CL
Washington Elementary School District	Alta Vista Elementary School	Non-CL
Amphitheater Unified District	Amphitheater Middle School	CL
Scottsdale Unified District	Anasazi Elementary	CL
Alhambra Elementary District	Andalucia Middle School	Non-CL
Alhambra Elementary District	Andalucia Primary School	Non-CL
Tucson Unified District	Anna Henry Elementary School	Non-CL
Tucson Unified District	Anna Lawrence Intermediate School	Non-CL
Chandler Unified District	Anna Marie Jacobson Elementary School	CL
Peoria Unified School District	Apache Elementary School	CL
Sunnyside Unified District	Apollo Middle School	CL
Scottsdale Unified District	Arcadia Neighborhood Learning Center	CL
Gadsden Elementary District	Arizona Desert Elementary	Non-CL
Tolleson Elementary District	Arizona Desert Elementary School	CL
Paradise Valley Unified District	Arrowhead Elementary School	Non-CL
Deer Valley Unified District	Arrowhead Elementary School	Non-CL
Washington Elementary School District	Arroyo School	Non-CL
Murphy Elementary District	Arthur M Hamilton School	Non-CL
Gilbert Unified District	Ashland Elementary	Non-CL
Dysart Unified District	Ashton Ranch Elementary School	CL
Gilbert Unified District	Augusta Ranch Elementary	Non-CL
Scottsdale Unified District	Aztec Elementary School	CL
Buckeye Elementary District	Bales Elementary School	Non-CL
Chandler Unified District	Basha Elementary	CL
Deer Valley Unified District	Bellair Elementary School	Non-CL
Sedona-Oak Creek Joint Unified District	Big Park Community School	Non-CL
Cave Creek Unified District	Black Mountain Elementary School	CL
Kingman Unified School District	Black Mountain Elementary School	Non-CL
Tucson Unified District	Bloom Elementary	Non-CL
Blue Ridge Unified District	Blue Ridge Elementary School	Non-CL
Blue Ridge Unified District	Blue Ridge Middle School	Non-CL
Chandler Unified District	Bogle Junior High School	CL
Tucson Unified District	Bonillas Elementary Magnet School	Non-CL
Tucson Unified District	Booth Magnet Elementary School	Non-CL
Tucson Unified District	Booth-Fickett Math/Science Magnet School	Non-CL
Tucson Unified District	Borman Elementary School	Non-CL
Mesa Unified District	Boulder Canyon Learning Center	CL
Paradise Valley Unified District	Boulder Creek Elementary School	Non-CL
Humboldt Unified District	Bradshaw Mountain Middle School	Non-CL

Cartwright Elementary District	Bret R. Tarver	Non-CL
Mesa Unified District	Brimhall Junior High School	CL
Mesa Unified District	Brinton Elementary	CL
Roosevelt Elementary District	Brooks Academy	Non-CL
Balsz Elementary District	Brunson-Lee Elementary School	Non-CL
Gilbert Unified District	Burk Elementary School	Non-CL
Mesa Unified District	Bush Elementary	CL
Tempe School District	Bustoz School	Non-CL
Cartwright Elementary District	Byron A. Barry School	Non-CL
Kyrene Elementary District	C I Waggoner School	CL
Roosevelt Elementary District	C O Greenfield School	Non-CL
Casa Grande Elementary District	Cactus Middle School	Non-CL
Mohave Valley Elementary District	Camp Mohave Elementary	Non-CL
Camp Verde Unified District	Camp Verde Elementary School	Non-CL
Pendergast Elementary District	Canyon Breeze Elementary	CL
Peoria Unified School District	Canyon Elementary School	CL
Gilbert Unified District	Canyon Rim	Non-CL
Catalina Foothills Unified District	Canyon View Elementary School	CL
Gilbert Unified District	Carol Rae Ranch Elementary	Non-CL
Mesa Unified District	Carson Junior High School	CL
Tucson Unified District	Carson Middle School	Non-CL
Cartwright Elementary District	Cartwright School	Non-CL
Casa Grande Elementary District	Casa Grande Middle School	Non-CL
Yuma Elementary District	Castle Dome Middle School	Non-CL
Alhambra Elementary District	Catalina Ventura School	Non-CL
Flowing Wells Unified District	Centennial Elementary School	CL
Crane Elementary District	Centennial Middle School	CL
Kingman Unified School District	Cerbat Elementary School	Non-CL
Gadsden Elementary District	Cesar Chavez Elementary	Non-CL
Roosevelt Elementary District	Cesar E Chavez Community School	Non-CL
Sunnyside Unified District	Challenger Middle School	CL
Chandler Unified District	Chandler Traditional Academy - Liberty Campus	CL
Washington Elementary School District	Chaparral Elementary School	Non-CL
Sunnyside Unified District	Chaparral Middle School	CL
Flagstaff Unified District	Charles W Sechrist Elementary School	CL
Cartwright Elementary District	Charles W. Harris School	Non-CL
Laveen Elementary District	Cheatham Elementary School	Non-CL
Scottsdale Unified District	Cherokee Elementary School	CL
Peoria Unified School District	Cheyenne Elementary School	CL
Scottsdale Unified District	Cheyenne Traditional Elementary School	CL
Dysart Unified District	Cimarron Springs Elementary	CL
Clarkdale-Jerome Elementary District	Clarkdale-Jerome Elementary School	Non-CL
Chandler Unified District	Clifford J Goodman Elementary School	CL
Roosevelt Elementary District	Cloves C Campbell Sr Elementary School	Non-CL
Scottsdale Unified District	Cochise Elementary School	CL
Scottsdale Unified District	Cocopah Middle School	CL
Tucson Unified District	Collier Elementary School	Non-CL
Littleton Elementary District	Collier Elementary School	Non-CL
Florence Unified School District	Copper Basin	Non-CL
Paradise Valley Unified District	Copper Canyon Elementary School	Non-CL

Deer Valley Unified District	Copper Creek Elementary	Non-CL
Amphitheater Unified District	Copper Creek Elementary School	CL
Pendergast Elementary District	Copper King Elementary	CL
Scottsdale Unified District	Copper Ridge Elementary School	CL
Scottsdale Unified District	Copper Ridge Middle School	CL
Globe Unified District	Copper Rim Elementary School	Non-CL
Peoria Unified School District	Copperwood School	CL
Alhambra Elementary District	Cordova Middle School	Non-CL
Alhambra Elementary District	Cordova Primary School	Non-CL
Higley Unified District	Coronado Elementary School	Non-CL
Amphitheater Unified District	Coronado K-8 School	CL
Litchfield Elementary District	Corte Sierra Elementary School	CL
Peoria Unified School District	Cotton Boll School	CL
Peoria Unified School District	Country Meadows Elementary School	CL
Dysart Unified District	Countryside Elementary	CL
Peoria Unified School District	Coyote Hills Elementary School	CL
Glendale Elementary District	Coyote Ridge	Non-CL
Humboldt Unified District	Coyote Springs Elementary School	Non-CL
Marana Unified District	Coyote Trail Elementary School	Non-CL
Crane Elementary District	Crane Middle School	CL
Sunnyside Unified District	Craycroft Elementary School	CL
Creighton Elementary District	Creighton Elementary School	CL
Mesa Unified District	Crismon Elementary School	CL
Tucson Unified District	Davis Bilingual Magnet School	Non-CL
Deer Valley Unified District	Deer Valley Middle School	Non-CL
Marana Unified District	Degrazia Elementary School	Non-CL
Cave Creek Unified District	Desert Arroyo Middle School	CL
Scottsdale Unified District	Desert Canyon Elementary	CL
Scottsdale Unified District	Desert Canyon Middle School	CL
Paradise Valley Unified District	Desert Cove Elementary School	Non-CL
Peoria Unified School District	Desert Harbor Elementary School	CL
Pendergast Elementary District	Desert Horizon Elementary School	CL
Yuma Elementary District	Desert Mesa Elementary School	Non-CL
Pendergast Elementary District	Desert Mirage Elementary School	CL
Peoria Unified School District	Desert Palms Elementary School	CL
Gilbert Unified District	Desert Ridge Jr. High	Non-CL
Deer Valley Unified District	Desert Sage Elementary School	Non-CL
Cartwright Elementary District	Desert Sands Middle School	Non-CL
Paradise Valley Unified District	Desert Shadows Elementary School	Non-CL
Paradise Valley Unified District	Desert Shadows Middle School	Non-CL
Apache Junction Unified District	Desert Shadows Middle School	CL
Deer Valley Unified District	Desert Sky Middle School	Non-CL
Paradise Valley Unified District	Desert Springs Elementary School	Non-CL
Avondale Elementary District	Desert Star	Non-CL
Cave Creek Unified District	Desert Sun Elementary School	CL
Avondale Elementary District	Desert Thunder	Non-CL
Paradise Valley Unified District	Desert Trails Elementary School	Non-CL
Peoria Unified School District	Desert Valley Elementary School	CL
Gadsden Elementary District	Desert View Elementary	Non-CL
Washington Elementary School District	Desert View Elementary School	Non-CL

Apache Junction Unified District	Desert Vista Elementary School	CL
Vail Unified District	Desert Willow Elementary School	Non-CL
Cave Creek Unified District	Desert Willow Elementary School	CL
Deer Valley Unified District	Desert Winds Elementary School	Non-CL
Deer Valley Unified District	Diamond Canyon Elementary	Non-CL
Glendale Elementary District	Discovery School	Non-CL
Safford Unified District	Dorothy Stinson School	CL
Chandler Unified District	Dr Howard K Conley Elementary School	CL
Litchfield Elementary District	Dreaming Summit Elementary	CL
Sunnyside Unified District	Drexel Elementary School	CL
Tucson Unified District	Dunham Elementary School	Non-CL
Dysart Unified District	Dysart Elementary School	CL
Amphitheater Unified District	E C Nash School	CL
Mesa Unified District	East Valley Academy	CL
Paradise Valley Unified District	Echo Mountain Primary School	Non-CL
Roosevelt Elementary District	Ed & Verma Pastor Elementary School	Non-CL
Mesa Unified District	Edison Elementary School	CL
Mesa Unified District	Eisenhower Elementary School	CL
Dysart Unified District	El Mirage School	CL
Sunnyside Unified District	Elvira Elementary School	CL
Mesa Unified District	Emerson Elementary School	CL
Tanque Verde Unified District	Emily Gray Junior High School	CL
Mesa Unified District	Entz Elementary School	CL
Chandler Unified District	Erie Elementary School	CL
Deer Valley Unified District	Esperanza Elementary School	Non-CL
Isaac Elementary District	Esperanza Elementary School	Non-CL
Sunnyside Unified District	Esperanza Elementary School	CL
Catalina Foothills Unified District	Esperero Canyon Middle School	CL
Flagstaff Unified District	Eva Marshall Elementary School	CL
Creighton Elementary District	Excelencia School	CL
Paradise Valley Unified District	Explorer Middle School	Non-CL
Morenci Unified District	Fairbanks Elementary School	Non-CL
Mesa Unified District	Falcon Hill Elementary School	CL
Tempe School District	Fees Middle School	Non-CL
Mesa Unified District	Field Elementary School	CL
Gilbert Unified District	Finley Farms Elementary	Non-CL
Flagstaff Unified District	Flagstaff Middle School	CL
Florence Unified School District	Florence K-8	Non-CL
Flowing Wells Unified District	Flowing Wells Junior High School	CL
Peoria Unified School District	Foothills Elementary School	CL
Paradise Valley Unified District	Foothills Elementary School	Non-CL
Mohave Valley Elementary District	Fort Mohave Elementary School	Non-CL
Fountain Hills Unified District	Fountain Hills Middle School	Non-CL
Fountain Hills Unified District	Four Peaks Elementary School	Non-CL
Apache Junction Unified District	Four Peaks Elementary School	CL
Fowler Elementary District	Fowler Elementary School	Non-CL
Bullhead City Elementary District	Fox Creek Jr High School	Non-CL
Amphitheater Unified District	Frances Owen Holaway Elementary School	CL
Cartwright Elementary District	Frank Borman Middle School	Non-CL
Mesa Unified District	Franklin Elementary School	CL

Mesa Unified District	Franklin Northeast School	CL
Mesa Unified District	Franklin South	CL
Mesa Unified District	Franklin West Elementary	CL
Peoria Unified School District	Frontier Elementary	CL
Payson Unified District	Frontier Elementary School	CL
Mesa Unified District	Frost Elementary School	CL
Tucson Unified District	Fruchthendler Elementary School	Non-CL
Chandler Unified District	Frye Elementary School	CL
Cartwright Elementary District	G. Frank Davidson	Non-CL
Tucson Unified District	Gale Elementary School	Non-CL
Sunnyside Unified District	Gallego Basic Elementary School	CL
Chandler Unified District	Galveston Elementary School	CL
Ganado Unified School District	Ganado Intermediate School	CL
Ganado Unified School District	Ganado Middle School	CL
Ganado Unified School District	Ganado Primary School	CL
Pendergast Elementary District	Garden Lakes Elementary School	CL
Phoenix Elementary District	Garfield School	Non-CL
Crane Elementary District	Gary A. Knox Elementary School	CL
Creighton Elementary District	Gateway School	CL
Deer Valley Unified District	Gavilan Peak Elementary	Non-CL
Yuma Elementary District	Gila Vista Jr High School	Non-CL
Gilbert Unified District	Gilbert Elementary School	Non-CL
Gilbert Unified District	Gilbert Junior High School	Non-CL
Gilbert Unified District	Gilbert Learning Center	Non-CL
Humboldt Unified District	Glassford Hill Middle School	Non-CL
Glendale Elementary District	Glendale American School	Non-CL
Cartwright Elementary District	Glenn L. Downs School	Non-CL
Apache Junction Unified District	Gold Canyon Elementary School	CL
Gilbert Unified District	GPS Traditional Academy	Non-CL
Alhambra Elementary District	Granada East School	Non-CL
Alhambra Elementary District	Granada Primary School	Non-CL
Paradise Valley Unified District	Grayhawk Elementary School	Non-CL
Deer Valley Unified District	Greenbrier Elementary School	Non-CL
Gilbert Unified District	Greenfield Elementary School	Non-CL
Gilbert Unified District	Greenfield Junior High School	Non-CL
Tucson Unified District	Gridley Middle School	Non-CL
Balsz Elementary District	Griffith Elementary School	Non-CL
Mesa Unified District	Guerrero Elementary School	CL
Crane Elementary District	H L Suverkrup Elementary School	CL
Mesa Unified District	Hale Elementary School	CL
Chandler Unified District	Hartford Elementary School	CL
Mesa Unified District	Hawthorne Elementary School	CL
Cartwright Elementary District	Heatherbrae School	Non-CL
Amphitheater Unified District	Helen Keeling Elementary School	CL
Mesa Unified District	Hendrix Junior High School	CL
Tucson Unified District	Henry Hank Oyama	Non-CL
Peoria Unified School District	Heritage School	CL
Mesa Unified District	Hermosa Vista Elementary School	CL
Paradise Valley Unified District	Hidden Hills Elementary School	Non-CL
Globe Unified District	High Desert Middle School	Non-CL

Mesa Unified District	Highland Elementary School	CL
Gilbert Unified District	Highland Jr High School	Non-CL
Deer Valley Unified District	Highland Lakes School	Non-CL
Deer Valley Unified District	Hillcrest Middle School	Non-CL
Scottsdale Unified District	Hohokam Elementary School	CL
Tucson Unified District	Holladay Intermediate Magnet School	Non-CL
Tucson Unified District	Hollinger Elementary School	Non-CL
Mesa Unified District	Holmes Elementary School	CL
Flowing Wells Unified District	Homer Davis Elementary School	CL
Scottsdale Unified District	Hopi Elementary School	CL
Glendale Elementary District	Horizon School	Non-CL
Gilbert Unified District	Houston Elementary School	Non-CL
Tucson Unified District	Howenstine High School	Non-CL
Sierra Vista Unified District	Huachuca Mountain Elementary School	Non-CL
Kingman Unified School District	Hualapai Elementary School	Non-CL
Tucson Unified District	Hudlow Elementary School	Non-CL
Tucson Unified District	Ida Flood Dodge Middle Magnet School	Non-CL
Roosevelt Elementary District	Ignacio Conchos School	Non-CL
Paradise Valley Unified District	Indian Bend Elementary School	Non-CL
Scottsdale Unified District	Ingleside Middle School	CL
Peoria Unified School District	Ira A Murphy School	CL
Tucson Unified District	Irene Erickson Elementary School	Non-CL
Marana Unified District	Ironwood Elementary School	Non-CL
Mesa Unified District	Irving Elementary School	CL
Isaac Elementary District	Isaac Middle School	Non-CL
Mesa Unified District	Ishikawa Elementary School	CL
Gilbert Unified District	Islands Elementary School	Non-CL
Flowing Wells Unified District	J Robert Hendricks Elementary School	CL
Isaac Elementary District	J B Sutton Elementary School	Non-CL
J O Combs Elementary District	J. O. Combs Middle School	Non-CL
Murphy Elementary District	Jack L Kuban Elementary School	Non-CL
Lake Havasu Unified District	Jamaica Elementary School	Non-CL
Chandler Unified District	Jane D. Hull Elementary	CL
Mesa Unified District	Jefferson Elementary School	CL
Tucson Unified District	John E Wright Elementary School	Non-CL
Roosevelt Elementary District	John F Kennedy Elementary School	Non-CL
Cartwright Elementary District	John F. Long	Non-CL
Chandler Unified District	John M Andersen Elementary School	CL
Chandler Unified District	John M Andersen Jr High School	CL
Flagstaff Unified District	John Q Thomas Elementary School	CL
Roosevelt Elementary District	John R Davis School	Non-CL
Mesa Unified District	Johnson Elementary School	CL
Mesa Unified District	Jordan Elementary School	CL
Isaac Elementary District	Joseph Zito Elementary School	Non-CL
Payson Unified District	Julia Randall Elementary School	CL
Cartwright Elementary District	Justine Spitalny School	Non-CL
Peoria Unified School District	Kachina School	CL
Mesa Unified District	Keller Elementary School	CL
Mesa Unified District	Kerr Elementary School	CL
Kingman Unified School District	Kingman Junior High School	Non-CL

Dysart Unified District	Kingswood Elementary School	CL
Mesa Unified District	Kino Junior High School	CL
Scottsdale Unified District	Kiva Elementary School	CL
Chandler Unified District	Knox Elementary School	CL
Kyrene Elementary District	Kyrene Akimel A-AI Middle School	CL
Kyrene Elementary District	Kyrene Altadena Middle School	CL
Kyrene Elementary District	Kyrene Aprende Middle School	CL
Kyrene Elementary District	Kyrene Centennial Middle School	CL
Kyrene Elementary District	Kyrene de la Colina School	CL
Kyrene Elementary District	Kyrene de la Esperanza School	CL
Kyrene Elementary District	Kyrene de la Estrella Elementary School	CL
Kyrene Elementary District	Kyrene de la Mariposa School	CL
Kyrene Elementary District	Kyrene de la Mirada School	CL
Kyrene Elementary District	Kyrene de la Paloma School	CL
Kyrene Elementary District	Kyrene de la Sierra School	CL
Kyrene Elementary District	Kyrene de las Brisas School	CL
Kyrene Elementary District	Kyrene de las Lomas School	CL
Kyrene Elementary District	Kyrene de las Manitas School	CL
Kyrene Elementary District	Kyrene de los Cerritos School	CL
Kyrene Elementary District	Kyrene De Los Lagos School	CL
Kyrene Elementary District	Kyrene de los Ninos School	CL
Kyrene Elementary District	Kyrene del Cielo School	CL
Kyrene Elementary District	Kyrene del Milenio	CL
Kyrene Elementary District	Kyrene del Norte School	CL
Kyrene Elementary District	Kyrene del Pueblo Middle School	CL
Kyrene Elementary District	Kyrene del Sureno School	CL
Kyrene Elementary District	Kyrene Middle School	CL
Kyrene Elementary District	Kyrene Monte Vista School	CL
Amphitheater Unified District	L M Prince School	CL
Amphitheater Unified District	La Cima Middle School	CL
Kingman Unified School District	La Senita Elementary School	Non-CL
Safford Unified District	Lafe Nelson School	CL
Scottsdale Unified District	Laguna Elementary School	CL
Flowing Wells Unified District	Laguna Elementary School	CL
Paradise Valley Unified District	Larkspur Elementary School	Non-CL
Creighton Elementary District	Larry C Kennedy School	CL
Deer Valley Unified District	Las Brisas Elementary School	Non-CL
Mesa Unified District	Las Sendas Elementary School	CL
Avondale Elementary District	Lattie Coor	Non-CL
Amphitheater Unified District	Lawrence W Cross Middle School	CL
Deer Valley Unified District	Legend Springs Elementary	Non-CL
Mesa Unified District	Lehi Elementary School	CL
Flagstaff Unified District	Leupp Public School	CL
Paradise Valley Unified District	Liberty Elementary School	Non-CL
Sunnyside Unified District	Liberty Elementary School	CL
Humboldt Unified District	Liberty Traditional School	Non-CL
Mesa Unified District	Lincoln Elementary School	CL
Mesa Unified District	Lindbergh Elementary School	CL
Show Low Unified District	Linden Elementary School	CL
Tucson Unified District	Lineweaver Elementary School	Non-CL

Litchfield Elementary District	Litchfield Elementary School	CL
Littleton Elementary District	Littleton Elementary School	Non-CL
Creighton Elementary District	Loma Linda Elementary School	CL
Cave Creek Unified District	Lone Mountain Elementary School	CL
Mesa Unified District	Longfellow Elementary School	CL
Osborn Elementary District	Longview Elementary School	Non-CL
Washington Elementary School District	Lookout Mountain School	Non-CL
Sunnyside Unified District	Los Amigos Elementary School	CL
Sunnyside Unified District	Los Ninos Elementary School	CL
Sunnyside Unified District	Los Ranchitos School	CL
Mesa Unified District	Lowell Elementary School	CL
Tucson Unified District	Lowell H Smith Elementary School	Non-CL
Phoenix Elementary District	Lowell School	Non-CL
Dysart Unified District	Luke School	CL
Amphitheater Unified District	Lulu Walker School	CL
Flagstaff Unified District	Lura Kinsey Elementary School	CL
Tucson Unified District	Lynn Urquides	Non-CL
Mesa Unified District	MacArthur Elementary School	CL
Madison Elementary District	Madison #1 Elementary School	Non-CL
Madison Elementary District	Madison Camelview Elementary	Non-CL
Mesa Unified District	Madison Elementary School	CL
Madison Elementary District	Madison Heights School	Non-CL
Madison Elementary District	Madison Meadows School	Non-CL
Madison Elementary District	Madison Park School	Non-CL
Madison Elementary District	Madison Richard Simis School	Non-CL
Madison Elementary District	Madison Rose Lane School	Non-CL
Tucson Unified District	Magee Middle School	Non-CL
Phoenix Elementary District	Magnet Traditional School	Non-CL
Tucson Unified District	Mansfeld Middle School	Non-CL
Flagstaff Unified District	Manuel DeMiguel Elementary School	CL
Cartwright Elementary District	Manuel Pena Jr. School	Non-CL
Washington Elementary School District	Manzanita Elementary School	Non-CL
Kingman Unified School District	Manzanita Elementary School	Non-CL
Catalina Foothills Unified District	Manzanita School	CL
Marana Unified District	Marana Middle School	Non-CL
Cartwright Elementary District	Marc T. Atkinson Middle School	Non-CL
Maricopa Unified School District	Maricopa Elementary	Non-CL
Amphitheater Unified District	Marion Donaldson Elementary School	CL
Marana Unified District	Marjorie W Estes Elementary School	Non-CL
Dysart Unified District	Marley Park Elementary	CL
Chandler Unified District	Marshall Humphrey li Elementary School	CL
Peoria Unified School District	Marshall Ranch Elementary School	CL
Yuma Elementary District	Mary A Otondo Elementary School	Non-CL
Washington Elementary School District	Maryland Elementary School	Non-CL
Laveen Elementary District	Maurice C. Cash Elementary School	Non-CL
Roosevelt Elementary District	Maxine O Bush Elementary School	Non-CL
Tempe School District	Mckemy Middle School	Non-CL
Mesa Unified District	Mendoza Elementary School	CL
Paradise Valley Unified District	Mercury Mine Elementary School	Non-CL
Mesa Unified District	Mesa Junior High School	CL

Amphitheater Unified District	Mesa Verde Elementary School	CL
Gilbert Unified District	Mesquite Elementary School	Non-CL
Vail Unified District	Mesquite Elementary School	Non-CL
Gilbert Unified District	Mesquite Jr High School	Non-CL
Tempe School District	Meyer Elementary School	Non-CL
Tucson Unified District	Miles-Exploratory Learning Center	Non-CL
Deer Valley Unified District	Mirage Elementary School	Non-CL
Sunnyside Unified District	Mission Manor Elementary School	CL
Isaac Elementary District	Mitchell Elementary School	Non-CL
Scottsdale Unified District	Mohave Middle School	CL
Mohave Valley Elementary District	Mohave Valley Elementary	Non-CL
Creighton Elementary District	Monte Vista Elementary School	CL
Alhambra Elementary District	Montebello School	Non-CL
Isaac Elementary District	Morris K. Udall Escuela de Bellas Artes	Non-CL
Flagstaff Unified District	Mount Elden Middle School	CL
Deer Valley Unified District	Mountain Shadows Elementary School	Non-CL
Paradise Valley Unified District	Mountain Trail Middle School	Non-CL
Washington Elementary School District	Mountain View Elementary School	Non-CL
Humboldt Unified District	Mountain View Elementary School	Non-CL
Scottsdale Unified District	Mountainside Middle School	CL
Isaac Elementary District	Moya Elementary	Non-CL
Tucson Unified District	Myers-Ganoung Elementary School	Non-CL
Tucson Unified District	Nan Lyons Elementary School	Non-CL
Scottsdale Unified District	Navajo Elementary School	CL
Window Rock Unified District	Navajo Immersion	CL
Chandler Unified District	Navarrete Elementary	CL
Tucson Unified District	Naylor Middle School	Non-CL
Flagstaff Unified District	Neil V Christensen School	CL
Tempe School District	Nevitt Elementary School	Non-CL
Deer Valley Unified District	New River Elementary School	Non-CL
Paradise Valley Unified District	North Ranch Elementary School	Non-CL
Yuma Elementary District	O C Johnson School	Non-CL
Gilbert Unified District	Oak Tree Elementary	Non-CL
Peoria Unified School District	Oakwood Elementary School	CL
Peoria Unified School District	Oasis Elementary School	CL
Mesa Unified District	O'Connor Elementary School	CL
Sunnyside Unified District	Ocotillo Elementary School	CL
Washington Elementary School District	Ocotillo School	Non-CL
Catalina Foothills Unified District	Orange Grove Middle School	CL
Balsz Elementary District	Orangedale Elementary School	Non-CL
Isaac Elementary District	P T Coe Elementary School	Non-CL
Page Unified District	Page Middle School	Non-CL
Amphitheater Unified District	Painted Sky Elementary School	CL
Cartwright Elementary District	Palm Lane	Non-CL
Litchfield Elementary District	Palm Valley Elementary	CL
Washington Elementary School District	Palo Verde Middle School	Non-CL
Casa Grande Elementary District	Palo Verde School	Non-CL
Creighton Elementary District	Papago School	CL
Deer Valley Unified District	Park Meadows Elementary School	Non-CL
Peoria Unified School District	Parkridge Elementary	CL

Deer Valley Unified District	Paseo Hills Elementary	Non-CL
Peoria Unified School District	Paseo Verde Elementary School	CL
Chandler Unified District	Pathways Learning Center	CL
Mesa Unified District	Patterson Elementary	CL
Gilbert Unified District	Patterson Elementary School	Non-CL
Payson Unified District	Payson Elementary School	CL
Pendergast Elementary District	Pendergast Elementary School	CL
Peoria Unified School District	Peoria Elementary School	CL
Cartwright Elementary District	Peralta School	Non-CL
Apache Junction Unified District	Peralta Trail Elementary School	CL
Phoenix Elementary District	Phoenix Prep Academy	Non-CL
Scottsdale Unified District	Pima Elementary School	CL
Paradise Valley Unified District	Pinnacle Peak Elementary	Non-CL
Gilbert Unified District	Pioneer Elementary School	Non-CL
Peoria Unified School District	Pioneer School	CL
Tucson Unified District	Pistor Middle School	Non-CL
Gilbert Unified District	Playa del Rey Elementary School	Non-CL
Mesa Unified District	Pomeroy Elementary School	CL
Tolleson Elementary District	Porfirio H. Gonzales Elementary School	CL
Mesa Unified District	Porter Elementary School	CL
Mesa Unified District	Poston Junior High School	CL
Mesa Unified District	Powell Junior High School	CL
Higley Unified District	Power Ranch Elementary	Non-CL
Sierra Vista Unified District	Pueblo Del Sol Elementary School	Non-CL
Isaac Elementary District	Pueblo Del Sol Middle School	Non-CL
Scottsdale Unified District	Pueblo Elementary School	CL
Crane Elementary District	Pueblo Elementary School	CL
Paradise Valley Unified District	Quail Run Elementary School	Non-CL
Marana Unified District	Quail Run Elementary School	Non-CL
Littleton Elementary District	Quentin Elementary School	Non-CL
Alhambra Elementary District	R E Simpson School	Non-CL
Yuma Elementary District	R Pete Woodard Jr High School	Non-CL
Litchfield Elementary District	Rancho Santa Fe Elementary School	CL
Crane Elementary District	Rancho Viejo Elementary School	CL
Mesa Unified District	Red Mountain Ranch Elementary	CL
Mesa Unified District	Redbird Elementary School	CL
Tucson Unified District	Reynolds Elementary School	Non-CL
Mesa Unified District	Rhodes Junior High School	CL
Amphitheater Unified District	Richard B Wilson Jr School	CL
Payson Unified District	Rim Country Middle School	CL
Gadsden Elementary District	Rio Colorado Elementary School	Non-CL
Pendergast Elementary District	Rio Vista Elementary	CL
Amphitheater Unified District	Rio Vista Elementary School	CL
Chandler Unified District	Robert and Danell Tarwater Elementary	CL
Flowing Wells Unified District	Robert Richardson Elementary School	CL
Tucson Unified District	Robins Elementary School	Non-CL
Mesa Unified District	Robson Elementary School	CL
Tucson Unified District	Rogers Elementary School	Non-CL
Yuma Elementary District	Ron Watson Middle School	Non-CL
Crane Elementary District	Ronald Reagan Fundamental School	CL

Mesa Unified District	Roosevelt Elementary School	CL
Washington Elementary School District	Royal Palm Middle School	Non-CL
Chandler Unified District	Rudy G Bologna Elementary	CL
Saddle Mountain Unified School District	Ruth Fisher Elementary School	Non-CL
Safford Unified District	Ruth Powell Elementary School	CL
Sunnyside Unified District	S.T.A.R. Academic Center	CL
Safford Unified District	Safford Middle School	CL
Casa Grande Elementary District	Saguaro Elementary School	Non-CL
Peoria Unified School District	Sahuaro Ranch School	CL
Crane Elementary District	Salida Del Sol Elementary	CL
Mesa Unified District	Salk Elementary School	CL
Tucson Unified District	Sam Hughes Elementary	Non-CL
Gadsden Elementary District	San Luis Middle School	Non-CL
Chandler Unified District	San Marcos Elementary School	CL
Higley Unified District	San Tan Elementary	Non-CL
Coolidge Unified District	San Tan Heights Elementary	Non-CL
Chandler Unified District	Sanborn Elementary School	CL
Paradise Valley Unified District	Sandpiper Elementary School	Non-CL
Sunnyside Unified District	Santa Clara Elementary School	CL
Peoria Unified School District	Santa Fe Elementary School	CL
Fowler Elementary District	Santa Maria Middle School	Non-CL
Chandler Unified District	Santan Junior High School	CL
Litchfield Elementary District	Scott L Libby Elementary School	CL
Scottsdale Unified District	Sequoia Elementary School	CL
Gilbert Unified District	Settlers Point Elementary	Non-CL
Alhambra Elementary District	Sevilla Primary School	Non-CL
Alhambra Elementary District	Sevilla West School	Non-CL
Washington Elementary School District	Shaw Butte School	Non-CL
Paradise Valley Unified District	Shea Middle School	Non-CL
Tolleson Elementary District	Sheely Farms Elementary School	CL
Mesa Unified District	Shepherd Junior High School	CL
Show Low Unified District	Show Low Intermediate School	CL
Show Low Unified District	Show Low Junior High School	CL
Show Low Unified District	Show Low Primary School	CL
Chandler Unified District	Shumway Elementary School	CL
Sunnyside Unified District	Sierra Middle School	CL
Deer Valley Unified District	Sierra Verde Elementary	Non-CL
Sierra Vista Unified District	Sierra Vista Middle School	Non-CL
Phoenix Elementary District	Silvestre S Herrera School	Non-CL
Mesa Unified District	Sirrine Elementary School	CL
Peoria Unified School District	Sky View Elementary School	CL
Mesa Unified District	Smith Junior High School	CL
Lake Havasu Unified District	Smoketree Elementary School	Non-CL
Tucson Unified District	Soleng Tom Elementary School	Non-CL
Somerton Elementary District	Somerton Middle School	Non-CL
Gilbert Unified District	Sonoma Ranch Elementary School	Non-CL
Paradise Valley Unified District	Sonoran Sky Elementary School	Non-CL
Pendergast Elementary District	Sonoran Sky Elementary School	CL
Cave Creek Unified District	Sonoran Trails Middle School	CL
Mesa Unified District	Sousa Elementary School	CL

Flagstaff Unified District	South Beaver Elementary School	CL
Gilbert Unified District	South Valley Jr. High	Non-CL
Roosevelt Elementary District	Southwest Elementary School	Non-CL
Gadsden Elementary District	Southwest Jr. High School	Non-CL
Gilbert Unified District	Spectrum Elementary	Non-CL
Creighton Elementary District	Squaw Peak Elementary School	CL
Cartwright Elementary District	Starlight Park School	Non-CL
Lake Havasu Unified District	Starline Elementary School	Non-CL
Deer Valley Unified District	Stetson Hills Elementary	Non-CL
Mesa Unified District	Stevenson Elementary School	CL
Flagstaff Unified District	Sturgeon Cromer Elementary School	CL
Sunnyside Unified District	Summit View Elementary	CL
Fowler Elementary District	Sun Canyon School	Non-CL
Peoria Unified School District	Sun Valley School	CL
Peoria Unified School District	Sundance Elementary School	CL
Washington Elementary School District	Sunnyslope Elementary School	Non-CL
Fowler Elementary District	Sunridge Elementary School	Non-CL
Mesa Unified District	Sunridge Learning Center	CL
Catalina Foothills Unified District	Sunrise Drive Elementary School	CL
Bullhead City Elementary District	Sunrise Elementary	Non-CL
Deer Valley Unified District	Sunrise Elementary School	Non-CL
Paradise Valley Unified District	Sunrise Middle School	Non-CL
Paradise Valley Unified District	Sunset Canyon School	Non-CL
Pendergast Elementary District	Sunset Ridge	CL
Deer Valley Unified District	Sunset Ridge Elementary	Non-CL
Washington Elementary School District	Sunset School	Non-CL
Cartwright Elementary District	Sunset School	Non-CL
Scottsdale Unified District	Supai Middle School	CL
Apache Junction Unified District	Superstition Mountain Elementary School	CL
Gilbert Unified District	Superstition Springs Elementary	Non-CL
Dysart Unified District	Surprise Elementary School	CL
Washington Elementary School District	Sweetwater School	Non-CL
Vail Unified District	Sycamore Elementary School	Non-CL
Chandler Unified District	T. Dale Hancock	CL
Mesa Unified District	Taft Elementary School	CL
Tanque Verde Unified District	Tanque Verde Elementary School	CL
Scottsdale Unified District	Tavan Elementary School	CL
Gilbert Unified District	Technology and Leadership Academy	Non-CL
Deer Valley Unified District	Terramar Elementary	Non-CL
Flagstaff Unified District	Thomas M Knoles Elementary School	CL
Dysart Unified District	Thompson Ranch Elementary	CL
Marana Unified District	Thornycroft Elementary School	Non-CL
Apache Junction Unified District	Thunder Mountain Middle School	CL
Lake Havasu Unified District	Thunderbolt Middle School	Non-CL
Somerton Elementary District	Tierra Del Sol Elementary School	Non-CL
Cartwright Elementary District	Tomahawk School	Non-CL
Scottsdale Unified District	Tonalea Elementary School	CL
Marana Unified District	Tortolita Middle School	Non-CL
Sierra Vista Unified District	Town & Country Elementary School	Non-CL
Window Rock Unified District	Tse Ho Tso Intermediate Learning Center	CL

Window Rock Unified District	Tse Ho Tso Middle School	CL
Window Rock Unified District	Tse Ho Tso Primary Learning Center	CL
Marana Unified District	Twin Peaks Elementary School	Non-CL
Tucson Unified District	Utterback Middle School	Non-CL
Roosevelt Elementary District	V H Lassen Elementary School	Non-CL
Gilbert Unified District	Val Vista Lakes Elementary School	Non-CL
Crane Elementary District	Valley Horizon Elementary School	CL
Roosevelt Elementary District	Valley View School	Non-CL
Tucson Unified District	Van Horne Elementary School	Non-CL
Nogales Unified District	Vasquez De Coronado Francisco School	Non-CL
Catalina Foothills Unified District	Ventana Vista Elementary School	CL
Litchfield Elementary District	Verrado Middle School	CL
Pendergast Elementary District	Villa De Paz Elementary School	CL
Sierra Vista Unified District	Village Meadows Elementary School	Non-CL
Deer Valley Unified District	Village Meadows Elementary School	Non-CL
Paradise Valley Unified District	Village Vista Elementary School	Non-CL
Paradise Valley Unified District	Vista Verde Middle School	Non-CL
Tucson Unified District	W Arthur Sewel Elementary School	Non-CL
Flagstaff Unified District	W F Killip Elementary School	CL
Tucson Unified District	W V Whitmore Elementary School	Non-CL
Tucson Unified District	Wakefield Middle School	Non-CL
Florence Unified School District	Walker Butte K-8	Non-CL
Flowing Wells Unified District	Walter Douglas Elementary School	CL
Mesa Unified District	Washington Elementary School	CL
Washington Elementary School District	Washington Elementary School	Non-CL
Mesa Unified District	Webster Elementary School	CL
Chandler Unified District	Weinberg Elementary School	CL
Flagstaff Unified District	Weitzel's Puente de Hozho Bilingual Magnet School	CL
Dysart Unified District	West Point Elementary	CL
Liberty Elementary District	Westar Elementary School	Non-CL
Litchfield Elementary District	Western Sky Middle School	CL
Fowler Elementary District	Western Valley Elementary School	Non-CL
Fowler Elementary District	Western Valley Middle School	Non-CL
Pendergast Elementary District	Westwind Intermediate School	CL
Pendergast Elementary District	Westwind Primary	CL
Alhambra Elementary District	Westwood Primary School	Non-CL
Tucson Unified District	Wheeler Elementary School	Non-CL
Paradise Valley Unified District	Whispering Wind School	Non-CL
Mesa Unified District	Whitman Elementary School	CL
Mesa Unified District	Whittier Elementary School	CL
Phoenix Elementary District	Whittier Elementary School	Non-CL
Litchfield Elementary District	Wigwam Creek Middle School	CL
Avondale Elementary District	Wildflower School	Non-CL
Murphy Elementary District	William R Sullivan Elementary School	Non-CL
Creighton Elementary District	William T Machan Elementary School	CL
Wilson Elementary District	Wilson Elementary School	Non-CL
Mesa Unified District	Wilson Elementary School	CL
Window Rock Unified District	Window Rock Elementary School	CL
Amphitheater Unified District	Winifred Harelson Elementary School	CL
Tucson Unified District	Wrightstown Elementary	Non-CL

Scottsdale Unified District
Mesa Unified District
Scottsdale Unified District
Peoria Unified School District

Yavapai Elementary School
Zaharis Elementary
Zuni Elementary School
Zuni Hills Elementary School

CL
CL
CL
CL

Appendix B: Summary of Career Ladder Research

ARIZONA CAREER LADDER PROGRAM RESEARCHED RESULTS, 1985 - 2002

Prepared by: Edna Nehrmeyer, Flowing Wells School District, Tucson, Arizona

1989: Mary Walton Braver (ASU), (Career Ladder Pilot Project)

Analysis of the impact of the Career Ladder on student academic achievement using a comparison of prior to and following implementation:

- 1) Average student achievement in Career Ladder districts showed a definite increase after Career Ladder was introduced. The change in achievement level was consistent for each of the three years after Career Ladder implementation
- 2) Average student achievement in Career Ladder districts exceeds that in non-Career Ladder districts. The difference in average student achievement between the two types of districts increases after the introduction of Career Ladder in favor of the Career Ladder districts

1990: Packard and Dereshiwsky

Positive outcomes were noted for Career Ladder teachers related to:

- 1) student achievement
- 2) curriculum and instruction and
- 3) teacher skills development and leadership.

In the area of student achievement and production outcomes, Career Ladder teachers demonstrated a/an:

- Increased ability to document pre- and post-tests and to assess associated gain scores.
- Increased ability to define measurable outcomes in “hard to quantify areas” (e.g., art, music, phys/ed).
- Greater emphasis on student achievement documented in teachers’ action plans.
- Increased documentation of standardized test results.
- Greater satisfaction, self-pride, and sense of accomplishment relative to student achievement gain-score assessment.

In the area of curriculum/instruction/student achievement measurement, Career Ladder teachers demonstrated:

- Tangible, ongoing curriculum alignment with district objectives.
- Creation of locally developed assessment tools.
- Increased focus on higher quality content, skills, classroom materials, and instructional strategies.
- Heightened teacher and administrator awareness of the overall importance of sound curriculum development.

1992-93: Datasphere Inc.

Results of a survey distributed to school board members, administrators, career ladder teachers, and non-career ladder teachers concerning the impact of the Career Ladder Program on student progress and achievement:

“Teachers and administrators believe there are very positive impacts on student achievement as a result of the Plan. They attribute this belief to five aspects of the Career Ladder Plan:

- 1) increased attention to sequenced instruction
- 2) better teacher organization for instruction
- 3) attention to higher order thinking skills
- 4) preparation of better curriculum materials and
- 5) general strengthening of schools’ instructional programs.”

1994: Sloat

The following information resulted from an examination of student achievement in the original 14 Group 1 Career Ladder Districts. In comparing student achievement in Career Ladder districts with student achievement in non-Career Ladder districts:

A. Career Ladder districts out-performed non-Career Ladder districts in four areas:

- 1) Drop out rate – From 0.04% to 1.86% lower dropout rates in Career Ladder districts between 1985-86 and 1991-92
- 2) Graduation rate – 5% higher graduation rates for Career Ladder districts in 1991 and 8% higher in 1992
- 3) ITBS Composite NCE scores – 7.95% higher Composite NCE Scores in Career Ladder districts in 1988, 8.14% higher in 1990, and 9.10% higher in 1991
- 4) 1993 ASAP Average Scores – Ranges from 4.67% to 5.81% higher Grade 8 Average ASAP Scores in 1993 Reading, Mathematics, and Writing assessments.

B. In comparing the actual and predicted students’ NCE scores for students in Career Ladder Districts with those in non-Career Ladder districts, students in non-Career Ladder districts scored slightly above predicted scores (.417 NCE points higher than predicted) and students in Career Ladder districts scored even higher (1.45 NCE points higher than predicted).

In comparing student achievement in Career Ladder teachers’ classrooms with student achievement in non-Career Ladder teachers’ classrooms:

A. In 12 of the 14 Career Ladder districts, the students receiving instruction from teachers participating in Career Ladder programs had higher achievement K-6 than students receiving instruction from non-Career Ladder teachers.

B. Across all districts, the NCE scores for students receiving instruction from Career Ladder teachers were 1.7 percent higher than the NCE scores for students in non-CL classrooms.

1998: Arizona Career Ladder Program : Teacher Perception Survey

Positive responses on a statewide survey indicated a perception among Career Ladder teachers that the Career Ladder Program has a positive impact on student achievement. Twenty-seven of the twenty-eight districts participating in the Career Ladder Program responded to the survey.

Sample Survey Items	Percent Indicating Strongly Agree and Agree
The Career Ladder Program promotes	
effective practices to monitor student achievement	87%
the attainment of district and state student standards	84%
higher level thinking skills appropriately in instruction	88%
strategies to engage all students in learning during instruction	86%
the use of effective instructional strategies	78%
the use of research based instructional methodologies	75%
the improvement of student achievement	88%

1999: Danzig

All 28 participating Career Ladder districts are designed with multiple steps and levels, demonstrating a career cycle for teachers with expectations for contributions greater than just “years of experience”.

An essential aspect of every district’s plan is the focus on teaching and monitoring of student outcomes.

2002: Sloat

The following resulted from the comparative study between the 28 Career Ladder districts and the Non-Career Ladder districts:

In comparing student achievement between Career Ladder and non-Career Ladder districts on the spring 2001 Stanford 9 assessment, Grades 2 through 8, Reading, Language, and Mathematics:

- A. Career Ladder districts out-performed non-Career Ladder districts at every grade level, 2-8, in Reading, Language, and Mathematics as indicated by the median scores.
- B. Career Ladder districts out-performed non-Career Ladder districts at every grade level, 2nd through 8th, in Reading, Language, and Mathematics as indicated by the mean NCE scores. The level of difference indicated was SIGNIFICANT, statistically speaking, at all grade levels and in all subject areas except for 6th grade Reading.