URBAN EDUCATION INSTITUTE

IMPACT STUDY OF GOODWILL SAN ANTONIO'S
GOOD CAREERS ACADEMY
JOB TRAINING PROGRAMS

By Dr. Michael U. Villarreal and Dr. Han Bum Lee

November 2020

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ABOUT THE URBAN EDUCATION INSTITUTE

OUR MISSION

The Urban Education Institute at UTSA produces scientific research to raise educational attainment, advance economic mobility, and help people achieve their potential in the greater San Antonio region.

The Institute pursues its mission by (1) producing rigorous and actionable analysis that supports education policymaking, program implementation, and philanthropic giving; (2) convening community leaders to address entrenched challenges that harm education and human development; and (3) training the next generation of social scientists and educators to address education challenges through observation, analysis, and discovery.

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INTRODUCTION

In 2018, of the largest 25 metro areas, San Antonio had the topmost percent of residents living in poverty—about one in five. Nearly half of those living in poverty were employed, but nearly all struggled to afford housing and nutrition for themselves and their children (COSA, 2019). To reduce the number of people living in poverty, Goodwill San Antonio has focused on helping those facing the most difficult circumstances acquire marketable skills through its Good Careers Academy program.

During the study period of 2013 to 2015, the Good Careers Academy (GCA) provided short-term, certified vocational training programs in various fields. The main training programs were in medicine (nurse's aide, medical assistant, pharmacy technician), commercial driving, and office administration. GCA also had smaller programs that led to certification in computer support, apartment maintenance and construction, software development, and supply chain logistics. Training programs last between 7 to 29 weeks.

In 2019, Goodwill San Antonio hired the Urban Education Institute (UEI) at The University of Texas at San Antonio (UTSA) to evaluate GCA's effectiveness in increasing employment rates and earnings.

This report presents the results of that evaluation.

In this study, the UEI compared the change in employment rates and earnings of GCA students to students with similar demographics and prior educational and employment experiences. Using wage data collected by the Texas Workforce Commission on all employees of employers in the state, researchers were able to study a sample of 555 GCA students who enrolled from 2013 to 2019 and compare their workforce outcomes to a similar group of adults.

KEY FINDINGS

- **GCA enrollees achieved exceptionally high completion rates. About 81% of GCA enrollees successfully completed GCA training programs within less than a year of enrollment.** In contrast, career school and community college enrollees who intended to earn a certificate during the study period completed their certificate programs within two years at rates equal to 56.6% and 17.1%, respectively.

- **Completion rates varied by training program:**
  - Students enrolled in GCA's three medical programs had a completion rate of 83%.
  - The administrative assistant program had a completion rate of 63%.
  - The commercial driver license program had a completion rate of 92%.
  - The smallest programs – apartment maintenance, construction, software development, and supply chain associate – had a combined completion rate of 87%.

- **Black students had the highest expected probability of completion with a rate of 86.1%. Hispanic[1] and White students had expected completion rates equal to 83.2% and 74.7%.**

- **On average, GCA completion rates increased as the length of programs decreased.** However, longer programs were associated with greater wage gains.

- **The more students earned before GCA training, the less likely they were to drop out.**

- **Overall, GCA improved the earnings of its graduates.** Students who completed their training programs increased their annual earnings in the third year from enrollment by 32% and in their fourth year by 73% compared to similar students who did not enroll in GCA.

- **GCA completers saw a gain in annual wages four years following enrollment above non-completers by $6,321.** Their expected earnings if they had not completed a GCA training program would have equaled $12,720 four years later. Instead, GCA training raised their earnings to $19,041 four years later.

- **GCA's effect on wage growth varied by field of study, ranging from 21% to 94% growth four years after enrollment.**

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[1] In this report, we use the terms Hispanic, Black, and White as mutually exclusive categories of people. No one identified as Black or White is also Hispanic. No people of Asian ethnicity or people of other ethnic groups participated in GCA.

GOOD CAREERS ACADEMY STUDENTS

STUDENT POPULATION

GCA serves a unique student population, as shown in Table 1. From 2013 to 2019, students who signed up for training were older (average age 34) and typically single (61%), female (63%), and lacking any postsecondary education (91%). All enrollees had earned a high school diploma or its equivalent.

Enrollees were 59% Hispanic, 19% Black, and 14% White.

Fifty-eight percent of students enrolled in one of three medical programs: medical assistant, nurse's aide, or pharmacy technician. The second most popular program was the commercial driver license program at 23% of all enrollees, followed by the administrative assistant program at 10%. Computer support specialist, apartment maintenance and construction, software development, and supply chain associate programs made up 9% of all GCA enrollees, combined. Researchers grouped this last set of certifications under "Other" because of its limited sample size as individual programs.

TABLE 1: GCA STUDENTS

	Mean	SD
Demographic Characteristics		
Age	34.0	9.27
Female	0.63	0.48
Black	0.19	0.39
Hispanic	0.59	0.49
White	0.14	0.35
Marital Status		
Married	0.22	0.40
Single	0.61	0.46
Educational Attainment		
High School Diploma or GED	0.91	0.28
Associate Degree	0.06	0.25
Program Participation		
Administrative Assistant	0.10	
Medical Programs	0.58	
Commercial Driver License	0.23	
Other Programs	0.09	
Program Dropout	0.20	
Program Length	174.2	128.03

Note: Observations equaled 1,214. Medical includes medical assistant, pharmacy technician, and nurse's aide. Other Programs include computer support specialist, apartment maintenance and construction, software development, and supply chain associate programs.

GCA graduates experienced a growth in earnings over time. Average wage growth varied by training programs from a low of $5,765 (Pharmacy Technician) to a high of $17,786 (Commercial Driver License), as displayed in Figure 1. The analysis will disaggregate these changes in earnings to identify how much of the change can be attributed to GCA.

FIGURE 1: AVERAGE ANNUAL EARNINGS BY GCA TRAINING PROGRAMS
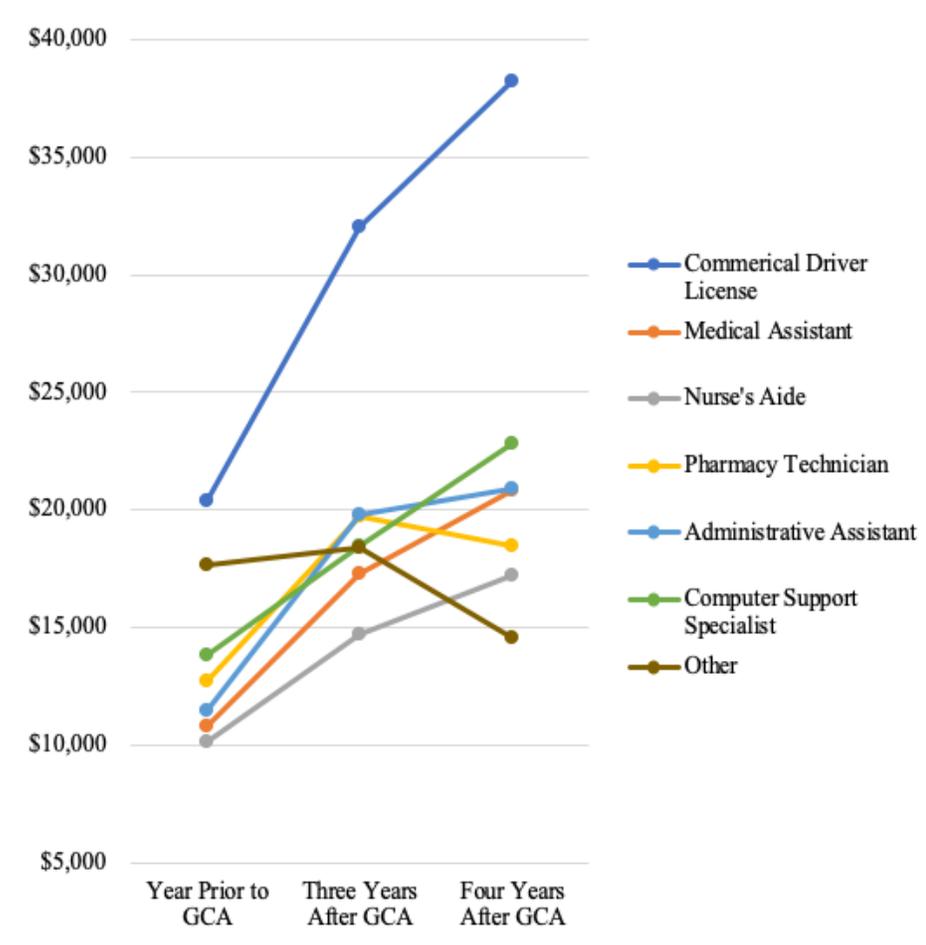
GCA graduates also experienced an improvement in quarters worked compared to when they started their training. Growth in average quarters employed also varied by training programs from a low of 0.08 quarters (Pharmacy Technician) to a high of 0.5 quarters (Medical Assistant), as displayed in Figure 2. Once again, the analysis will disaggregate these changes to identify how much of the change can be attributed to GCA.

FIGURE 2: AVERAGE QUARTERS EMPLOYED BY GCA TRAINING PROGRAMS
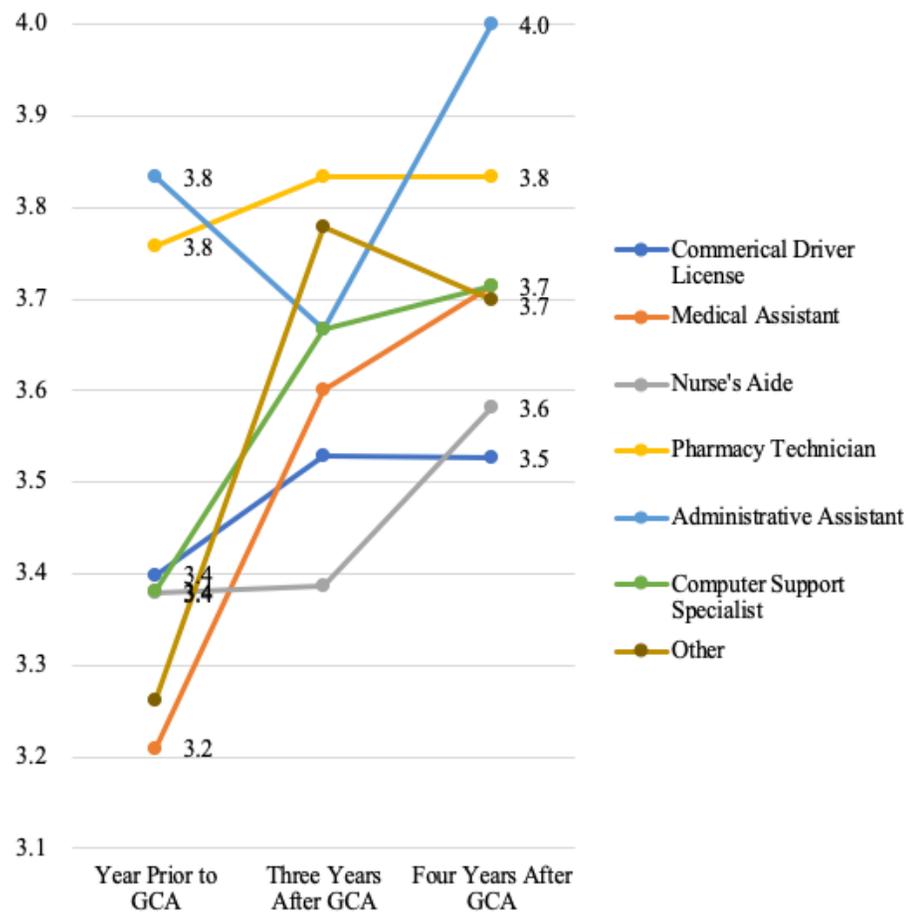
GCA STUDENTS INCLUDED IN STUDY

Researchers were unable to include all GCA students due to missing data. Researchers were unable to link some GCA students to the state's longitudinal data system of educational or workforce outcomes. The reason for missing student data may be that these students completed their secondary education prior to the late 1990s, a period

before the state improved its data collection system. Their education data could also be missing because they attended school outside of Texas or at a private or home school. Their earnings data would be missing if they were self-employed, employed outside Texas or by the federal government, or unemployed. In the end, 54% of the GCA students could not be included in the study due to missing data. We suspect the primary reasons for missing data is that those excluded were older, self-employed or unemployed prior to GCA enrollment. To the extent those excluded were unemployed or under-employed in self-employed jobs, our estimates of GCA's effectiveness are understated.

As shown in Table 2, the GCA students included in the study population (not to be confused with the earlier-described overall GCA student population) were on average 29 years old and typically single (73%), female (66%), and lacking any postsecondary education (94%).

Enrollees were 65% Hispanic, 17% Black, and 12% White.

Once again, most students enrolled in the medical programs (63%), followed by the commercial driver license program (20%), and administrative assistant program (8%). Computer support specialist, apartment maintenance and construction, software development, and supply chain associate programs represented 9% of all enrollees.

TABLE 2: GCA STUDENTS INCLUDED IN THE ANALYSIS

	Mean	SD
Demographic Characteristics		
Age	28.85	8.25
Female	0.66	0.47
Black	0.17	0.37
Hispanic	0.65	0.48
White	0.12	0.33
Marital Status		
Married	0.15	0.36
Single	0.73	0.45
Educational Attainment		
High School Diploma or GED	0.94	0.25
Associate Degree	0.06	0.23
Program Participation		
Administrative Assistant	0.08	
Medical Programs	0.63	
Commercial Driver License	0.20	
Other Programs	0.09	
Program Dropout	0.19	
Program Length	179.62	128.94

Note: Observations equaled 779. Medical includes medical assistant, pharmacy technician, and nurse's aide. Other Programs include computer support specialist, apartment maintenance and construction, software development, and supply chain associate programs.

Researchers tested the statistical equivalence (a Wald test) between GCA students who could be linked to their education and workforce data and included in the study (Table 2) and the original study population (Table 1). The two groups were found to not be statistically equivalent, as shown in Table A1 in the Appendix. Consequently, the findings of this study may be limited to those included in the study population.

RESEARCH DESIGN

INTRODUCTION

Like an architect's blueprint, a research design describes a span of decisions made. Some decisions are large and strategic, others detailed and tactical. These decisions culminate in answering a project's research questions. This section provides a general description of this study's research design. A fuller presentation of the research design can be found in the Appendix.

STRATEGY

Researchers identified the effect of GCA on workforce outcomes using a design known as difference-in-differences. As the name suggests, this procedure involves taking the difference between two differences. For example, researchers compared the change in wages earned by GCA students before and after completing a GCA training program (difference 1) to the change in wages over the same time period of a similar group of people (difference 2).

Researchers then calculated the difference between the two wage changes (difference 1 minus difference 2) to produce an estimate of the average effect GCA produced on the earnings or program graduates. Subtracting out the change in wages of the comparison group removed the influence of trends on wages (such as those associated with age, workforce experience, or fluctuations in the economy) that would have occurred if a GCA student had not enrolled in the program.

COMPARISON GROUPS

Researchers constructed comparison groups using a method called propensity score matching (PSM) (See Appendix for details). Two comparison groups were used to improve the robustness of the findings and to identify if GCA affected the workforce outcomes of different subgroups differently.

The first comparison group was comprised of GCA students who did not complete their training program. These students were not only statistically identical to GCA graduates after the PSM process (based on demographics and prior educational and employment history see Table 3 in the Appendix), but they also shared the history of voluntary enrollment in the same GCA training programs. The one downside of this group was that its sample size was small, a result of GCA's high completion rate. Having a small sample size limited researchers' ability to explore all the ways GCA may have impacted different subgroups of students differently, which is also why a second comparison group was created.

Researchers were able to use this first comparison group to identify GCA's effect by the training program categories of commercial driver license, medical, administrative assistant, and all others. Students enrolled in the nurse's aide, medical assistant, and pharmacy technician programs had to be combined due to the limited sample sizes of

dropouts. As a result, the unique effects of these three individual programs could not be identified.

The second comparison group was comprised of people who were statistically equivalent to GCA graduates based on demographics and prior educational and employment history, as shown in Table 4 in the Appendix. Unlike the first comparison group, however, this group was pooled from across Texas. Using this larger comparison group allowed researchers to explore how GCA uniquely impacted subgroups of students who varied by demographics, prior education, and prior earnings. The pool of potential comparison group members was not limited to Bexar County because of missing data that located people's place of employment.

OUTCOMES OF INTEREST

Researchers examined how GCA affected annual wages earned and the number of quarters employed in a year. The data source – unemployment insurance records filed quarterly by Texas employers – limited measurement to employment by quarters. The number of quarters employed in a year does not vary as much as the number of days employed in a year. As a result, the research team's ability to detect a change in employment was significantly hampered.

CONTROL VARIABLES

In the construction of comparison groups, researchers were able to control for variables that influenced wages outside of enrollment in GCA training programs. These control variables included age, gender, race and ethnicity, marital status, highest degree earned, training program (in comparison to GCA dropouts), timing, and earnings one year prior to GCA enrollment.

LIMITATIONS

The research team conducted this study within an experimental research design using observational data previously collected by GCA and state agencies. As such, the research design and a rich supply of variables were relied upon to simulate treatment and control groups after the intervention took place.

Unlike a true experiment where researchers randomly assign subjects to treatment and control groups before the intervention takes place, the study's research design is vulnerable to omitted variable bias. For example, researchers could not include measures of each student's grit (perseverance for accomplishing long-term goals) in estimating effects because grit was not measured. If students who completed GCA training disproportionately possessed grit, and if existing control variables were poor proxies for grit, then grit may confound this study's attempt to identify GCA's effect without bias. If this is the case, then not controlling for grit will cause program effects to be overstated, assuming grit makes one a more productive worker. Grit's effect would be conflated with GCA's effect.

"For me, Good Careers Academy has meant stability. Earning my Nurse's Aide certification will open doors for me to earn more income and take care of my family."

–Frei, mother of four whose training at Goodwill has inspired her to become either a licensed vocational or registered nurse

Of course, there may also be other lurking factors that bias effect sizes downward. Because these omitted variables are unobserved, their confounding effects cannot be dismissed, only mitigated through research design, a rich supply of observed variables, and a sound theoretical framework.

The analysis that used workers similar to GCA students but from across Texas may be biased by wage trends that are unique to Bexar County, where GCA students resided. Though no plausible trend was identified, its existence cannot be entirely ruled out. Moreover, the overall direction of this potential bias is unknown.

Finally, as mentioned earlier, researchers tested the statistical equivalence (a Wald test) between GCA students who could be linked to their education and workforce data and those who could not and were therefore excluded from the study. Because the two groups were not statistically equivalent, the findings of this study may be limited to the study sample.

FINDINGS

PROGRAM COMPLETION

GCA enrollees achieved exceptionally high completion rates. Approximately, 81% of GCA enrollees successfully completed their GCA training programs within less than a year of enrollment. In contrast, career school and community college enrollees who intended to earn a certificate during the study period completed their certificate programs within two years at rates equal to 56.6% and 17.1%, respectively.

Completion rates varied by training program, as shown in Figure 3. Students enrolled in GCA's nurse's aide, medical assistant, and pharmacy technician programs had completion rates of 98%, 73%, and 62%, respectively. The administrative assistant program had a completion rate of 61%. The commercial driver license program had a completion rate of 92%. The smallest programs, which are no longer offered, had a combined completion rate of 58.3%.

FIGURE 3: AVERAGE RATE OF COMPLETION OVERALL AND BY GCA TRAINING PROGRAM
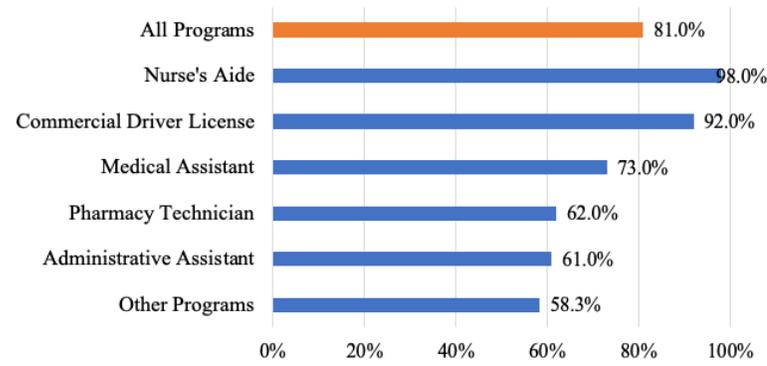
Note: Other programs included computer support specialist, apartment maintenance and construction, medical coding, medical secretary, and software development.

The likelihood of dropping out of a GCA training program increased as the length of programs increased, as shown in Figure 4.

FIGURE 4: EXPECTED PROBABILITY OF DROPPING OUT OF GCA TRAINING PROGRAM BY PROGRAM LENGTH IN DAYS
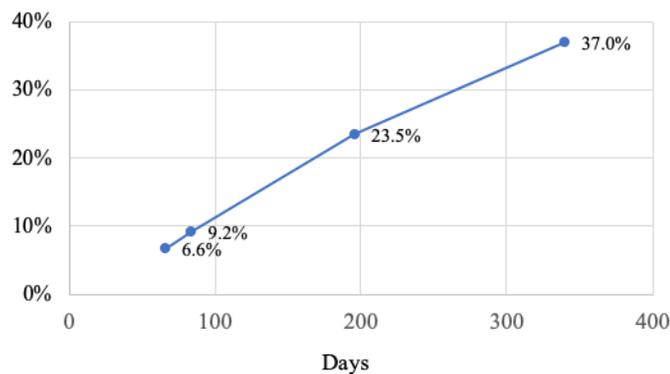
As shown in Figure 5, Black students had the highest expected probability of completion with a rate of 86.1%. Hispanic and White students had expected completion rates equal to 83.2% and 74.7%.

FIGURE 5: EXPECTED PROBABILITY OF COMPLETING GCA TRAINING PROGRAM BY RACIAL & ETHNIC SUBGROUP
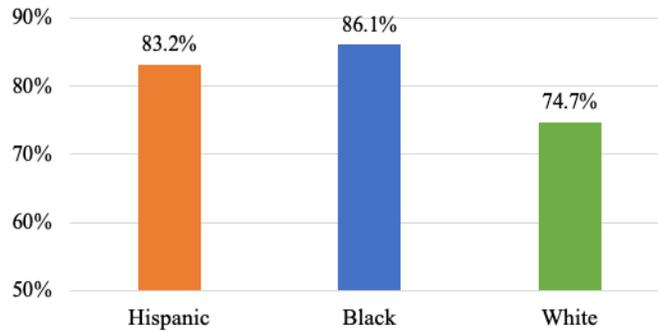
Students with only a high school diploma or equivalent were almost as likely to complete GCA training as those with some postsecondary education, as shown in Figure 6. GCA enrollees with a high school diploma or GED had an expected completion rate of 80.4%, while those with some college education had an expected completion rate of 83.7%.

FIGURE 6: EXPECTED PROBABILITY OF COMPLETING GCA TRAINING PROGRAM BY HIGHEST LEVEL OF PRIOR EDUCATION
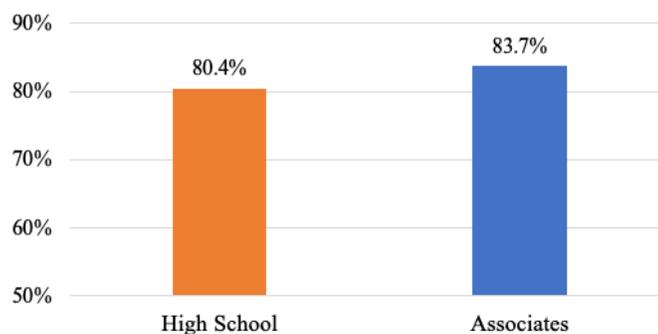
Finally, the more participants earned one year prior to GCA the less likely they were to drop out—a $1,000 increase in earnings predicted a 0.7 percentage point increase in completion, as displayed in Figure 7.

FIGURE 7: EXPECTED PROBABILITY OF COMPLETING GCA TRAINING PROGRAM BY PRE-TRAINING ANNUAL INCOME
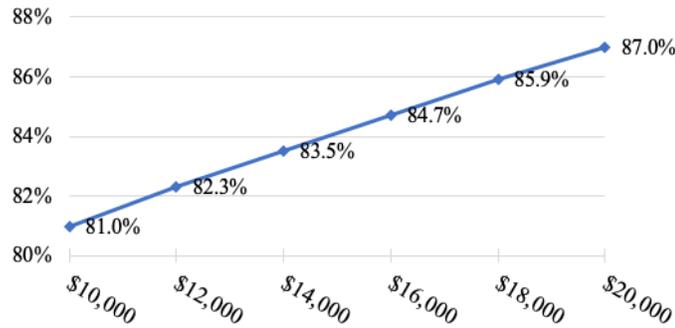
COMPLETERS AND NON-COMPLETERS

GCA effects by the third year from enrollment were not statistically significant, as shown in Table 3. Though completers saw growth in their annual wages of $2,422, this change was not statistically different from the wage growth experienced by their classmates who dropped out of the program. GCA effects on quarters employed were also not statistically significant. However, by the following year, GCA completers realized a statistically significant edge over non-completers.

TABLE 3: GCA EFFECTS ON YEAR 3 AND 4 OUTCOMES BASED ON COMPARISON BETWEEN GCA COMPLETERS AND NON-COMPLETERS

Year-3 Outcomes	Mean	SE	
Annual earnings ($)	2,422	1,957	
Log of earnings	0.393	0.32	
Quarters Employed	0.179	0.232	
Year-4 Outcomes	Mean	SE	
Annual earnings ($)	6,321	2504	**
Log of earnings	0.658	0.369	*
Quarters Employed	0.636	0.337	*

Note: Transforming earnings into log of earnings allows the effect to be interpreted as a growth rate in earnings. Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

As illustrated in Figure 8, GCA completers saw a gain in annual wages four years following enrollment above non-completers by $6,321. Their expected earnings if they had not completed a GCA training program would have equaled $12,720 four years later. Instead, GCA training raised their earnings to $19,041 four years later.

FIGURE 8: EARNINGS FOUR YEARS AFTER ENROLLMENT IF GCA TRAINING HAD NOT OCCURRED PLUS ADDITIONAL EARNINGS DUE TO GCA TRAINING
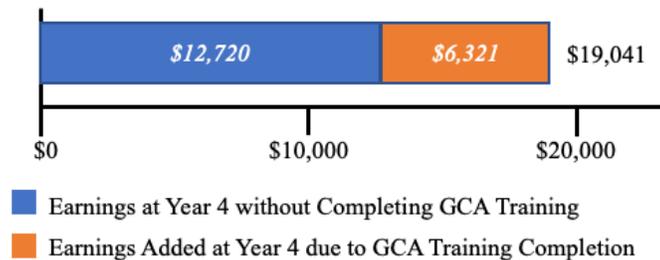
GCA completers also increased quarters of employment four years after GCA enrollment by 0.64 quarters, or 38 days, compared to non-completers.

TRAINING PROGRAM

GCA's effect on wage growth varied by training program. Commercial driver license graduates experienced the greatest increase in wages, 56% growth by the third year after enrollment and 94% growth by the fourth year. As shown in Figure 9, they reached an average of $37,480 four years after enrollment, helping them achieve a living wage for adults with no children (a minimum threshold of $22,221 in 2016 dollars).

GCA medical program graduates experienced the next highest increase. Medical program graduates realized a 55% gain in wages three years after enrollment and a 74% gain by the fourth year. Their wages reached an average of $18,696 four years after GCA enrollment.

GCA administrative assistant graduates also experienced wage growth. Their annual earnings grew by 26.1% three years after enrollment and 20.6% by the fourth year. Their wages reached an average of $19,399 four years after GCA enrollment.

The remaining graduates of GCA programs experienced a growth in wages. Their annual earnings grew by 30% three years after enrollment and 45% by the fourth year. Their wages reached an average of $18,543 four years after GCA enrollment.

"Good Careers Academy help people like me, who have the potential. We know we can do it. We just need help."

– Christina, pharmacy technician graduate

FIGURE 9: EARNINGS BY PROGRAM FOUR YEARS AFTER GCA ENROLLMENT

Commercial Driver License: $19,319 | $18,161 | $37,480
Medical Programs: $10,744 | $7,952 | $18,696
Administrative Assistant: $16,085 | $3,314 | $19,399
Other Programs: $12,788 | $5,755 | $18,543

■ Earnings at Year 4 without Completing GCA Training
■ Earnings Added at Year 4 due to GCA Training Completion
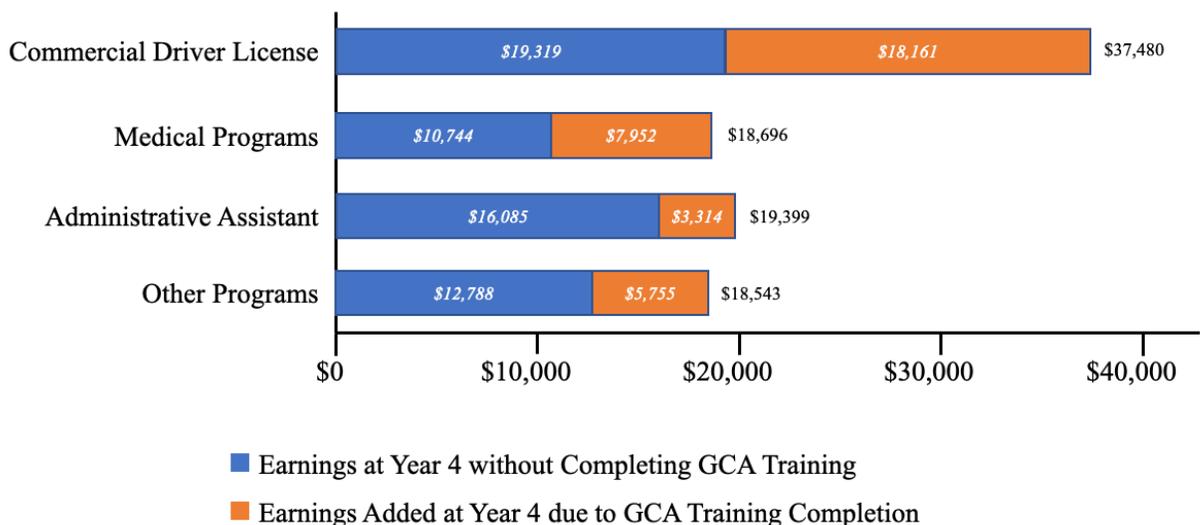
COMPLETERS AND NON-PARTICIPANTS

Researchers also compared changes in earnings and employment of GCA completers to similar adults who never enrolled in GCA. This second set of comparisons allowed for a check of the consistency of our earlier findings. Overall, the earlier results were confirmed: GCA effects on earnings begin to emerge in year 3 post enrollment but become statistically significant in year 4.

The UEI found that completers increased their annual wage by 32% compared to non-participants by the third year following enrollment. GCA produced no effect on number of quarters employed in a year.

By the fourth year after enrollment, GCA-completers increased earnings by 73% compared to non-participants. Once again, no effect was found on quarters employed, as shown in Table 4.

"Thank you Good Careers Academy and Goodwill San Antonio for hiring great people that actually CARE AND FIGHT for those of us put in unfortunate situations of being unemployed or underemployed."

-Michael, father of two who graduated at the top of his class in the commercial driver license program and received multiple job offers

GCA also affected wage increases differently for different subgroups of students.

TABLE 4: GCA EFFECTS ON YEAR 3 AND 4 OUTCOMES BASED ON COMPARISON BETWEEN GCA COMPLETERS AND NON-PARTICIPANTS

Year-3 Outcomes	Mean	SE	
Annual earnings ($)	1,179	1592	
Log of earnings	0.278	0.143	*
Quarters Employed	0.053	0.137	
Year-4 Outcomes	Mean	SE	
Annual earnings ($)	6,041	2285	***
Log of earnings	0.552	0.185	***
Quarters Employed	0.286	0.163	*

Note: Transforming earnings into log of earnings allows the effect to be interpreted as a growth rate in earnings. Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

PRIOR EDUCATION

GCA did not cause an increase in wages by the third year following enrollment for those whose highest educational attainment was a high school diploma (or its equivalent). GCA did cause an increase in wages by year 3 for adults with an associate degree. This higher educated group realized an effect of 58% growth in earnings, as shown in Figure 10.

GCA's level of effectiveness changed in the fourth year following enrollment for adults whose highest educational attainment was a high school diploma (or its equivalent). For this group, GCA caused a growth in earnings by 54.7% four years from enrollment, while those with at least some college realized a 64.1% increase, as shown in Figure 10.

FIGURE 10: GCA EFFECT ON ANNUAL INCOME IN YEAR 3 AND YEAR 4 POST ENROLLMENT BY HIGHEST LEVEL OF PRIOR EDUCATION
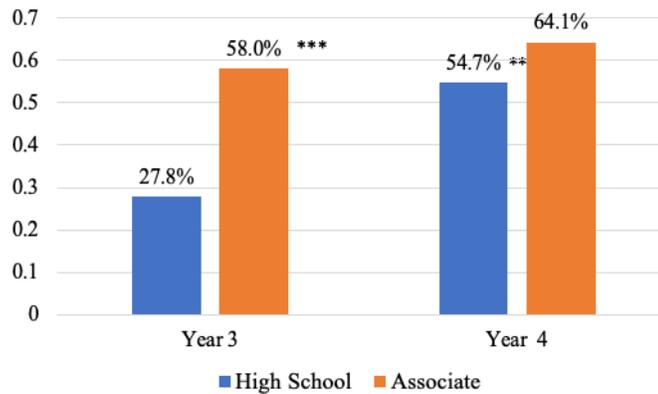
Note: Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

PRIOR EARNINGS

As shown in Figure 11, GCA improved the earnings of those ranked in the bottom 25% of earners the most. GCA caused the earnings of these lowest quartile of earners to increase by 98.7% three years after enrollment and 83.3% four years after enrollment. Students in the third quartile also received an enhanced GCA effect on wages four years after enrollment equal to 67.2%. No other quartiles experienced effects statistically distinct from zero.

FIGURE 11: GCA EFFECT ON ANNUAL INCOME IN YEAR 3 AND YEAR 4 POST ENROLLMENT BY QUARTILES OF PRIOR EARNINGS
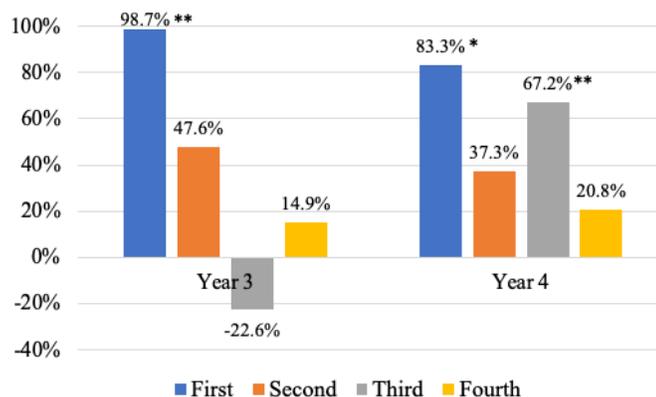
Note: Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

GENDER

Females received a pronounced wage increase due to GCA, as compared to their male counterparts. GCA wage effects by the third year from enrollment were not statistically significant for males or females. Four years past enrollment, GCA produced a larger effect on wages of females compared to males. Female earnings increased by 64.8% four years after enrolling in GCA and completing their training program; while male earnings increased by 34.4% but was not statistically different from zero, as shown in Figure 12.

FIGURE 12: GCA EFFECT ON ANNUAL INCOME IN YEAR 3 AND YEAR 4 POST ENROLLMENT BY GENDER
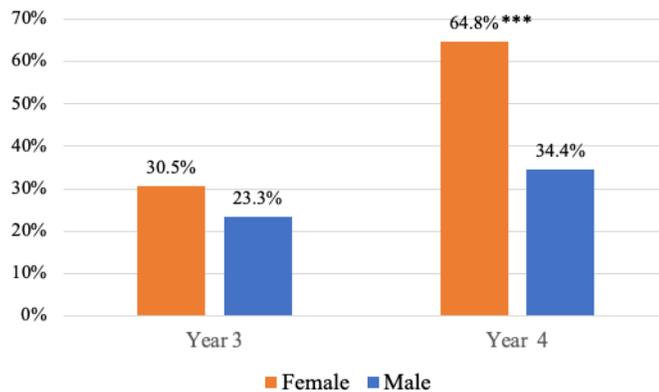
Note: Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

AGE

A consistent pattern of wage effects by age quartiles did not emerge, as shown in Figure 13. GCA effects on wages in year 3 were above average for graduates in the youngest (21 and younger) and oldest quartiles (29 and older) equal to 97.8% and 84.2%, while graduates in between age 24 and 28 experienced a negative effect of 53.2%. In year 4, GCA effects on wages were above average for adults between 21 and 24 years of age and older than 28 with an effect sizes equal to 146.7% and 239.8%, respectively. The remaining quartiles experienced GCA effects on wage growth statistically equivalent to zero.

FIGURE 13: GCA EFFECT ON ANNUAL INCOME IN YEAR 3 AND YEAR 4 POST ENROLLMENT BY AGE GROUPS
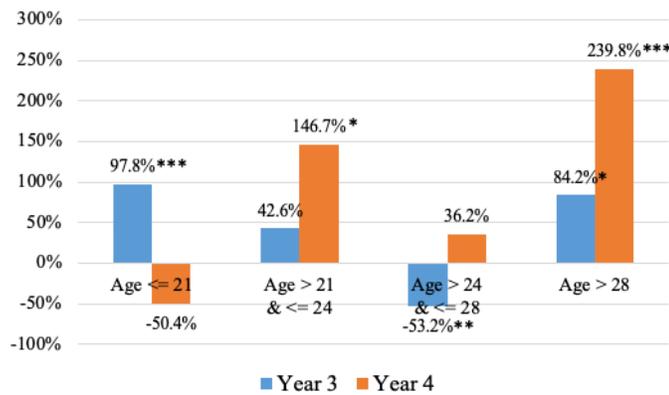

Note: Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

RACE AND ETHNICITY

GCA produced a pronounced effect on wage growth for Black and Hispanic adults, as compared to their White counterparts. GCA wage effects by the third year from enrollment were not statistically significant for either group, as displayed in Figure 14. However, four years past enrollment, GCA produced an effect on Black and Hispanic wages equal to 58.1%. White student earning effects were not statistically different from zero.

FIGURE 14: GCA EFFECT ON ANNUAL INCOME IN YEAR 3 AND YEAR 4 POST ENROLLMENT BY MINORITY SUBGROUP STATUS
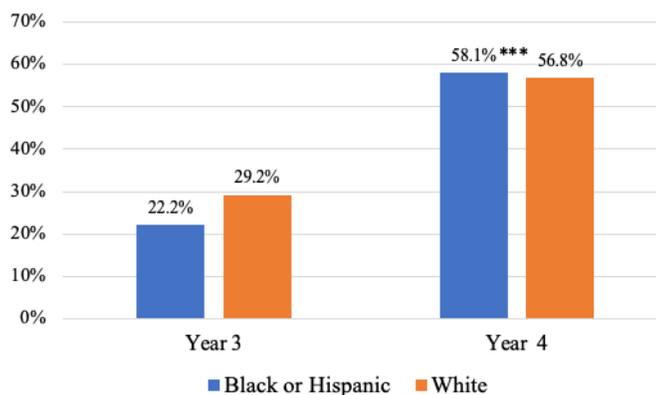

Note: Statistical significance is represented by asterisks: * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

DISCUSSION

ROLE OF GOOD CAREERS ACADEMY

The leadership of Goodwill of San Antonio has a case to make for expanding Good Careers Academy's role in the San Antonio education ecosystem. GCA improved the earnings of its students who were studied and did so with above average effects for students with the greatest need. Furthermore, GCA served a population underrepresented in other training programs.

GCA served older adults (average age 34) earning wages below the poverty line ($11,020 per year) prior to enrollment. Despite the challenging economic circumstances of these nontraditional students, an extraordinary share—8 out of 10 students—completed their training programs. Most importantly, students who completed their training (compared to similar students who did not) earned 73% more income four years after enrollment due to GCA.

Finally, GCA's program proved to be cost efficient. At $2,500 per participant, the evidence suggests that GCA produces results no less than more costly job training programs in San Antonio (Roder & Elliott, 2019).

The commissioning of this research study demonstrates that Goodwill of San Antonio is committed to the continuous improvement of its programs. In that spirit, the UEI offers two recommendations for program improvements.

"One of the things I experienced was the genuine support the Good Careers Academy has for their students. I know my instructor was very thorough with us. She made sure we knew everything, all the material – front and back."

-Christina

First, GCA should continue to study the local labor market to identify high demand jobs that pay a living wage to ensure that its students are steered into jobs that will allow them to reach self-sufficiency. As shown in Figure 7, graduates of GCA training programs are closer to earning a living wage by varying levels. Second, GCA should improve its program application system to collect essential data fields that will allow for ongoing monitoring of program effectiveness.

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APPENDIX A: RESEARCH DESIGN

ATTRITION IN LINKING DATA

Researchers were unable to include all GCA students who enrolled during the study period due to missing data that described the education and workforce experience of GCA students prior to their GCA enrollment. These students were not found in the state's data system of educational or workforce outcomes. The reason for their missing data may be that they completed their secondary education prior to the late 1990s, a period before the state improved its data collection system. Their education data could also be missing because they attended school outside of Texas or at a private or home school. Their earnings data would be missing if they were self-employed, employed outside Texas or by the federal government, or unemployed. In the end, 54% of the GCA students could not be included in the study due to missing data. We suspect the primary reasons for missing data is that those excluded were older, self-employed or unemployed prior to GCA enrollment. To the extent those excluded were unemployed or under-employed in self-employed jobs, our estimates of GCA's effectiveness are understated.

Researchers tested the statistical equivalence (a Wald test) between GCA students who could be linked to their education and workforce data and the original study population. The two groups were found to not be statistically equivalent, as shown in Table A1 in the Appendix. Consequently, the findings of this study may be limited to those included in the study population.

Table A1

Summary Statistics of Selected Characteristics of GCA Program Participants by Attrition

	Not in ERC [*]	Found in ERC [*]
Demographic Characteristics		
Age	43.279	28.854
	(10.860)	(8.253)
Female	0.575	0.660
	(0.495)	(0.474)
African American	0.221	0.167
	(0.415)	(0.373)
Hispanic	0.494	0.646
	(0.501)	(0.479)
White	0.186	0.121
	(0.390)	(0.326)
Marital Status		
Married	0.340	0.151
	(0.474)	(0.359)
Single	0.407	0.727
	(0.492)	(0.446)
Educational Attainment		
High School Diploma or GED	0.869	0.935
	(0.338)	(0.248)
Associate Degree	0.080	0.055
	(0.272)	(0.229)
Frequency		
Administrative Assistant		
Medical Assistant		
Commercial Driver License		
Other Programs		
Program Dropout		
Mean		
Program Length	164.372	179.62
	(126.385)	(128.939)
Observations	435	779

Note: Standard deviation is reported in parenthesis. *ERC is the Education Research Center data repository in Texas

IDENTIFICATION STRATEGY

Researchers identified the effect of GCA on workforce outcomes using a design known as difference-in-differences ("DID"). In this study, this procedure was used to compare the change in wages earned by GCA graduates before and after completing GCA training (difference 1) to the change in wages over the same time period of a similar group of people who started but did not complete GCA training (difference 2).

The difference was then calculated between the two wage changes (difference 1 minus difference 2) to produce an estimate of the average effect GCA produced on the earnings of GCA graduates. Subtracting out the change in wages of the comparison group allowed for the removal of the natural change in wages (such as those associated with increased age or work experience, or changes in the economy) that would have occurred absent GCA training.

We performed these calculations by modeling the following regression equation:

REGRESSION EQUATION

$$Y_{it} = \beta_0 + GCA_i\,\beta_1 + Post_t\,\beta_2 + GCA_i * Post_t\,\beta_3 + \boldsymbol{X}_{it}\,\boldsymbol{\beta}_4 + \boldsymbol{t} + \varepsilon_{it},$$

where i and t index unique people and years, respectively. Y_{it} represents labor market outcomes of interest for person i at time t. GCA_i equals 1 if a person completed a GCA training program and 0 otherwise. $Post_t$ equals 0 for the baseline year prior to treatment and 1 for the post-treatment period at time t. $\boldsymbol{X}_{it}$ represents an array of variables that control for individual attributes, and $\boldsymbol{t}$ denotes indicator variables for each calendar year. β_0 captures unobserved time-invariant heterogeneity, and ε_{it} is an error term. β_3 represents the program effect, estimated by

$$\beta_3 = (Y_{i2}^T - Y_{i1}^T) - \sum_{j \in C} w(i,j)(Y_{j2}^C - Y_{j1}^C),$$

where $w(i,j)$ denotes propensity score weights (a procedure discussed below), given to the jth comparison unit matched to a treatment unit i. Researchers also used robust standard errors clustered at the individual level to control for intercorrelation among individuals over time (Bertrand et al., 2004).

A strength of DID's internal validity is that it mitigates biases stemming from differences in observed as well as unobserved characteristics between the treatment and control groups that do not change with time. Threats to the internal validity of our identification strategy include selection bias, attrition, history, and regression.

SELECTION BIAS

Selection bias is a challenge that researchers must overcome when trying to estimate a program's effectiveness without being able to randomly assign subjects to treatment and control groups. In this case, selection bias arises when people make their own decision to enroll in a GCA program or not. It is plausible that those who voluntarily enroll in GCA are more likely to have qualities that also will make them good employees. Someone who seeks out GCA probably has a desire for self-improvement greater than those with similar educational and employment experiences but who do not enroll in GCA. It is also plausible that GCA enrollees are more persistent and have better planning skills than their virtually identical counterparts who do not enroll.

To control for selection bias, researchers worked with available data to identify a group of people who did not complete a GCA program but who were statistically identical to students who did based on observable variables. This group would simulate a counterfactual to GCA completers: their workforce outcomes represent what would have naturally occurred if GCA completers had not completed a GCA training program. The UEI constructed two counterfactuals (or comparison groups) using a method called propensity score matching. Building two comparison groups improved the robustness of the findings.

The first comparison group was comprised of GCA students who did not complete their GCA training program. These students after matching were not only jointly statistically identical to GCA graduates based on demographics and prior educational and employment history; but they also shared the history of voluntary enrollment in GCA training programs. The one downside of this group was that its sample size was small, a result of GCA's high completion rate. Having a small sample size prevented researchers

from fully exploring how GCA impacted different subgroups of students differently, which was also why the research team created a second comparison group.

Researchers used the Kernel matching (KM) method, a procedure recommended for limited samples. A five-subject nearest neighbor matching (5-NNM) was conducted, but the KM method produced better matching results.

Researchers also applied the common support condition, dropping study group members that could not be matched to someone with a similar propensity score. The common support condition required that one observation of non-completers be dropped.

The difference in characteristics between GCA dropouts and completers who were included in the analysis of three-year post-treatment outcomes was significantly reduced after PSM weights were applied. In Table A2, rows preceded with a U represent unweighted groups, while rows preceded with a W represented weighted groups. Mean differences in pre-treatment attributes were statistically equivalent to zero.

Indicators of matching quality signal strong matches. The pseudo R^2 is decreased substantially from 26.2 percent to 2.3 percent; the likelihood ratio (LR) test leads to accepting the null hypothesis after matching with a p-value of 1, indicating that the included regressors were not statistically different between completers and dropouts. The results also show that mean and median bias decreased substantially from 17.1 to 5.7 and from 4.9 to 4.3, respectively.

TABLE A2: MEAN DIFFERENCE IN PRE-TREATMENT ATTRIBUTES BETWEEN STUDENTS WHO WERE GCA DROPOUTS AND STUDENTS WHO WERE GCA COMPLETERS WHO COMPRISED THE STUDY SAMPLE OF THREE-YEAR POST-ENROLLMENT OUTCOMES

	Weighted	Dropout	Complete	Difference Between Program Dropout and Complete Participants p-value
Age	U	28.634	28.759	0.922
	W	28.459	28.340	0.932
Age^2	U	866.47	898.78	0.705
	W	855.71	857.57	0.983
Female	U	0.704	0.644	0.419
	W	0.698	0.761	0.471
Black	U	0.204	0.190	0.820
	W	0.208	0.195	0.870
Hispanic	U	0.574	0.598	0.759
	W	0.566	0.578	0.898
Married	U	0.148	0.144	0.935
	W	0.132	0.153	0.759
High School Diploma or GED	U	0.907	0.897	0.818
	W	0.906	0.894	0.849
Administrative Assistant	U	0.093	0.057	0.365
	W	0.094	0.108	0.821
Medical Assistant	U	0.630	0.638	0.912
	W	0.623	0.624	0.986
Commercial Driver License	U	0.037	0.207	0.003
	W	0.038	0.046	0.842
Log of Program Length	U	5.560	4.800	0.000
	W	5.540	5.600	0.624
Previous Wage (/1000) (One year prior to baseline)	U	9.089	12.937	0.033
	W	9.255	10.300	0.530
Previous Quarters of Employment (One year prior to baseline)	U	2.648	2.822	0.383
	W	2.679	2.707	0.916
Matching Quality Indicators				
Pseudo R^2	U		0.262	
	W		0.023	
Likelihood Ratio (LR) χ^2	U		65.45***	
	W		3.37	
Mean Standardized Bias	U		17.1	
	W		4.9	
Median Standardized Bias	U		5.7	
	W		4.3	

Note: Kernel propensity score matching is used. U denotes unmatched (or before matching) and W denotes matched (or after matching). The results of year dummy variables are omitted due to space. * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

The differences between GCA dropouts and completers who were included in the analysis of four-year post-treatment outcomes were also significantly reduced after PSM weights were applied. As shown in Table A3, mean differences in pre-treatment attributes were statistically equivalent to zero.

Indicators of matching quality again signal strong matches. Due to the common support condition, four observations of non-completers were dropped. Matching quality indicators show that pseudo R2 is decreased substantially from 31.9 percent to 2.2 percent; the LR test leads us to accept the null hypothesis after matching with a p-value of 1, indicating that the included regressors are not statistically different between completers and non-completers. The results also show that mean and median bias decreased substantially from 20.6 to 5.3 and from 12.6 to 5.2, respectively.

TABLE A3: MEAN DIFFERENCE IN PRE-TREATMENT ATTRIBUTES BETWEEN STUDENTS WHO WERE GCA DROPOUTS AND STUDENTS WHO WERE GCA COMPLETERS WHO COMPRISED THE STUDY SAMPLE OF FOUR-YEAR POST-ENROLLMENT OUTCOMES

		Dropout	Complete	Difference Between Program Dropout and Complete Participants p-value
Age	U	28.115	28.822	0.922
	W	27.759	27.344	0.932
Age^2	U	832.59	916.71	0.705
	W	813.82	794.05	0.983
Female	U	0.714	0.779	0.419
	W	0.711	0.718	0.471
African American	U	0.143	0.125	0.820
	W	0.132	0.117	0.870
Hispanic	U	0.595	0.625	0.759
	W	0.632	0.657	0.898
Married	U	0.167	0.135	0.935
	W	0.158	0.166	0.759
High School Diploma or GED	U	0.881	0.913	0.818
	W	0.895	0.897	0.849
Administrative Assistant	U	0.143	0.096	0.365
	W	0.158	0.124	0.821
Medical Assistant	U	0.524	0.760	0.912
	W	0.553	0.547	0.986
Log of Program Length	U	5.575	4.995	0.000
	W	5.593	5.625	0.624
Previous Wage (/1000) (One year prior to baseline)	U	8.576	11.204	0.033
	W	8.323	9.467	0.530
Previous Quarters of Employment (One year prior to baseline)	U	2.357	2.519	0.383
	W	2.263	2.333	0.916
Matching Quality Indicators				
Pseudo R^2	U		0.319	
	W		0.022	
Likelihood Ratio (LR) χ^2	U		55.90	
	W		2.29	
Mean Standardized Bias	U		20.6	
	W		5.3	
Median Standardized Bias	U		12.6	
	W		5.2	

Note: Kernel propensity score matching method is used. U denotes unmatched (or before matching) and W denotes matched (or after matching). The results of year dummy variables are omitted due to space. * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

The second comparison group was comprised of people who were statistically equivalent to GCA graduates based on demographics and prior educational and employment history. Unlike the first comparison group, however, this group was pooled from across Texas. Using this larger comparison group allowed the study sample to be increased and for further exploration of how GCA impacted different subgroups of students differently. Researchers chose not to limit this pool of potential comparison group members to Bexar County because of missing observations that located people's place of employment.

The differences between GCA completers and non-participants who were included in the analysis of three-year post-treatment outcomes were also significantly reduced after PSM weights were applied. As shown in Table A4, mean differences in pre-treatment attributes were statistically equivalent to zero.

Matching quality indicators support an effective match: pseudo R2 decreased from 32.1 percent to 0.9 percent; and the LR test accepted the null hypothesis after matching with a p-value of 0.995, indicating that the included regressors are not statistically different between the two groups. Researchers also found that mean and median bias decreased substantially from 41 to 4.7 and 43.6 to 4.1, respectively.

TABLE A4: MEAN DIFFERENCE IN PRE-TREATMENT ATTRIBUTES BETWEEN TREATMENT (GCA COMPLETERS) AND COMPARISON GROUPS (NON-GCA PARTICIPANTS) WHO COMPRISED THE STUDY SAMPLE OF THREE-YEAR POST-ENROLLMENT OUTCOMES

		Treatment Group	Comparison Group	Difference Between the Treatment and Comparison Groups p-value
Age	U	28.622	23.333	<0.001
	W	25.309	25.67	0.612
Age^2	U	891.24	552.87	<0.001
	W	672.10	692	0.632
Female	U	0.657	0.498	<0.001
	W	0.628	0.633	0.939
Black	U	0.195	0.143	0.055
	W	0.202	0.196	0.909
Hispanic	U	0.598	0.382	<0.001
	W	0.574	0.550	0.702
High School Diploma or GED	U	0.923	0.623	<0.001
	W	0.915	0.932	0.609
Associate Degree	U	0.006	0.101	<0.001
	W	0.008	0.011	0.796
Previous Wage (/1000)	U	12.845	21.778	<0.001
(One year prior to baseline)	W	12.108	11.445	0.662
Previous Quarters of Employment	U	2.793	3.360	<0.001
(One year prior to baseline)	W	2.814	2.778	0.808

Matching Quality Indicators

Pseudo R^2	U		0.321	
	W		0.009	
Likelihood Ratio (LR) χ^2	U		729.52	
	W		3.05	
Mean Standardized Bias	U		41.0	
	W		4.7	
Median Standardized Bias	U		43.6	
	W		4.1	

Note: 5-nearest neighbor propensity score matching method is used. U denotes unmatched (or before matching) and W denotes matched (or after matching). The results of year dummy variables are omitted due to space. * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

The differences between GCA completers and non-participants who were included in the analysis of four-year post-treatment outcomes were also significantly reduced after PSM weights were applied. As shown in Table A5, mean differences in pre-treatment attributes were statistically equivalent to zero.

Matching quality indicators support an effective match: pseudo R2 is decreased substantially from 39.9 percent to 0.4 percent; the LR test leads us to accept the null hypothesis after matching with a p-value of 0.995, indicating that the included regressors are not statistically different between the two groups. The results also show that mean and median bias decreased substantially from 54.3 to 2.4 and 52 to 1.8, respectively.

TABLE A5: MEAN DIFFERENCE IN CHARACTERISTICS BETWEEN THE TREATMENT (GCA COMPLETERS) AND COMPARISON GROUPS (NON-GCA PARTICIPANTS) IN THE BASELINE YEAR

		Treatment Group	Comparison Group	Difference Between the Treatment and Comparison Groups
Age	U	28.9	22.808	<0.001
	W	23.637	223.471	0.771
Age^2	U	915.58	526.87	<0.001
	W	571.63	564.38	0.794
Female	U	0.672	0.493	<0.001
	W	0.610	0.590	0.800
African American	U	0.164	0.148	<0.619
	W	0.183	0.155	0.634
Hispanic	U	0.615	0.373	<0.001
	W	0.561	0.554	0.925
High School Diploma or GED	U	0.926	0.685	<0.001
	W	0.927	0.934	0.855
Previous Wage (/1000) (One year prior to baseline)	U	12.075	17.866	<0.001
	W	10.406	10.327	0.964
Previous Quarters of Employment (One year prior to baseline)	U	2.508	3.108	<0.001
	W	2.537	2.522	0.936

Matching Quality Indicators

Pseudo R^2	U	0.399
	W	0.004
Likelihood Ratio (LR) χ^2	U	599.49
	W	0.94
Mean Standardized Bias	U	54.3
	W	2.4
Median Standardized Bias	U	52.0
	W	1.8

Note: 5-nearest neighbor propensity score matching method is used. U denotes unmatched (or before matching) and W denotes matched (or after matching). The results of year dummy variables are omitted due to space. * denotes significance at 10 percent level, ** denotes significance at 5 percent level, and *** denotes significance at 1 percent level.

ATTRITION

Researchers were unable to match all of GCA's student data to the state longitudinal data system, known as Education Research Center (ERC) data. The UEI received GCA data on 1,214 individuals who enrolled in their programs in San Antonio from 2013 to 2019; however, researchers were only able to find 779 GCA enrollees (or 64.2 %) in the state's education data. For convenience, this report refers to the 435 participants without education data as the education-attrition group and the rest as a non-attrition group.

The education-attrition and non-attrition groups varied from each other, as shown in Table A6. On average, the education-attrition group was older and had a higher proportion of male, Black, White, and single people. The group also tended to have a fractionally higher level of educational attainment and enrolled in training programs with a different distribution. For example, the education-attrition group was more likely to enroll in administrative assistant and commercial driver license programs.

TABLE A6: SUMMARY STATISTICS OF SELECTED ATTRIBUTES OF GCA PROGRAM PARTICIPANTS BY EDUCATION-ATTRITION

	Education-Attrition	Non-Attrition
Demographic Characteristics		
Age	43.279	28.854
	(10.860)	(8.253)
Female	0.575	0.660
	(0.495)	(0.474)
African American	0.221	0.167
	(0.415)	(0.373)
Hispanic	0.494	0.646
	(0.501)	(0.479)
White	0.186	0.121
	(0.390)	(0.326)
Marital Status		
Married	0.340	0.151
	(0.474)	(0.359)
Single	0.407	0.727
	(0.492)	(0.446)
Educational Attainment		
High School Diploma or GED	0.869	0.935
	(0.338)	(0.248)
Associate Degree	0.080	0.055
	(0.272)	(0.229)
Program Distributions		
Administrative Assistant	12.87%	8.09%
Medical Assistant	48.28%	63.29%
Commercial Driver License	28.51%	20.03%
Other Programs	10.34%	8.59%
Program Dropout	21.6%	19.0%
Program Length	164.372	179.62
	(126.385)	(128.939)
Observations	435	779

Note: Standard deviation is reported in parenthesis.

Researchers tested for an overall difference in characteristics between the education-attrition and non-attrition groups by running a probit regression of attrition status on a set of selected characteristics, listed in Table A6. The process involved assigning the value of 1 for members of the education-attrition group and 0 otherwise. The regression results are omitted for the sake of brevity, but we find that the age and Hispanic variables were statistically significant predictors of attrition at the 1 percent level, controlling for all other factors. Researchers then performed a Wald test, which rejects the null hypothesis, indicating that the two groups were not equivalent. Consequently, the findings of this study may be limited to those included in the study.

Attrition patterns were analyzed of those who could not be found in the workforce data of the ERC. Of those found in the ERC education data, 224 were not found in the ERC workforce data (or 28.8 %). For convenience, this report names the 224 participants without wage data as a wage-attrition group and the rest as a non-attrition group.

The ERC workforce data do not include people who are unemployed, self-employed, employed outside of Texas, or employed by the federal government. The descriptive statistics in Table A7 show that the wage-attrition group tended to have a larger share of male, white, Hispanic, and married people. The group was also comprised of persons who tended to hold high school diplomas or GEDs and who enrolled in GCA's commercial driver license program with a slightly lower dropout rate.

TABLE A7: SUMMARY STATISTICS OF SELECTED ATTRIBUTES OF GCA PROGRAM PARTICIPANTS BY WAGE-ATTRITION

	Wage-Attrition Group	Non-Attrition Group
Demographic Characteristics		
Age	28.484	28.987
	(8.128)	(8.303)
Female	0.589	0.688
	(0.493)	(0.464)
African American	0.134	0.180
	(0.341)	(0.385)
Hispanic	0.683	0.631
	(0.466)	(0.483)
White	0.138	0.114
	(0.346)	(0.318)
Marital Status		
Married	0.174	0.142
	(0.380)	(0.350)
Single	0.705	0.735
	(0.457)	(0.442)
Educational Attainment		
High School Diploma or GED	0.960	0.924
	(0.197)	(0.265)
Associate Degree	0.036	0.063
	(0.186)	(0.243)
Program Distributions		
Administrative Assistant	6.70%	8.65%
Medical Assistant	57.14%	65.77%
Commercial Driver License	26.34%	17.48%
Other Programs	9.82%	8.10%
Program Dropout	17.9%	19.3%
Program Length	175.281	179.892
	(131.210)	(127.707)
Observations	224	555

Note: Standard deviation is reported in parenthesis.

HISTORY

The DID research design effectively controls for extraneous events that occur alongside the intervention and that are experienced by both the treatment and control groups. For example, the U.S. economy experienced a steady economic recovery during the study period. The DID estimate of GCA's effect on workforce outcomes removes the trend in wages and employment shared by the treatment and control groups. However, if an

economic wage trend was only experienced by either the treatment or control group but not by both, this one-sided trend would weaken DID's internal validity. This threat to internal validity is less plausible for the comparison between GCA completers and non-completers since they resided in the same regional labor market and mostly likely remained in the same labor markets. It is more plausible that the second comparison group that pools from across Texas may experience economic trends different from San Antonio residents; however, a test of equivalence between unemployment rate data for Texas and San Antonio did not reveal a statistically significant difference.

REGRESSION

Subjects selected from the tails of a distribution in one period are likely to regress to a less extreme value, one that is closer to the average, in a following period. This natural statistical pattern known as "regression to the mean" may be mistaken for improvement caused by GCA since adults who completed GCA training started with exceptionally low wages. Researchers mitigated this threat to internal validity by constructing comparison groups (both GCA non-completers and non-participants) with low wages and rates of quarterly employment statistically equivalent to GCA completers prior to treatment.

MATURATION

As people age and acquire more work experience, their wages increase on average. Growth in wages due to maturation can be mistaken for a program's treatment effect over time. DID mitigates this threat to internal validity by subtracting out the change in workforce outcomes experienced by the comparison group, which represent what would have occurred to the treatment group absent GCA training (also referred to as counterfactual).

IMPACT STUDY
OF GOODWILL SAN ANTONIO'S
GOOD CAREERS ACADEMY
JOB TRAINING PROGRAMS

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