



**Bridge to Advanced Technological Education Project:
External Evaluation of the Chicago Manufacturing Technology Bridge Program¹
1997-1999**

Executive Summary

Since 1997, the Chicago Manufacturing Technology Bridge program has successfully prepared educationally disadvantaged residents of high-poverty communities for advanced technology careers and post-secondary technical education. One of the program's four sites, the Instituto del Progreso Latino, has had sufficient staff and resources to operate the program effectively and is therefore a model for future implementation. Outcomes for participants at this site are as follows:

- 65% graduation rate
- Mean increase in TABE math scores of 2.2
- Mean increase in TABE reading scores of 1.1
- 85% job placement rate for graduates
- 95% health care benefits rate for placed graduates
- Mean starting hourly wage of \$9.46
- Mean increase in wage over participants' most recent job of \$1.48
- 27% enrollment rate in post-secondary education rate for graduates

Although the Bridge program has been successful overall in placing its graduates in livable wage jobs, it is most successful in placing those with a good work history. It has not been successful in placing those who have been on welfare. Among participants with prior manufacturing experience, those who have worked in manufacturing for a long period of time and have earned relatively high wages are the most successful. One factor that seems to lead to success in post-program employment and enrollment in post-secondary education, regardless of employment history, is high math scores.

¹ This project was funded by a grant from the National Science Foundation's Advanced Technological Education Program.

1. Introduction

This report presents the findings of an external evaluation of the Chicago Manufacturing Technology Bridge training program conducted by the Academy for Educational Development as part of the Bridge to Advanced Technological Education project. The purpose of the project is to develop and evaluate “bridge” training programs which are designed to prepare educationally disadvantaged residents of high-poverty communities for advanced technology careers and post-secondary technical education. The project is being carried out by a partnership of universities, community colleges, community organizations and industry groups in Chicago and Detroit and is funded by the National Science Foundation’s Advanced Technological Education Program. More information is available on the project’s web site at www.uic.edu/cuppa/techbridge.

This report focuses on the Chicago Manufacturing Technology Bridge program, which is Chicago pilot for the project. Since its inception in March 1997, the Chicago MT Bridge program has admitted 256 students, most of whom are poor, minority, undereducated men with a sporadic employment history.² The average family income is \$11,777 per year;³ 26% of enrollees have been on welfare. Ninety-six percent are either African American or Hispanic, 36% have a high school diploma or GED, and 34% were employed at the start of the program. Overall, the Bridge program has succeeded in routing these participants into career-track jobs. It has been especially successful for participants with a history of stable employment.

² This evaluation covers the first nine cohorts of the Chicago Manufacturing Technology Bridge Program. There have been a total of 11 cohorts. The two most recent ones, however, began their course in August 1999 and there is not enough data to analyze their performance in this paper except that one of the cohorts, which graduated in December 1999, was included in the enrollment count and graduation rate noted above.

³ The average annual income per member of enrollee’s families is \$3,694; the median family size is three members.

The following section of this evaluation examines the performance of participants at all Chicago program sites.⁴ The next section focuses on the Instituto site because it was the only site with adequate staffing and facilities. The last section draws conclusions about the performance of the Bridge program and offers recommendations for improvement.

2. Performance Measures of Bridge Program – All Enrollment Sites Included

The Bridge program has been effective for a majority of the students but has been especially effective for those with a history of stable employment. Sixty five percent of participants completed the program; two-thirds of these graduates were placed in jobs and 32% went on to enroll in post-secondary education.⁵ On average, program participants significantly increased their scores on both math and reading TABE tests and received a significantly higher wage upon placement than they had received in their previous jobs. Ninety percent of those placed in a job received health coverage. The most successful participants – those who completed the program and either were placed in a job earning more than they had earned previously or enrolled in a post-secondary education program – were likely to have had a higher wage relative to other Bridge participants in their previous job and unlikely to have ever been on welfare. The Bridge program is most successful with individuals who have work experience and are thus work-ready, as opposed to those with limited employment histories. The following sections discuss the program completion rate, reading and math score increases, enrollment in post-secondary

⁴ The four sites were Instituto del Progreso Latino, a community organization in the Pilsen/Little Village of Chicago, Mexican Community Committee (MCC), an organization in South Chicago, Mr. Malo's Youth Center on the Far South Side, and Daley College, one of the City Colleges of Chicago, on the Southwest Side

education programs, rates of job placement and health coverage, and placement wage. A profile of successful participants and a comparison among cohorts are also presented.

2.1. Program Completion Rate

Sixty five percent of enrollees completed the Bridge program. Participants who completed the program were more likely than non-completers to have a solid employment history. Having been in a previous job for many years, never having been on welfare, never having committed a felony, having held a manufacturing position in the past, and having a relatively

good wage in previous positions

all predisposed a participant to

graduate. By dividing

participants into two groups, the

importance of employment

history is obvious. Participants

who have never been on welfare,

never committed a felony, and

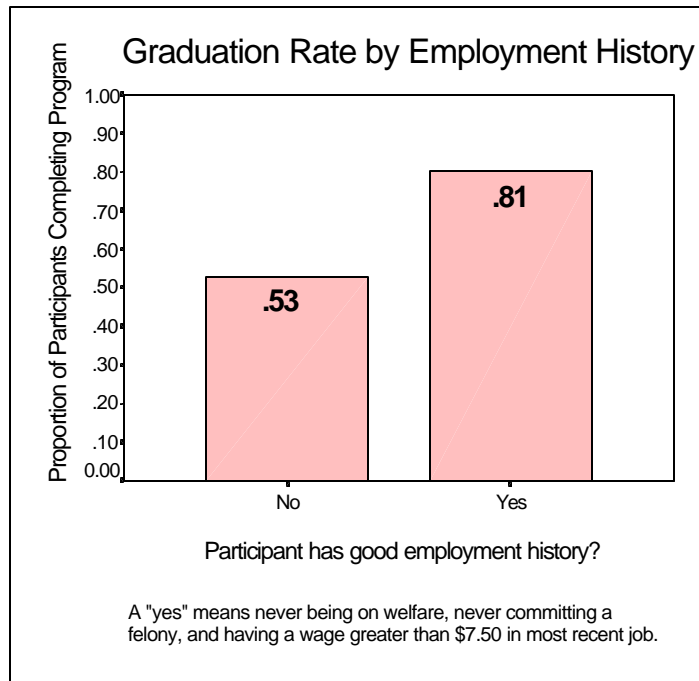
who earned more than \$7.50 per

hour in their most recent job were more likely than other participants to graduate: 81% of

these participants completed the program while just 53% of other participants did. Using

a binomial comparison, this difference is significant at the 99% level. (See attached

appendix for test results).



⁵ The participants in these two categories overlap: many graduates who enrolled in higher education also were placed in jobs.

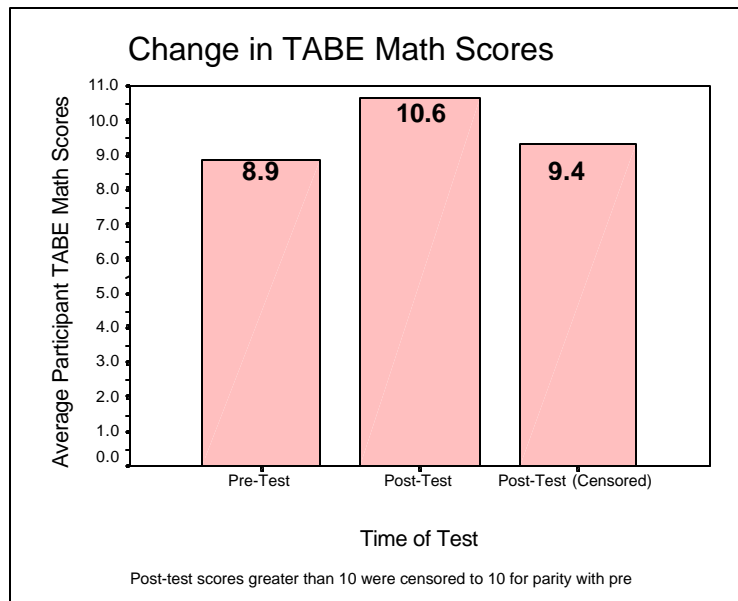
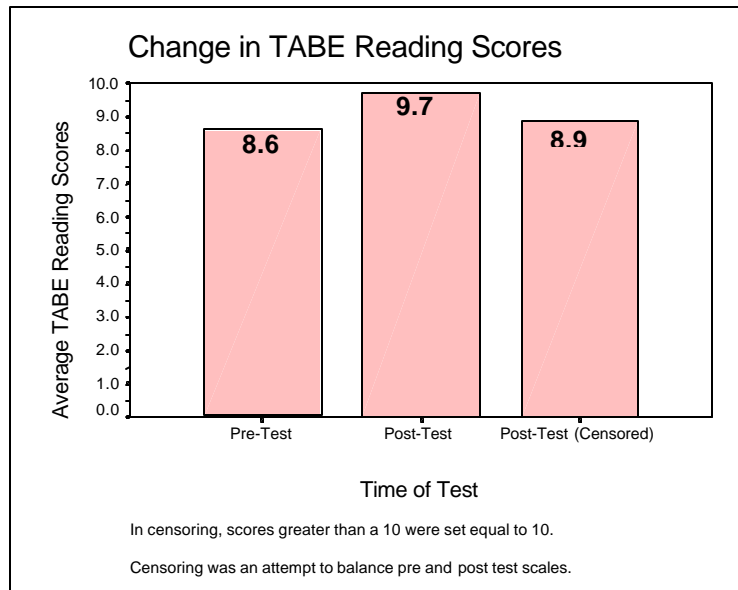
2.2. Reading and Math Test Scores

The average Bridge participant increased his scores in both the math and reading TABE. These increases were significant at the 95% level. (See appendix for table for the results of paired sample t-tests; note that only 83 participants took the post tests).

The average reading scores increased from 8.6 to 9.7 while the average math score rose from 8.9 to 10.6. The post-test was graded on a different scale than the pre-test, allowing participants to score ten or higher on the post-test which was not possible on the pre-test.

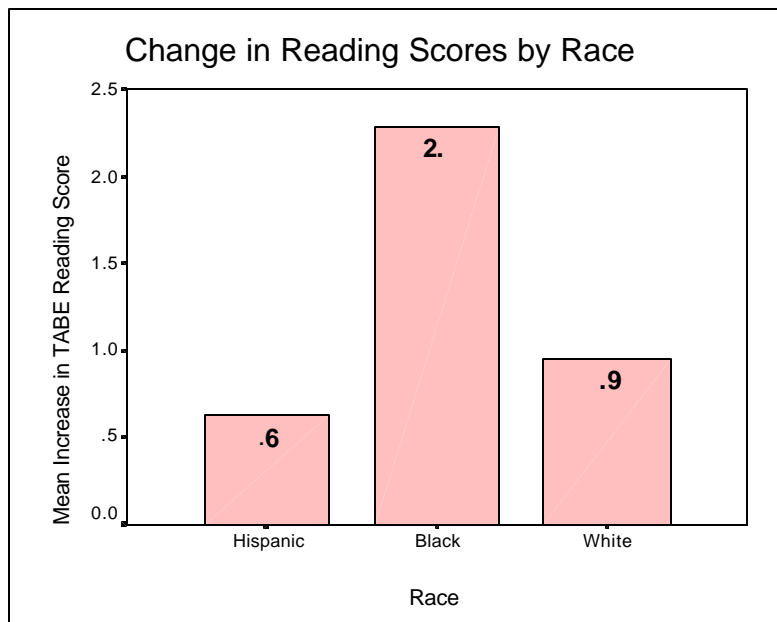
To account for this difference,

UIC principal investigators assigned a post-test score of 9.9 to all participants that scored 10 or higher. As measured by this censored scale, the average post-test scores were 8.9 for reading and 9.4 for math. Forty-three percent of graduates taking the post tests had



both reading and math scores above 9.6, the threshold necessary for admission to Chicago community colleges. Fifty-eight percent of this group increased their scores to this level during the Bridge program; the remainder had sufficiently high scores upon admission.

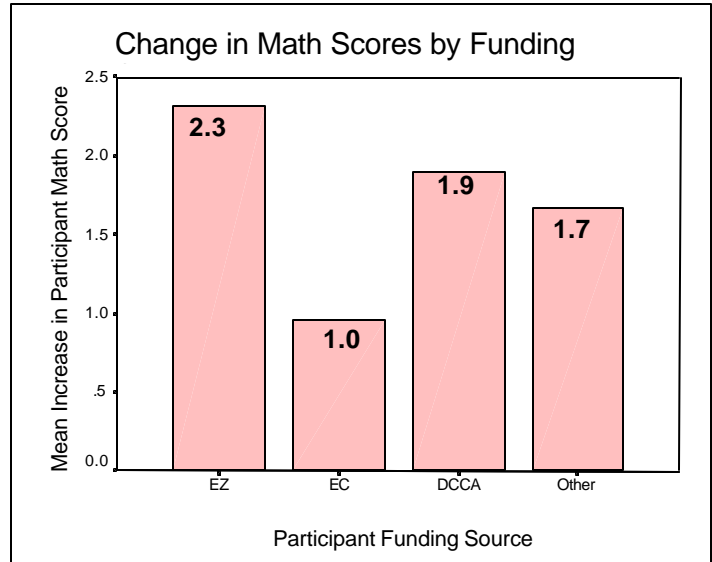
Increases in reading scores were more strongly correlated with race than with any other factor. African American participants increased their uncensored TABE reading scores more than any other group – by an average of 2.28 points.



Meanwhile, Hispanics increased their scores by .62 points and whites by .95. These differences are statistically significant at the 95% level. When pre-test scores are compared with censored post test scores, the differences are not statistically significant. (See appendix for table of the results of paired t-tests).

The low increase among Hispanic participants can probably be explained by low English proficiency. According to program administrators, approximately two-thirds of Hispanic participants are recent immigrants to the United States, many of whom are just learning English. Low reading scores among this sub-group suggests that the English-as-a-Second-Language component of the Bridge program should be bolstered.

Increases in uncensored math scores were most strongly correlated with participant funding source and enrollment site. Participants funded by the Empowerment Zone program, for example, increased their test scores by more than twice as much as participants funded by the Enterprise Community program.



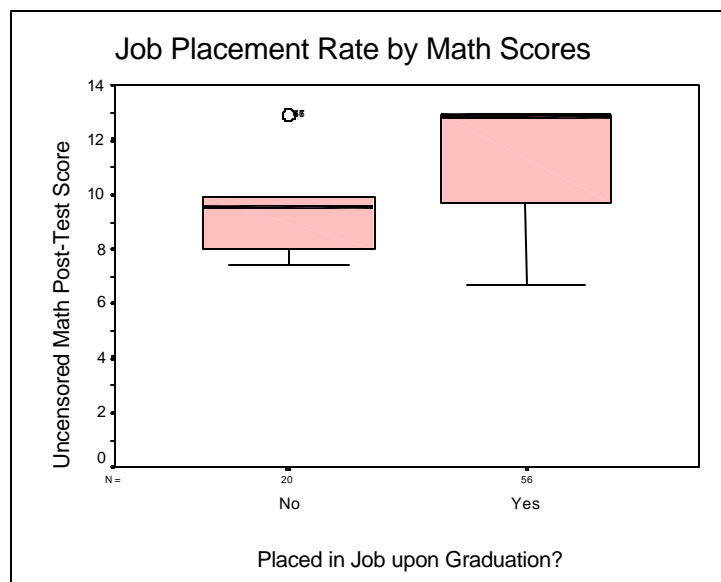
The difference in uncensored math scores between EZ and non-EZ-funded participants is significant at the 95% level. (See appendix for table of the results of paired t-test). Based on conversations with Bridge program administrators and principal investigators, this difference seems to be accounted for by the different types of students funded by each source. Many of the EZ-funded students are immigrants while many EC-funded students are African American or second and third generation Latinos, many of whom were former gang members. Increases in scores also differed significantly among enrollment sites. Students at Instituto increased their uncensored math scores by an average of 2.15 points while those at other sites increased theirs by only .6 points. This difference is significant at the 99% level. (See appendix for results of t-test). This difference may be partly caused by differences in student populations; it is also likely caused by a difference in the quality of math instruction at the sites, an issue raised by principal investigators and program administrators. (A multiple regression shows funding source to be a statistically significant indicator of the change in uncensored math

scores when controlling for participant funding source. Participant funding source was not significant, however, this may be caused by multi-colinearity between the two variables and therefore does not indicate that funding source is not associated with math score changes).

The ability of the Bridge program to bring participants to a basic level of math proficiency is important for job placement. The math post-test scores for those graduates placed in jobs was 11.2 while

those not placed scored an average of 9.5. (See appendix for table of the results of t-test showing this difference to be significant at the 99% level).

Although math scores are likely indicative of other factors that affect employment,



the ability to do basic mathematical calculations is crucial for employees, according to area employers. The ability of the Bridge program to raise math scores may be a way of giving participants a chance at finding a livable wage job regardless of their employment history.

Unfortunately, the Daley and MCC sites did not conduct post-tests; the above-mentioned statistics on test score improvements, therefore, apply only to the Instituto and South Side sites. This lapse makes it impossible to compare student test outcomes among

sites. And it makes it difficult to identify opportunities to improve the reading and math instruction. In the future, all sites should conduct both pre and post tests.

2.3. Enrollment in Post-Secondary Education

Thirty-two percent of Bridge graduates enrolled in a post-secondary institution of education, many in the one of the City Colleges of Chicago (Chicago's community college system). Eighty-two percent of those who enrolled in higher education were also placed in a job upon graduation. Graduates who enrolled in post-secondary education institutions attended slightly more Bridge classes than those who did not enroll, attending 89% of classes compared to 81%. They also had much higher uncensored post test math scores (11.8 compared to 10.2) and uncensored post test reading scores (10.8 compared to 9.5). All of these differences are statistically significant at the 95% level. (See appendix for t-test output).

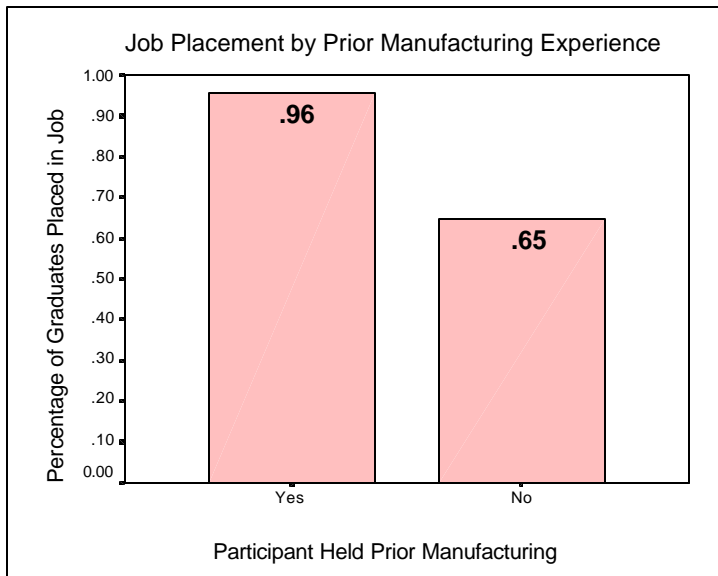
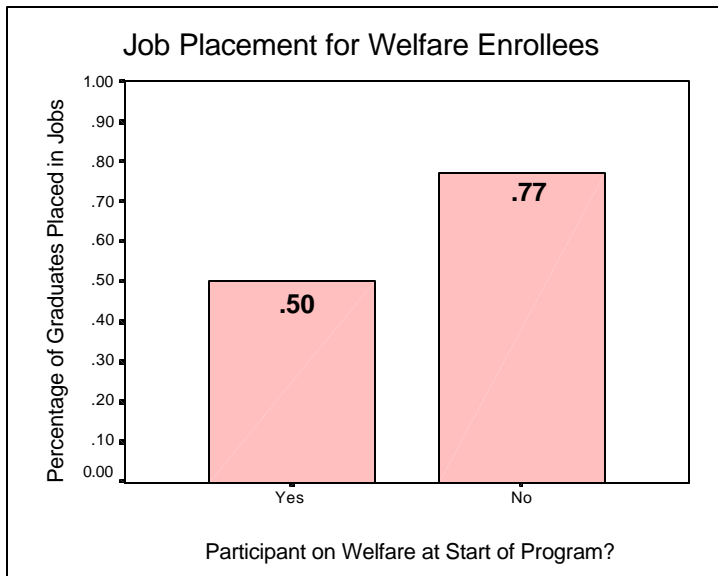
2.4. Job Placement

Of the first 148 graduates, that is, the graduates for all cohorts through March 1999, 101 -- or 68% -- have been placed in jobs as of December 1999. Four others who did not graduate from the program were placed in jobs. Eighty-three graduates were placed in manufacturing positions; all but one of the remaining placed graduates were placed in construction jobs. Eighty-five graduates were placed in jobs with health care coverage. A few significant differences emerge between those placed and those not placed: employment and welfare status, site of instruction and funding source, and race. These

differences are statistically significant at the 95% level. (See appendix for table with the results of t-tests between these groups).

Graduates placed in a job were more likely to be employed upon enrollment – especially in manufacturing positions – and less likely to be on welfare. Eighty-four

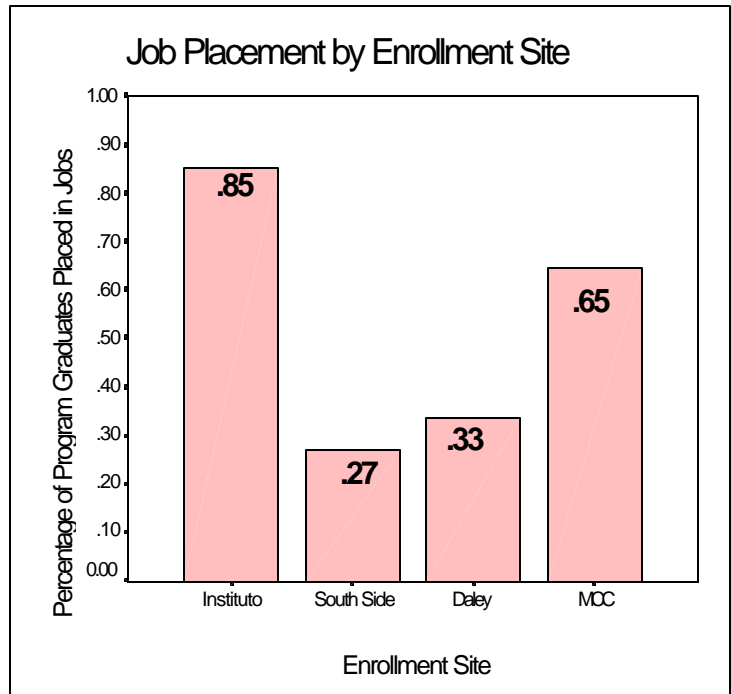
percent of graduates who were employed upon enrollment were placed in a job upon graduation while just 65% of those unemployed upon enrollment were placed. In part, graduates who were already working were more likely to be placed because they remained with the same employer: forty-six percent of the 46 graduates who were employed upon enrollment in the Bridge program kept their job upon graduation. An even higher number – 96% -- of graduates who had had prior manufacturing experience were placed compared



to 65% of those without such experience. Only half of the participants on welfare at the start of the program were placed in a job upon completing the program while 77% of

graduates not on welfare were placed. Program administrators indicated that finding a job for these graduates was more difficult because many lacked transportation to work or childcare, both of which were provided during the program.

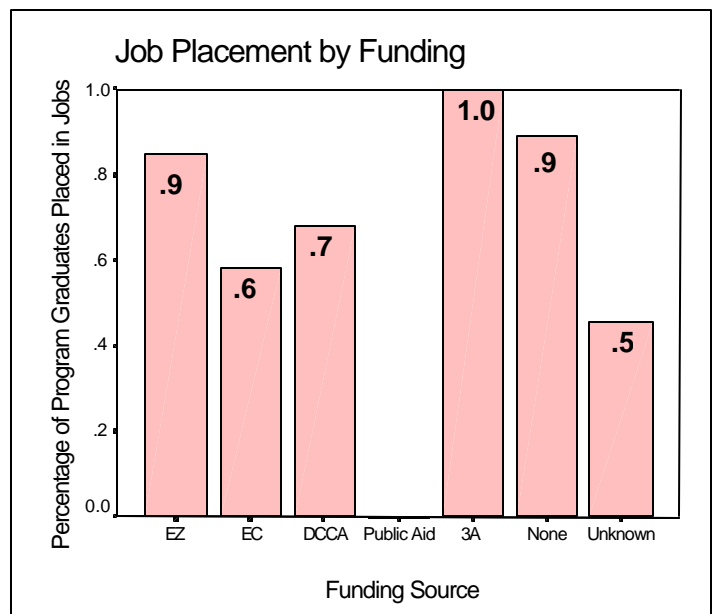
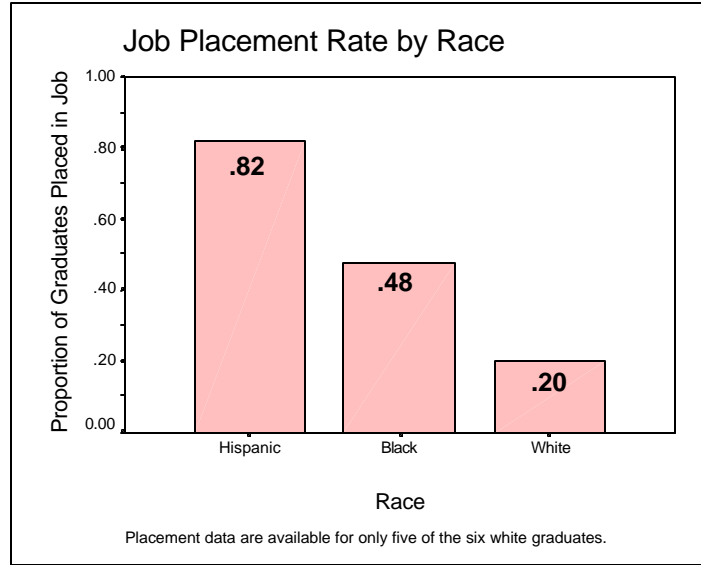
There was tremendous difference in placement rates among sites and a slight difference among funding sources. The Bridge program was offered at four sites in Chicago. Graduates from Instituto were over three times as likely to be placed as those at South Side, the second largest site. Principal investigators at the University of Chicago and



Instituto administrators indicate that Instituto, the largest site, had more staff and better facilities. Not only does Instituto have more participants than any other site, it also has more staff, with two full-time employees and a full-time director, creating an economy of scale by allowing each staff member to specialize in particular tasks. It is also set in a school, as opposed to the South Side site which was set in a storefront, and is attended by students in other programs, creating what the Instituto director called "a culture of learning." The Instituto site had more first-generation immigrants -- who are often driven to succeed -- and more students with prior manufacturing experience. Thus, it may have been more successful in part because of its student population.

Placement rates also differed widely among students sponsored by different

funding sources. The attached graph shows this difference. As noted above in Section 2.2., however, this difference is most likely caused by the difference in student populations funded by each source and the tendency of students funded by certain sources to attend certain sites. Job placement rates differ significantly among races. While just under half of black graduates were placed in a job, eighty-two percent of Hispanic graduates were. Race and enrollment site appear to have an independent effect on placement rate. A logistic regression shows

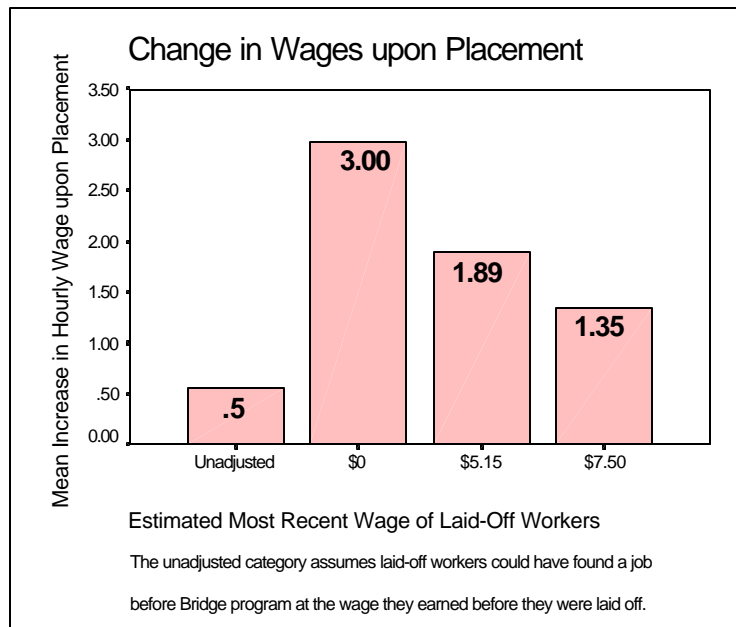


both factors to be highly statistically significant predictors of placement, even while controlling for funding source: being Hispanic and attending Instituto made a graduate more likely to be placed. (See appendix for regression output).

2.5. Placement Wage

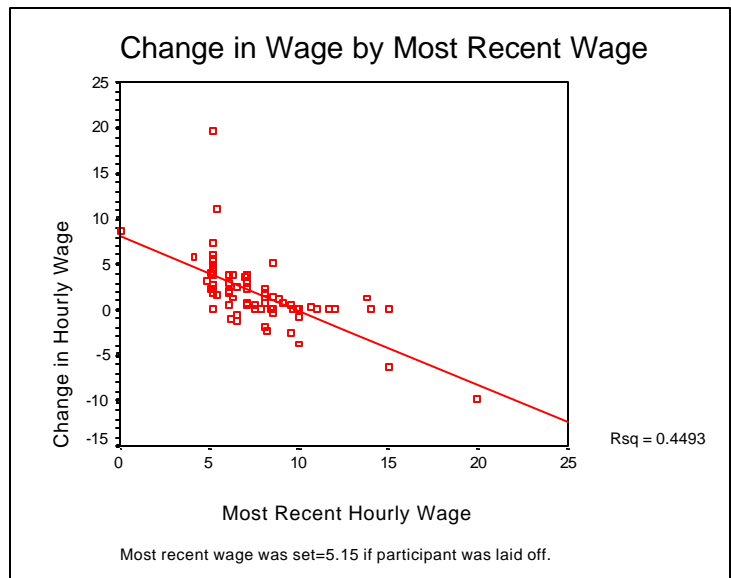
The average Bridge graduate earned \$9.17 per hour upon job placement. Overall, graduates of the Bridge Program earned a higher hourly wage after the program than before; the size of this increase differs depending upon how one measures the pre-program wage of workers on unemployment insurance (assuming that being on unemployment insurance is an indication that a worker was laid off from relatively high-paying manufacturing jobs). If

one considers the wages these workers were earning before they were laid off to be their pre-program wage, the average graduate earned 74 cents more per hour after the program than before. If one assumes that these workers were no longer able to



earn such a high wage and were earning nothing before the program, the average graduate earned \$3.00 more per hour after the program. Finally, if one assumes that laid off participants would have been able to earn at least \$7.50 per hour, because of their extensive work experience and the high demand for workers in Chicago, the average placed graduate increased his wage by \$1.35. This last measure is the probably the most accurate. All of these increases are statistically significant at the 95% level. (See appendix for table with results of statistical tests).

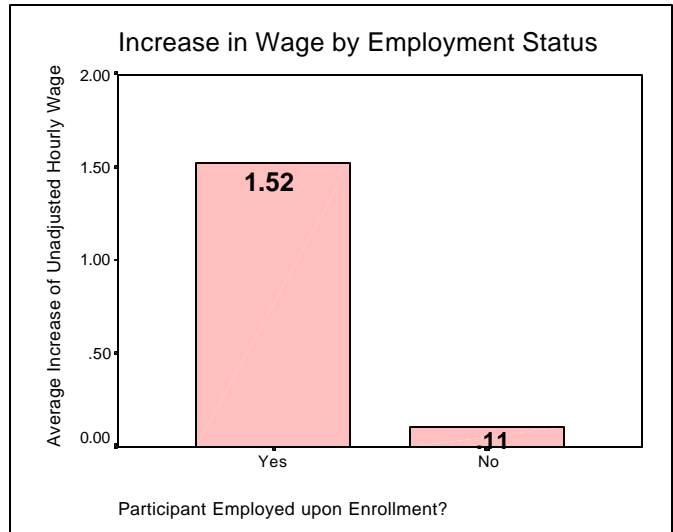
The increase in wage is most strongly associated with a participant's most recent wage. Those with low previous wages are likely to make the biggest gains upon program completion. According to a simple linear regression, participants who earned less than \$9.97 per hour in their previous job were likely to increase their wages upon program completion; those who made more than that were likely to decrease their wage.



This corresponds to the average starting wage for entry-level skilled operators in Chicago of between nine and ten dollars per hour.⁶ Thus, while the Bridge program participants were unlikely to be successful if they had had no prior work experience, they were unlikely to make large increases in their wages if they had a history of relatively high wage jobs. As noted above, however, most participants who once held higher wage jobs and were laid off from those jobs no longer had the opportunity to earn such a wage, because jobs that pay higher wages yet require relatively low levels of skill have disappeared with the restructuring of manufacturing. Even though some of these workers earned less upon placement than they had earned in previous jobs -- as was the case with one-third of them -- the Bridge program was successful since it routed them into a skilled job with career potential.

⁶ "Survey of Hiring Needs and Practices of Chicago Manufacturers." January 1998.

Participants employed upon enrollment increased their placement wage by an average of \$1.52 per hour while those unemployed upon enrollment increased their wage over their most recent position by only 11 cents. (See appendix for results of t-tests showing this difference to be statistically significant at the 95% level). This difference seems to primarily reflect the fact that many of the unemployed workers had been laid off from relatively high-paying



positions; upon placement, many of them earned a lower wage than they were earning before they were laid off. When using a measurement of previous wage that adjusted for the participant having been laid off, the change in wage does not differ in a statistically significant way between those employed upon enrollment and those unemployed upon enrollment. According to the director of the Instituto site, many participants saw receiving a certificate from the Bridge program as a way to advance in their current job. Most of these participants had jobs as low-level machine operators in metalworking plants and advanced to assistant machinists or mechanics. The Bridge program may be particularly appropriate for employees in low-paying, semi-skilled jobs in manufacturing firms who desire to advance to higher-paying, skilled positions.

2.6. Profile of Successful Bridge Participants

Forty-four percent – or 102 of the 232 participants for which there are sufficient data -- graduated⁷ from the Bridge program and either were placed in a job with a higher wage than they had earned previously or enrolled in post-secondary education or both. How do these successful participants differ from the unsuccessful ones? This evaluation hypothesizes that there are three primary measurable differences between successful and unsuccessful participants:

1. Successful participants have a minimum level of prior work experience.
Therefore, having a higher wage in a previous job will increase a person's chances of success while having been on welfare will decrease that person's chances of success.
2. Successful participants will be more likely to be enrolled in the Instituto site, since this site had sufficient resources for staff and adequate facilities.
3. African Americans will be less likely to be successful because of discriminatory hiring practices.

To test these hypotheses, two logistic regression models were formulated.⁸ (See below for model results).

⁷ Two participants who did not graduate were categorized as successes because they were placed in a job with a higher wage.

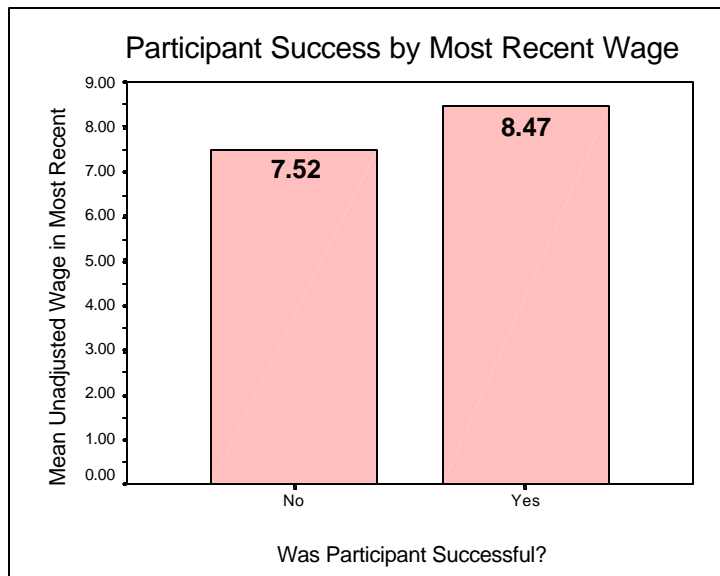
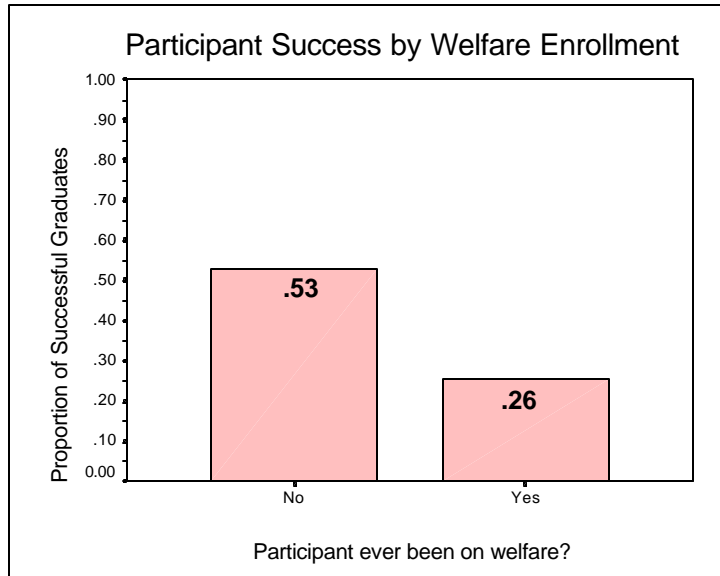
⁸ Because of multi-colinearity between black Hispanic, South Side and Instituto, one variable from each pair could be included in the analysis; one defines the other, however, because the two virtually exhaust the possible values. Because of few observations, previous length of employment and post math scores were excluded from the model, although these variables might have explanatory power. Because gender was colinear with history of welfare enrollment, it also was excluded.

Logistic Regression Model #1							
Number of cases included in the analysis: 165							
-2 Log Likelihood	208.548						
Goodness of Fit	166.292						
Cox & Snell - R ²	.111						
Nagelkerke - R ²	.149						
Dependent Variable: Participant Successful?							
----- Variables in the Equation -----							
Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
INSTITUTO?	.8790	.4185	4.4108	1	.0357	.1028	2.4085
WELFARE?	-.7792	.4503	2.9940	1	.0836	-.0660	.4588
RECENTWAGE	.0984	.0543	3.2904	1	.0697	.0752	1.1034
BLACK?	-.5839	.3742	2.4348	1	.1187	-.0437	.5577
Constant	-1.2660	.6211	4.1555	1	.0415		
Logistic Regression Model #2							
Number of cases included in the analysis: 165							
-2 Log Likelihood	208.220						
Goodness of Fit	166.250						
Cox & Snell - R ²	.113						
Nagelkerke - R ²	.151						
Dependent Variable: Participant Successful?							
----- Variables in the Equation -----							
Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
INSTITUTO?	.8483	.4213	4.0536	1	.0441	.0949	2.3356
WELFARE?	-.7686	.4507	2.9083	1	.0881	-.0631	.4636
RECENTWAGE	.0939	.0544	2.9805	1	.0843	.0656	1.0984
HISPANIC?	.6163	.3707	2.7640	1	.0964	.0579	1.8521
Constant	-1.7998	.6199	8.4304	1	.0037		

This model confirms two of the three above hypotheses and nearly confirms the third.

First, a participant's employment and welfare history have a significant effect on his chances of succeeding in the Bridge Program. Of 43 participants who had ever been on welfare, only 11 succeeded in the program (26%); of 21 on welfare at the start of the program, only two were successful (10%). By comparison, 52% of participants who had never been on welfare were successful. In comparison to its overall success, the Bridge

program is not successful in placing welfare recipients into good jobs. This is not surprising since the Bridge program is not designed to be a welfare-to-work program, rather it is designed as a step beyond welfare to work—from low-wage jobs to living-wage jobs. Likewise, the average most recent wage for successful participants was \$8.47 compared to \$7.52 for unsuccessful ones. Successful participants had a stronger job history prior to enrolling in the Bridge program.⁹



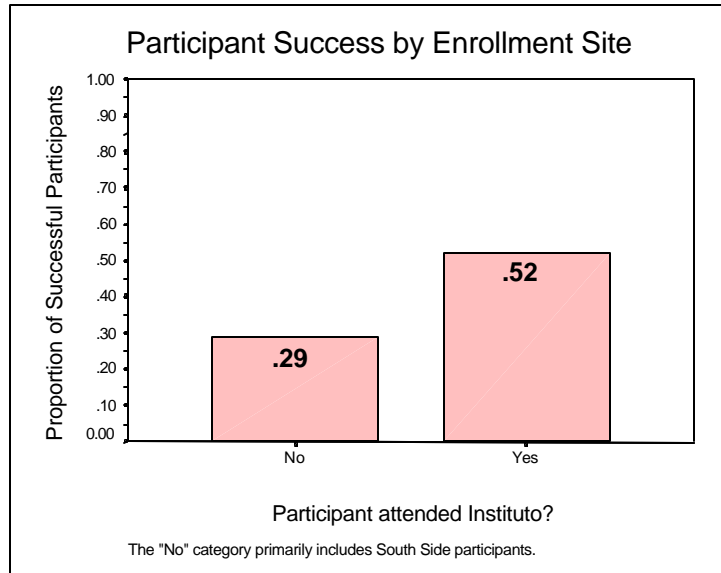
Second, enrollment site

affected participant outcome. Nearly all of the participants with sufficient data for analysis came from either the Instituto or South Side sites; thus, it was only possible to compare these two sites to each other. Attending the Instituto site significantly affected a

⁹ It is likely that graduates who earned very high wages in previous jobs were likely to be less successful (See section 5, “Placement Wage”). The logistic regression model, however, because it uses a categorical instead of a continuous dependent variable (i.e., success or failure), is unlikely to detect such a phenomenon.

participant's chances of success even when holding race constant, an important point considering that the two sites differ greatly in their racial makeup.¹⁰

Finally, this analysis tends to confirm the hypothesis that race affects a participant's chances of



success. There are two attached logistic regression models: one which uses "Black?" as a coefficient and another which uses "Hispanic?" The coefficient for Black was close to being statistically significant at the 90% level (with a p-value of .1187) while the coefficient for Hispanic was statistically significant, when controlling for program site, welfare history, and past wages. Nearly all of the participants were either African American or Hispanic; practically none – only four of the 164 participants analyzed -- were white.

The most successful participants attended Instituto, were never on welfare, had relatively high previous wages, and were Hispanic. According to the second regression model, a participant of Hispanic origin, attending Instituto, who had never been on welfare, and who had previously earned \$7.50 per hour, would have a .59 probability of success. A non-Hispanic who did not attend Instituto, who had been on welfare, and who had earned minimum wage in a previous job, would have a .11 probability of success.

¹⁰ "Other sites" in this case primarily refer to the South Side where most of the non-Instituto participants in this analysis attended.

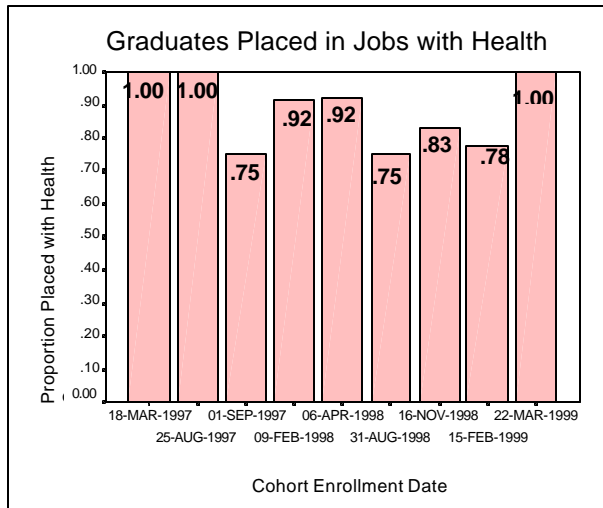
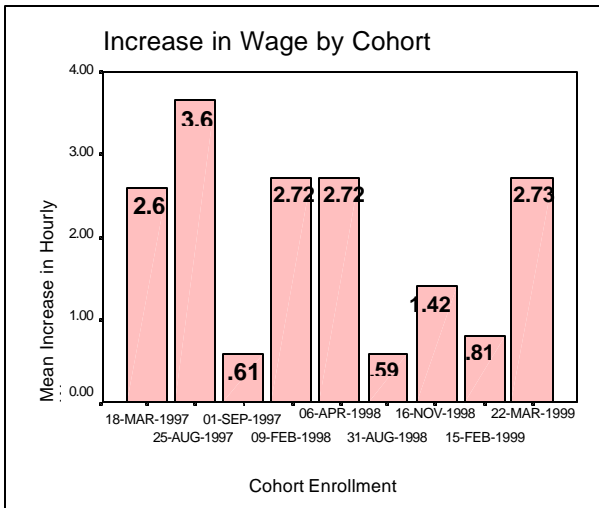
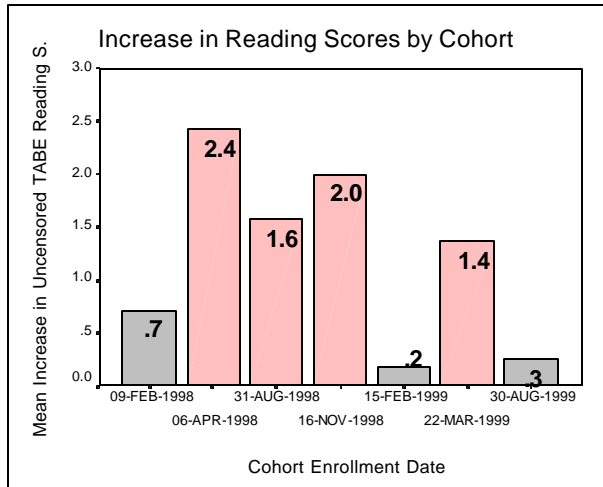
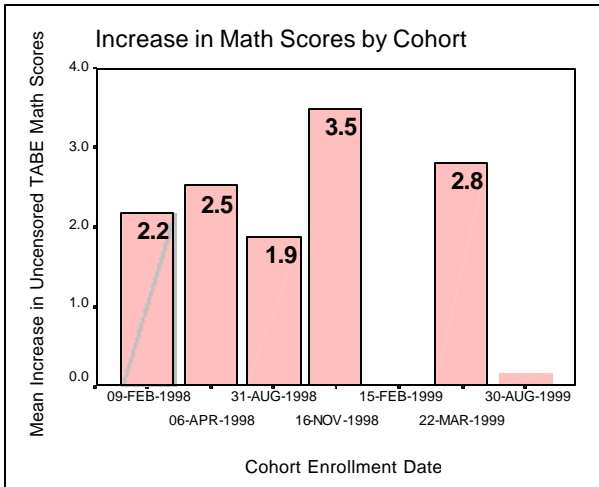
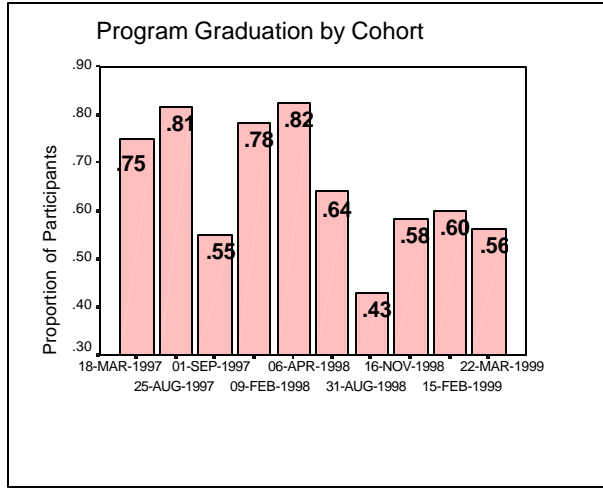
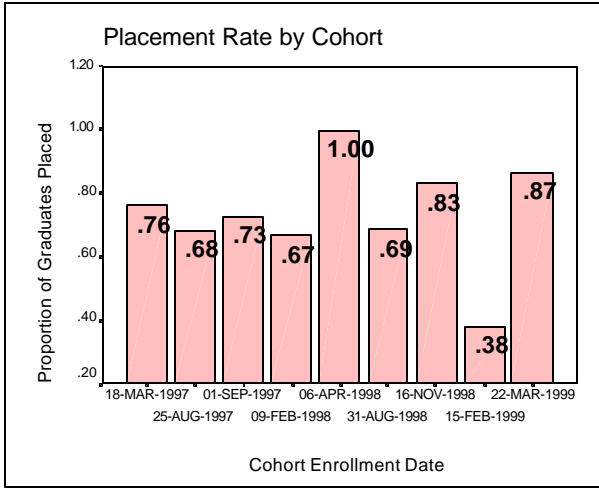
These predictions are very rough, however, since both regression models account for only 15% for the variation in participant success.

It is possible that other factors – such as math ability, previous length of employment, being enrolled at a site other than Instituto or South Side, and gender – affected a participant's success. Indeed, the low R^2 value of .15 indicate this is likely. Unfortunately, because of incomplete data, the first four of the above-mentioned factors could not be included in the analysis. Program administrators should collect these data on participants in future Bridge cohorts. Although data on gender were collected, gender is too highly correlated with welfare history to be able to be included in these regressions. That is, its effects on success could not be differentiated from those of welfare history because a high percentage of female participants had also been on welfare.

2.7. Cohort Comparison

There are no apparent trends in the performance of successive cohorts of Bridge participants, although certain cohorts performed better than others. Participants in the April 6, 1998 cohort outpaced others with the highest increase in reading scores, the highest graduation rate, a perfect placement rate, and the third highest increase in hourly wage (one penny behind the second highest). The August 25, 1997 cohort, with the largest increase in hourly wage, and the March 22, 1999 cohort, with the second highest increase in math scores and hourly wage, were also particularly successful. Ninety-five percent of the participants from these cohorts attended the Instituto site. The least successful cohort was the February 15, 1999 cohort with virtually no increase in math scores, the lowest increase in reading scores, the lowest placement rate, and the third

lowest increase in wage. Sixty percent of the participants in this cohort attended the South Side site.



3. Instituto as a Model Site

Since Instituto is the only site that had all of the necessary success factors – primarily adequate staffing and facilities – it alone can be considered a complete pilot of the Bridge program. If the Bridge program were to be replicated, it should be based on the success of Instituto. For this reason, the following is a review and analysis of the performance outcomes for the Instituto site alone.

3.1. Program Outcomes for Instituto

One hundred and seventy-two participants have enrolled in the Bridge program at Instituto as of December 1999. One hundred and two completed the program, 14 are still enrolled, and 56 dropped out. Thus, 65% of those for which data are available graduated from the Instituto site. Completers and non-completers differ in several ways¹¹: family income, most recent wage, employment upon enrollment, length of previous employment, felony convictions, and vocational training. (See appendix for chart with results of t-tests between these completers and non-completers). The average family income for completers was \$14,198 and for non-completers, \$10,480. Completers earned an average of \$8.27 per hour in their most recent jobs while non-completers earned only \$6.90. Eighty-one percent of those employed upon enrollment graduated compared to 61% of those unemployed upon enrollment. Non-completers had worked an average of only nine months in their most recent job while completers had worked an average of two and one-half years. Finally, 41% of those with a felony conviction graduated while 68%

¹¹ The differences cited here are both statistically significant and large.

of those without such a conviction graduated. Ironically, fewer students with prior vocational training graduated than those without.

Graduates of the Instituto site have been very successful in finding jobs – especially jobs that provide healthcare coverage; a significant, although smaller number,

have gone on to post-secondary education programs. Of the 102 graduates, 85%¹² were placed in jobs¹³ and 27% enrolled in post-secondary education, most of them in a Chicago community college.

Eighty-nine percent of those

enrolled in post-secondary

education were also placed in jobs.

Of those placed in a job, 95% were

placed in a job that provides

healthcare coverage.

The average participant

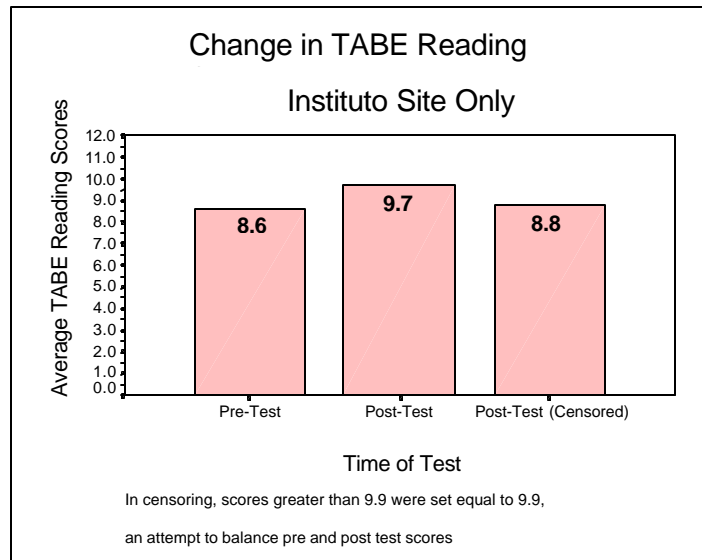
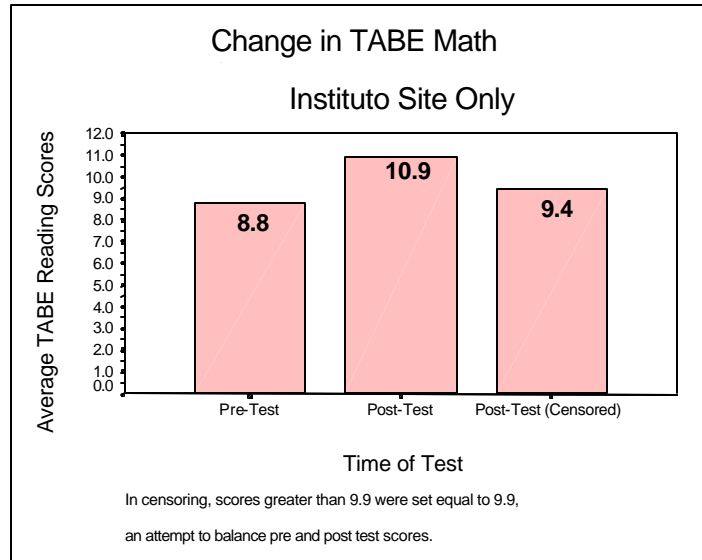
increased his scores on both the

math and reading TABE tests.

Uncensored math scores improved

by an average of 2.2 points and uncensored reading scores by 1.1. (See appendix for t-

test results). These increases were statistically significant at the 99%. Increases between

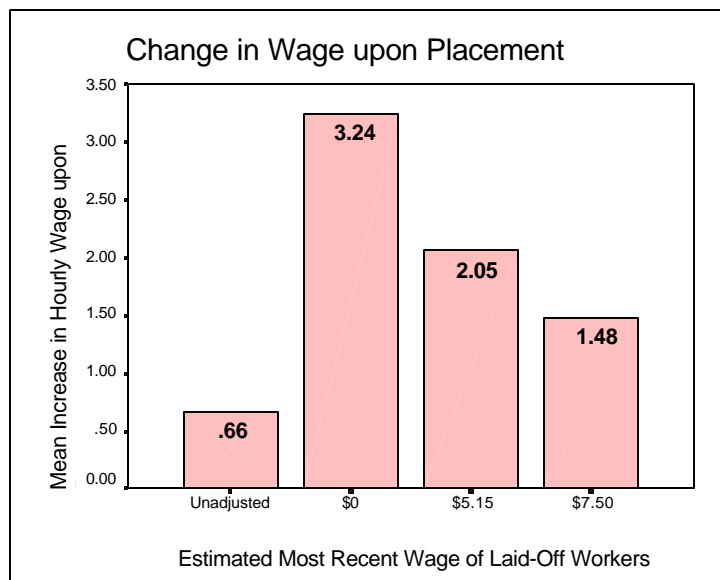


¹² Placement data are missing for nine of the graduates.

pre-tests and censored post-tests, however, averaged only .6 points for math and were not statistically significant for reading. This lack of significant difference is because of the post-test scores were censored, negating the increases made by many students who had initially scored at the top of the scale.

The average participant also received a higher wage upon job placement – an average of \$9.46 -- than in his previous jobs. Depending upon how one accounts for the most recent wage of laid-off

workers, the average increase in hourly wage was between \$.66 and \$3.24. Probably the most accurate measurement assumes that laid-off workers would be earning \$7.50 if they were to find a job. According to this measurement, the average wage



increase is \$1.48. No matter which measurement of most recent wage is used, the wage increase is statistically significant at the 99% level. (See appendix for results of t-tests).

3.12. Profile of Successful Instituto Participants

Fifty-two percent of Instituto participants were successful according to the same criteria for success explained in Section 2.6. Overall, the salient difference between successful and unsuccessful participants was a history of welfare enrollment; for participants with

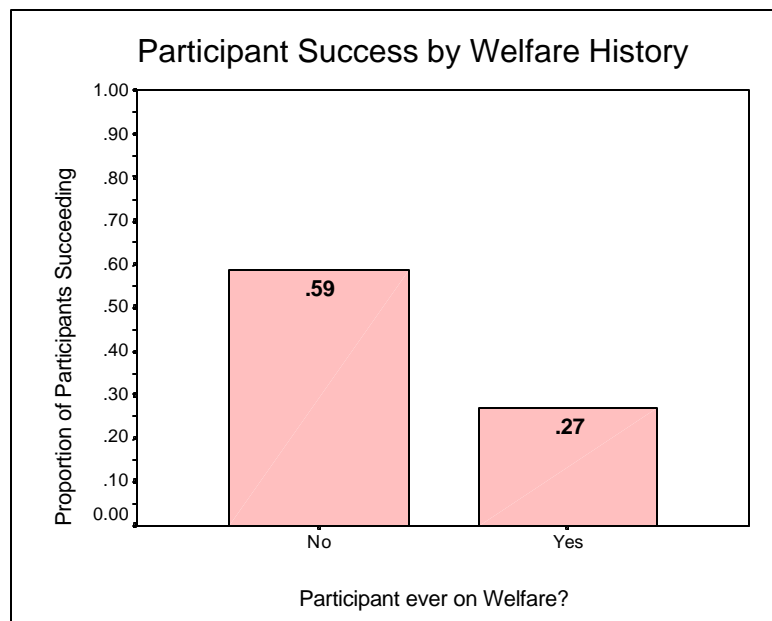
¹³ Four participants were placed in jobs without completing the program. These four are not included in the 85% graduation rate cited above.

prior manufacturing experience, however, the extent of that experience and the most recent wage were the most significant explanatory factors.

A logistic regression model, which uses the same independent variables to predict the success of Instituto participants as was used above (Section 2.6) to predict the success of participants at all sites, has little explanatory power.

Logistic Regression Model #3: Instituto Participants							
Number of cases included in the analysis: 126							
-2 Log Likelihood	162.323						
Goodness of Fit	128.568						
Cox & Snell - R ²	.091						
Nagelkerke - R ²	.122						
Dependent Variable: Participant Successful?							
----- Variables in the Equation -----							
Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
WELFARE?	-1.0272	.5382	3.6422	1	.0563	-.0970	.3580
RECENTWAGE	.0964	.0680	2.0083	1	.1564	.0069	1.1012
HISPANIC?	.5917	.4358	1.8433	1	.1746	.0000	1.8070
Constant	-.9135	.6045	2.2835	1	.1308		

It reaffirms the significance of a person’s having been on welfare – estimating that, with recent wage and race held constant, having been on welfare reduces a person’s chance of success by 25% -- but finds neither race nor most recent wage to be statistically significant. Only 27% of current or former welfare recipients were



successful compared to 59% of those who had never been on welfare. Although this regression has the advantage of analyzing records of 126 of the 172 participants, it explains only 12% of the variation in participant success and therefore has little predictive power.¹⁴

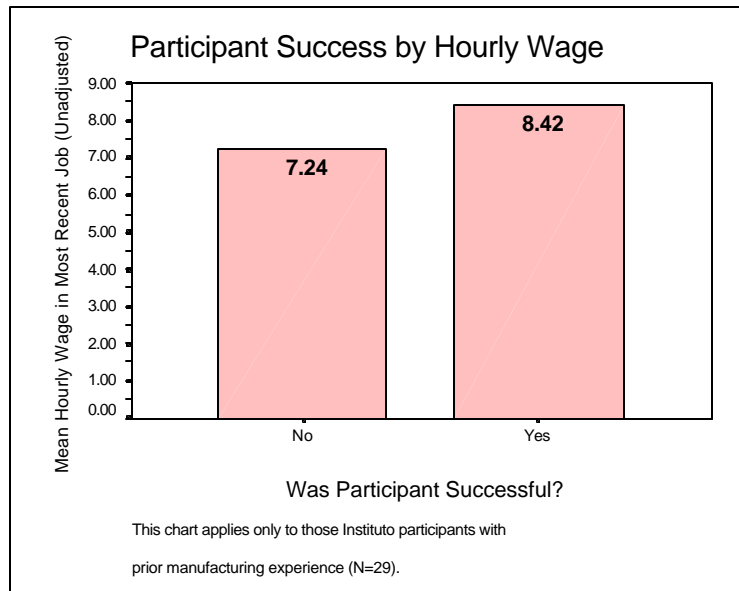
A second regression model, although it applies only to those participants with prior manufacturing experience, has much better predictive power, explaining 47% of the variation in participant success. The leap in power comes from the inclusion of a variable for the number of years a participant spent in manufacturing. The small number of participants with prior manufacturing experience reduced the number of records included in this analysis to 29.

Logistic Regression Model #4: Instituto Participants with Prior Manufacturing Experience							
Number of cases included in the analysis: 29							
-2 Log Likelihood	27.214						
Goodness of Fit	22.774						
Cox & Snell - R ²	.354						
Nagelkerke - R ²	.474						
Dependent Variable: Participant Successful?							
----- Variables in the Equation -----							
Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
WELFARE?	-.4852	1.6409	.0874	1	.7675	.0000	.6156
RECENTWAGE	.6047	.3439	3.0926	1	.0787	.1655	1.8307
HISPANIC?	-.0977	1.4722	.0044	1	.9471	.0000	.9070
YEARSMANFCTR	.2842	.1475	3.7145	1	.0539	.2073	1.3287
Constant	-6.3374	4.0567	2.4405	1	.1182		

This analysis finds that, among participants with prior manufacturing experience, a long period of prior manufacturing work and relatively high wages in prior jobs increase a participant's chance of success. Hardly any participants with both a low wage in their most recent job and a short length of employment at that job were successful. In their

¹⁴ Several other variables were highly correlated with success. These were not included in this analysis because of multi-collinearity with other, more important explanatory variables, or because of small sample

most recent jobs, successful participants earned an average of \$1.18 more than unsuccessful ones. Successful participants spent an average of seven years in their most recent job; unsuccessful ones worked an average of 3.3 years. No participant with fewer than two years of experience on his last job succeeded; only one who had most recently earned less than \$6.50 per hour succeeded.¹⁵ See the scatterplot below: most of the white triangles, which represent participants who failed,



appear in the lower left-hand corner of the graph, indicating that these participants had both low wages and a short term of employment in their most recent job; most of the black dots, which represent participants who succeeded, are clustered in the upper right-hand corner, indicating that they had both relatively high wages and long terms of work in their most recent positions. Program administrators should consider using this and

size. They include age, family income, gender, completion of vocational training, and felony conviction.
¹⁵ These statistics apply only to a group of 29 participants for which data on most recent job and most recent wage were collected.

other information about successful participants to improve admissions process by targeting participants who are most likely to succeed.¹⁶

When the records of all Instituto participants -- instead of just those with prior



manufacturing experience -- are examined, there is still a statistically significant difference in years of manufacturing experience between successful and unsuccessful participants. (See appendix for results of t-test). This difference disappears, however, in a logistic regression model when years of manufacturing experience is included with race, prior wages, and welfare enrollment. (See below for regression output). In this regression model, welfare enrollment, once again, is the only significant variable.

Logistic Regression #5: Instituto Participants

Number of cases included in the analysis: 119

-2 Log Likelihood 152.427
 Goodness of Fit 119.548
 Cox & Snell - R² .097
 Nagelkerke - R² .129

----- Variables in the Equation -----

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
WELFARE?	-.9610	.5465	3.0921	1	.0787	-.0815	.3825
RECENTWAGE	.0728	.0711	1.0487	1	.3058	.0000	1.0755
HISPANIC?	.5095	.4482	1.2920	1	.2557	.0000	1.6644
YEARSMANFCTR	.0795	.0710	1.2541	1	.2628	.0000	1.0827
Constant	-.7462	.6207	1.4453	1	.2293		

¹⁶ Of course, if administrators simultaneously improve the program to address the needs of less qualified applicants, such admissions thresholds, having been based on student performance of the program as it has evolved at the end of 1999, would not apply.

This could be due to multi-colinearity between years of manufacturing experience and most recent wage, although the former is still not significant in a regression where the later is excluded. Thus, although there is some connection between years of manufacturing experience and program success, this analysis cannot show that the connection is statistically significant for all Instituto participants when controlling for other success factors.

4. Conclusion and Recommendations

Although the Bridge program has been successful overall in placing its graduates in livable wage jobs, it is most successful in placing those with a good work history. It has been least successful, by contrast, in placing those who have been on welfare. Although those with relatively high wages in previous jobs are most likely to succeed in the program, those with low wages in previous jobs are most likely to benefit in terms of a substantial increase in their hourly wage. One factor that seems to lead to success in post-program employment and enrollment in post-secondary education, regardless of employment history, is high TABE math scores.

Based on these conclusions, AED recommends that Bridge program administrators consider the following actions:

1. Bolster the English-as-a-Second-Language instruction to improve the skills of Hispanic students.
2. Focus on teaching math and other skills to participants with weak job records. Increasing their math skills in particular may be a way of helping them to succeed in spite of limited work history.

3. Concentrate on improving math scores as a means of helping all students to succeed, regardless of their previous employment history.
4. Develop admissions guidelines for Bridge participants. Factors such as previous experience in manufacturing, current employment in manufacturing, history of welfare enrollment, and wage in previous jobs could be used to determine the suitability of the Bridge program for a potential participant and could be used to predict the probability that that student will succeed in the program.
5. If other sites for the Bridge program are to be opened, consider modeling them after the Instituto site with a critical mass of three staff members and in a facility conducive to education such as a school.
6. Study the success factors of the April 6, 1998 cohort, the August 25, 1997 cohort, and the March 22, 1999 cohort and apply them to subsequent cohorts.
7. Collect all participant tracking data at all sites, particularly wages and post-program test scores.