

## Executive Summary

The impact evaluation conducted by Ray Marshall Center (RMC) attempted to gauge the “value-added” from the enhanced TAACCCT training pathways by comparing both postsecondary education and labor market outcomes for students enrolled in courses supported by the TAACCCT grant with the outcomes of TCC students enrolled in broadly similar programs who have not participated in the enhanced TAACCCT pathways.

Research questions guiding the impact evaluation were:

1. Do participants persist at higher rates than similar non-participants, measured in terms of continued enrollment?
2. Do participants complete the program at higher rates than similar non-participants, measured in terms of certificates and degrees attained?
3. Do participants who complete the program go on to enroll in further programs of study at 4-year higher education institutions at higher rates than similar non-participants?
4. How do participants’ employment rates compare to the employment rates of similar nonparticipants, measured at program completion and up to four quarters post-completion?
5. How do participants’ quarterly earnings compare to similar non-participants’ earnings post-program completion, measured up to four quarters post-completion?

A quasi-experimental evaluation design was initially proposed but such a comparison group approach proved to be infeasible given limitations with the available data. Student records available from TCC’s Institutional Research office had significant numbers of missing records on many key demographic variables including gender, race, area of residence, veteran status, and receipt of financial aid. In addition, UI wage records from the Oklahoma Employment Security Commission (OESC) were only accessible by aggregate groups, not by individual, precluding the use of standard matching procedures to support quasi-experimental analysis.

The TAACCCT program identified student program completers, and start and end dates for program completers. TCC’s Institutional Research office provided limited student demographics, credit hours, certificates and degrees, total credits earned, and GPAs for all students who had a unique student ID. The National Student Clearinghouse (NSC) shared data

on students who have enrolled in further programs of study at 4-year higher education institutions. OESC provided employment status, earnings mean and median by quarter.

## Outcomes

Table 1 presents the following outcomes for participant and benchmark students.

- Benchmark students completed and continued enrollment at higher rates than TAACCCT participants by 35 percentage points and 14 percentage points, respectively.
- Participants received certificates and/or degrees at a higher rate (57%) than benchmark students (27%).
- NSC data indicates that participants and benchmark students continued their education at 4-year institutions at the same rate (5%).
- TAACCCT participants were employed at higher rates in the four-quarter post-program period compared to benchmark students.
- TAACCCT participants earned more on average than benchmark students in the four-quarter post-program period, measured both by mean and median earnings.

Table 1. Percent of Participant and Benchmark Student for Each Outcome,

Outcome Measure	TAACCCT Participants	Benchmark Students
Program Completion	50%	85%
Continued Enrollment at TCC	41%	55%
Certificates and/or Degrees Earned	57%	27%
Enrolled in 4-year Institution of Higher Education	5%	5%
Employment Rates	75%	64%
Earnings Mean	\$7,491	\$7,049
Earnings Median	\$6,615	\$6,006

## Introduction

The Tulsa Community College (TCC) Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program – the Advanced Manufacturing, Aerospace, and/or Transportation and Logistics Pathways Project – represents TCC’s efforts to strategically align workforce, education and training activities in the interest of developing sustainable career pathways. Under this grant, the college outlined the following two primary goals:

1. Develop Tulsa MSA manufacturing, aerospace, and/or transportation and logistics career pathways with industry partners.
2. Build TCC institutional educational capacity.

The Certified Production Technician (CPT) program, an effort which encompasses both goals listed above is a series of four courses (Safety, Quality, Manufacturing Processes, and Manufacturing Awareness). Students take a test at the end of each course and, upon passing the test, receive an industry-recognized certificate. Upon completing all four courses and receiving all four certificates, students are then considered to be recipients of the national CPT certification. Participants will have earned 12 college credit hours within the Engineering Technology degree program. The CPT program fits into a larger AAS degree – the Manufacturing Production Technician – and so students who receive the CPT certification can continue on seamlessly to attain an Associate degree.

The Tulsa Community College (TCC) TAACCCT grant impact evaluation, conducted by the Ray Marshall Center (RMC) in partnership with the Corporation for a Skilled Workforce (CSW), is a comparison of postsecondary education and labor market outcomes for students enrolled in courses supported by the TAACCCT grant with students enrolled in similar offerings but without the treatment that is part of the TAACCCT grant, or to similar populations in broadly similar programs.

## Purpose and Scope of the Impact Evaluation

This impact evaluation conducted by RMC attempted to gauge the “value-added” from the TAACCCT enhanced training pathways by comparing both educational progress and — to a limited extent — labor market outcomes with those of several groups of TCC students who have not had access to or participated in the enhanced TAACCCT pathways.

Research questions guiding the impact evaluation were:

1. Do participants persist at higher rates than similar non-participants, measured in terms of continued enrollment?
2. Do participants complete the program at higher rates than similar non-participants, measured in terms of certificates and degrees attained?
3. Do participants who complete the program go on to enroll in further programs of study at 4-year higher education institutions at higher rates than similar non-participants?
4. How do participants’ employment rates compare to the employment rates of similar nonparticipants, measured at program completion and up to four quarters post-completion?
5. How do participants’ quarterly earnings compare to similar non-participants’ earnings post program completion, measured up to four quarters post completion?

A quasi-experimental evaluation design was initially proposed that would have matched students from non-modified programs with the same or similar occupational focus to program participants in the new pathways using characteristics such as student demographics and labor market experience. Such a comparison group approach proved to be infeasible given limitations with the available data. Student records available from TCC’s Institutional Research (IR) office had significant numbers of missing records on many key demographic variables including gender, race, area of residence, veteran status, and receipt of financial aid. As the following tables indicate, the degree to which these records were missing varied considerably by participant and benchmark student status. In addition, due to recent changes in state legislation, UI wage records from the Oklahoma Employment Security Commission (OESC) were only accessible by aggregate groups, not by individual, precluding the use of standard matching procedures to support quasi-experimental impact analysis. Alternatively, RMC worked with TCC Associate Dean Pat Green to identify six (6) groups of students to serve as “benchmark” groups

for comparison purposes. These benchmark TCC students were enrolled in the following courses:

- Introduction to Quality (QCTT 1313)
- Manufacturing Processes (ENGT 1313)
- Computer User Certificate
- Microsoft Office (CSYS 2073)
- Intro to Hospitality Operations (BUSN 1153)
- Labor and Food Cost Management (HFSV 1413, 2021, 2312)

These were determined to be either similar course offerings to those under the grant but without the treatment that is part of TAACCCT grant, or they were similar populations in broadly similar programs of study to those served under the grant. Benchmark students are thus neither control nor comparison groups but cruder approximations used for comparison purposes as a result of the data limitations encountered in the research.

Table 2 presents two domains, educational progress and labor market outcomes, identified to measure differences between participants and benchmark students. Educational progress was evaluated by comparing differences in the following measures, course completion, certifications and/or degrees awarded, credits earned, grade point average, continued enrollment at TCC and further enrollment in a 4-year institution. Labor market outcomes were measured by comparison of UI earnings data to answer questions of employment four quarters pre- and post-completion of TAACCCT and benchmark courses.

Table 2. Research Domains, Measures and Data Sources

Domain	Measure	Source
Educational Progress	Course Completion	<ul style="list-style-type: none"> <li>• TAACCCT student records</li> <li>• Tulsa Community College Institutional Research</li> </ul>
	Demographics Certificate &/or Degree Credits Earned Grade Point Average Continued enrollment in TCC	<ul style="list-style-type: none"> <li>• Tulsa Community College Institutional Research</li> </ul>
	Enrollment in a 4-year Institution	<ul style="list-style-type: none"> <li>• National Student Clearinghouse</li> </ul>
Labor Market Outcomes	Earnings Data	<ul style="list-style-type: none"> <li>• Oklahoma Employment Security Commission</li> </ul>

TCC provided RMC researchers with information on 1,000 TAACCCT student participants and 676 benchmark comparison students. Students identified in both participant and benchmark groups were removed from the benchmark group and remained in the participant group. Unique identifiers were used to locate participant and benchmark students in four different data sources.

Table 3 presents the number of participants and benchmark students with unique identifiers. TAACCCT provided information on student name, student ID, some social security numbers, student start and end dates, and identified TAACCCT completers. TCC's Institutional Research office provided student demographics, credit hours, certificates and degrees, total credits earned, and GPAs for all students who had a unique student ID. NSC requires student name and date of birth to report on students who have enrolled in further programs of study at 4-year higher education institutions. Four hundred and twenty-nine participants and 676 benchmark students have both a unique student ID and a date of birth. OESC provided employment status, earnings mean and median by quarter for 473 participant and 641 benchmark students for whom Social Security Numbers (SSNs) were provided. As a result of more restrictive legislation enacted several years earlier, OESC only provided UI wage data on an aggregate or group basis, not by individual.

Table 3. Participants and Benchmark Students Available Data

	Unique Records	Unique Valid Student ID	Date of Birth	Social Security Number
Participants	1,000	429	429	473
Benchmark	676	676	676	641

## Participant and Benchmark Student Characteristics

The majority of the students from both the participant and benchmark groups were similar in all demographics except gender: participants were overwhelmingly male (78%) while benchmark students were more balanced, with 53% female and 44% male. The groups were similar in that nearly half of the students in each group identified as white: participants 46% and benchmarks 55%. The next largest racial group of students identified as black (13% and 15%, respectively).<sup>1</sup> For both groups, half or more of the students were younger than 29 years of age: participants 57% and benchmark 50%. The majority of the TAACCCT participants resided in the city of Tulsa; however, area of residence was missing for the majority of the benchmark students. Six percent or fewer identified themselves as veterans in both groups.<sup>2</sup> Of the students who reported their financial aid status, 25% of participants and 53% of benchmark students reported receiving some financial aid (Table 4). Much of this difference is likely accounted for by the fact that TCC used foundation funds to pay tuition and fee costs for some TAACCCT participants, such that they did not need to apply for financial aid to the same extent as benchmark students.

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<sup>1</sup> Participant Race/Ethnicity is missing in 19% of the cases.

<sup>2</sup> Participant Veteran Status is missing in 18% of the cases.

Table 4. Demographics of Participants and Benchmark Students Identified in the IR Date

	Participants		Benchmark	
	Number	Percent	Number	Percent
Total	429	100	676	100
Gender				
Female	92	21%	357	53%
Male	336	78%	298	44%
Not Reported	1	0%	21	3%
Race/Ethnicity				
White	196	46%	370	55%
Black or African American	56	13%	103	15%
Hispanic of any race	26	6%	51	8%
American Indian or Alaska	28	7%	63	9%
Asian	11	3%	19	3%
More than one race report	32	7%	1	0%
Not Reported	80	19%	44	7%
Age				
17 or younger	86	20%	15	2%
18 to 29	159	37%	325	48%
30 to 39	81	19%	163	24%
40 to 49	60	14%	85	13%
50 to 59	31	7%	70	10%
60 or older	12	3%	18	3%
Area				
Tulsa	203	47%	53	8%
Northern suburbs	41	10%	5	1%
Eastern suburbs	93	22%	32	5%
Southern suburbs	39	9%	15	2%
Western suburbs	52	12%	11	2%
Not Reported	1	0%	560	83%
Veteran				
Yes	25	6%	36	5%
No	326	76%	619	92%
Not Reported	78	18%	21	3%
Received Financial Aid <sup>3</sup>				
Yes	106	25%	361	53%
No	197	50%	257	38%
Not Reported	126	29%	58	9%

<sup>3</sup> The variable “applied for financial aid”, not included in this table, identified more students receiving aid than had applied.

## Program Outcomes

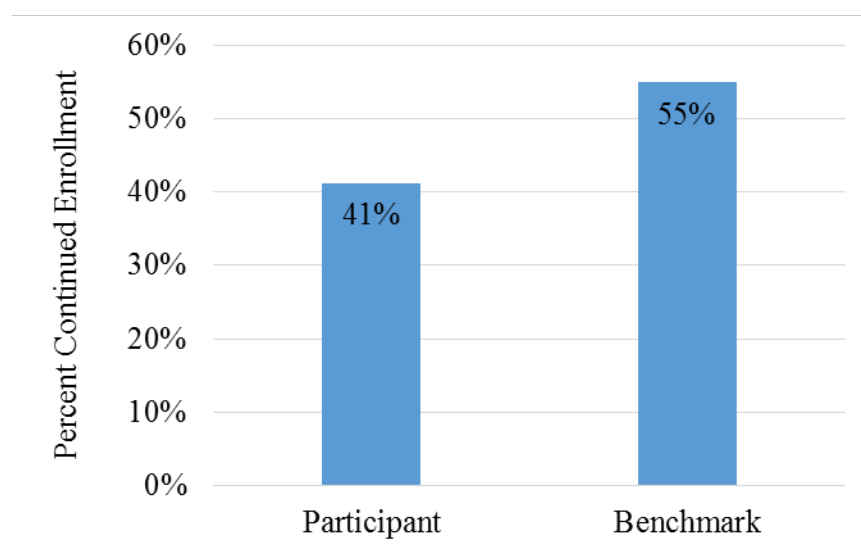
This section reports outcomes and impacts for each of the five research questions.

**Question 1:** Do participants persist at higher rates than similar non-participants, measured in terms of continued enrollment at TCC?

This research question addresses the issue of continued enrollment in programs at TCC, not higher education in general. The analysis includes only those students in TCC's IR data who had a valid, unduplicated student ID, a total of 429 participants and 676 benchmark students. Figure 1 compares the percentage of students from each group identified as “continued enrollment.”

Participant continued enrollment was indicated if the student took additional TCC classes after their program “end date” (n=177). Benchmark continued enrollment was indicated if the student took additional classes at TCC following the semester end date of the benchmark course in which they were enrolled (n=372). Forty-one percent of participants and 55 percent of benchmark students continued enrollment at TCC by this measure. Benchmark students continued enrollment at a higher rates than TAACCCT participants by 14 percentage points (Figure 1).

Figure 1. Percent of Participant and Benchmark Student Continued Enrollment,  
Participant N=429, Benchmark N=676



**Question 2:** Do participants complete the program at higher rates than similar non-participants, measured in terms of certificates and degrees attained?

This question addresses a particular definition of program completion, i.e., students attaining certificates and/or degrees captured in TCC's IR data.

- 213 TAACCCT participants were identified by TAACCCT as having obtained a certificate, an additional 30 TAACCCT students were identified in the in TCC's IR data as having obtained a certificate and/or a degree.
- 180 benchmark students were identified in TCC's IR data as having obtained a certificate and/or degree.

Table 5 presents participants and benchmark student totals who received a certificate and/or degree. Nearly three-fifths (57%) of TAACCCT participants were recorded as having received a degree or certificate, most of these being certificate recipients. Only 27% of benchmark students received degrees or certificates, in part reflecting the fact that these courses are part of a continuing program of education at TCC.

Table 5. Participants and Benchmark Students Awarded a Certificate and/or Degree

	Total	Students Awarded a Degree and/or Certificate	Percent of Total
Participants	429	243	57%
Benchmark	676	180	27%

Table 6 presents average GPAs and total credits earned for participants and benchmark students as captured in TCC's IR data. Even though 243 participants were identified as having been awarded a certificate and/or a degree, only 193 of these 243 students were found in TCC's IR with earned credits and, thus, had an officially computed GPA. In discussions, TAACCCT staff indicated that some students receiving certificates through the TAACCCT program were enrolled in TCC's Continuing Education program and, thus, would not receive credits for certificates earned. For both groups, average GPAs are similar with only a 0.06 grade point difference. On average, benchmark students earned a total of 7.7 more credits than participants, representing at least two additional courses.

Table 6. Demographics of Participants and Benchmark Students Awarded a Degree or Certificate  
Average GPA and Average Total Credits

	Participants			Benchmark		
	Number	Avg. GPA	Avg. Total Credits	Number	Avg. GPA	Avg. Total Credits
Total	193	3.09	47.7	180	3.15	55.4
Gender						
Female	56	3.20	45.23	115	3.17	40.65
Male	136	3.04	48.69	65	3.13	81.54
Not Reported	1	3.50	6.00	0	-	-
Race/Ethnicity						
White	101	3.20	56.20	106	3.18	58.01
Black or African American	42	2.76	28.42	24	3.09	40.54
Hispanic of any race	8	3.02	65.13	15	2.97	75.73
American Indian or Alaska	16	3.22	34.39	19	3.30	41.11
Asian	6	2.93	90.75	0	-	-
More than one race report	18	3.18	32.67	9	2.86	88.89
Not Reported	2	3.29	44.00	7	3.24	19.43
Age						
17 or younger	6	2.58	63.00	0	-	-
18 to 29	66	3.03	59.87	69	3.07	55.58
30 to 39	45	3.28	33.62	56	3.20	49.93
40 to 49	42	3.08	33.35	27	3.07	48.44
50 to 59	24	2.94	52.51	20	3.39	64.50
60 or older	10	3.28	65.80	8	3.20	93.25
Area						
Tulsa	123	2.99	44.38	10	3.23	82.60
Northern suburbs	16	3.18	58.06	2	2.75	159.50
Eastern suburbs	32	3.29	53.97	6	3.18	105.83
Southern suburbs	17	3.31	50.01	0	-	-
Western suburbs	5	3.23	39.20	4	3.11	133.75
Not Reported	0	0	0	158	3.15	48.48
Veteran						
Yes	7	2.99	88.14	9	3.04	104.00
No	186	3.09	45.94	171	3.16	52.86
Not Reported	0	0		0	-	-
Received Financial Aid						
Yes	110	3.26	61.17	112	3.17	44.88
No	40	3.09	46.17	49	3.12	80.43
Not Reported	43	2.93	38.74	19	3.13	53.05

**Question 3.** Do participants who complete the program go on to enroll in further programs of study at 4-year higher education institutions at higher rates than similar non-participants?

This research question addresses the issue of continuing enrollment beyond TCC in 4-year institutions of higher education. This analysis includes students found in the NSC database of institutions of higher education nationwide.<sup>4</sup> Student name and date of birth were required to access NSC data. Some 429 TAACCCT participants and 676 benchmark students had valid birthdates and could be linked to NSC data.

As shown in Table 7, only 5% of participants and benchmark students were found to have continued their education at a 4-year institution.

Table 7. All Participants and Benchmark Students Enrolled in 4-year Education Institutions  
Participant N=429, Benchmark N=676

	Enrolled in 4-year Institution	Percentage of Total
Participants	20	5%
Benchmark	35	5%

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<sup>4</sup> NSC data now encompasses some 96% of all enrollments in higher education in the United States (National Student Clearinghouse 2016).

As mentioned earlier, due to recent changes in state legislation, UI wage records from the Oklahoma Employment Security Commission (OESC) used to address the following two questions, were only accessible in the aggregate, not by individual, precluding the use of standard matching procedures to support quasi-experimental impact analysis. Aggregates of SSNs, based upon participant and benchmark students' dates of completion, were submitted to OESC to request quarterly employment and wage data for 463 participants and 522 benchmark students for four quarters prior to completion, the completion quarter and four quarters post-completion. From the original twelve aggregates submitted to the OESC, only six were in the job market long enough to report employment and wage data for the nine identified quarters.<sup>5</sup>

**Question 4.** How do participants' employment rates compare to the employment rates of similar non-participants, measured from four quarters prior to program completion, at program completion and up to four quarters post-completion?

Figure 2 illustrates that participants had higher rates of employment than benchmark students four quarters prior to their completion of the training program and maintained this difference throughout the nine quarters. Across the nine quarters measured the rate of employment increased for both groups. Nearly three-fourths of participants were employed in the post-program period compared to about 64 percent of benchmark students (Table 8). The difference in employment rates between participants and benchmark students increased by one percentage point over the period. It is unclear whether these differences can be attributed to program participation at this point.

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<sup>5</sup> UI wage records become available from OESC approximately seven months following the end of the quarter in which a person is employed in UI-covered employment.

Figure 2. Participant and Benchmark Employment Rates by Quarter  
Participant N=110, Benchmark N=284

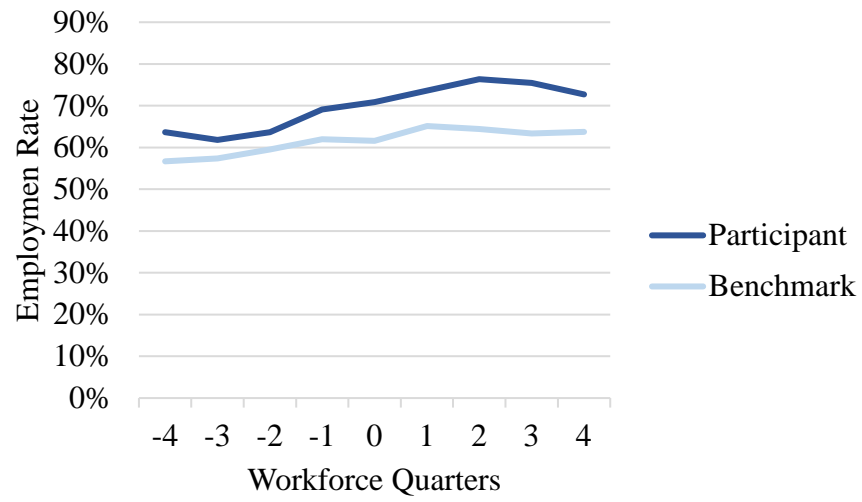


Table 8. Participant and Benchmark Employment Counts and Employment Rate by Quarter: Participant N=110, Benchmark N=284

Participant Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr. 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	16	17	19	18	18	18	21	22	24	29
7/1-9/30/2014	11	8	8	13	17	16	14	13	12	24
10/1-12/31/2014	43	43	43	45	43	47	49	48	44	57
<b>Total</b>	<b>70</b>	<b>68</b>	<b>70</b>	<b>76</b>	<b>78</b>	<b>81</b>	<b>84</b>	<b>83</b>	<b>80</b>	<b>110</b>
<b>Percentage</b>	<b>64%</b>	<b>62%</b>	<b>64%</b>	<b>69%</b>	<b>71%</b>	<b>74%</b>	<b>76%</b>	<b>75%</b>	<b>73%</b>	<b>70%</b>
Benchmark Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr. 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	66	66	63	70	74	78	75	73	78	123
7/1-9/30/2014	22	23	26	28	28	31	29	28	25	42
10/1-12/31/2014	73	74	80	78	73	76	79	79	78	119
<b>Total</b>	<b>161</b>	<b>163</b>	<b>169</b>	<b>176</b>	<b>175</b>	<b>185</b>	<b>183</b>	<b>180</b>	<b>181</b>	<b>284</b>
<b>Percentage</b>	<b>57%</b>	<b>57%</b>	<b>60%</b>	<b>62%</b>	<b>62%</b>	<b>65%</b>	<b>64%</b>	<b>63%</b>	<b>64%</b>	<b>62%</b>

**Question 5.** How do participants' quarterly earnings compare to similar non-participants' earnings measured from four quarters prior to program completion, at program completion and up to four quarters post-completion?

Participant and benchmark student mean and median earnings for nine quarters are illustrated in Figures 4 and 5. For both figures, the mean quarterly wage and the median quarterly wage by quarter were calculated by weighting the individual quarterly aggregate wage by the total number employed in a particular quarter. TAACCCT participants experienced the expected “dip” in wages, both mean and median, during the quarter immediately prior to their enrollment in the program.<sup>6</sup> Benchmark student wages did not follow this pattern.

Figure 3 illustrates that participants had higher mean wages than benchmark students four quarters prior to completing the training program. Participants experienced a decrease in wages in the quarter prior to entering the program yet gained on average \$1,000 in wages during the completion quarter (see Table 9). Participant mean wages fell slightly during the second quarter following completion but increased to almost \$7,900 by the fourth quarter post completion of the TAACCCT program. Benchmark students experienced a decrease in mean wages during the first quarter following completion with wages increasing to \$7,201 by the end of the fourth quarter post completion. For the four-quarter period post completion, on average, participants earned \$442 more in mean wages than benchmark students. Without more rigorous estimation—using either a control or a well designed comparison group—it is unclear to what extent this difference can be attributed to participation in the program or to other factors.

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<sup>6</sup> Ashenfelter first pointed out that mean earnings of participants in government training programs declined in the period just prior to program entry. See: Ashenfelter, O. “Estimating the Effect of Training Programs on Earnings.” *Review of Economics and Statistics*, February 1978, 60, pp. 47-57.

Figure 3. Participant and Benchmark Mean Wage by Quarter:  
Participant N=110, Benchmark N=284

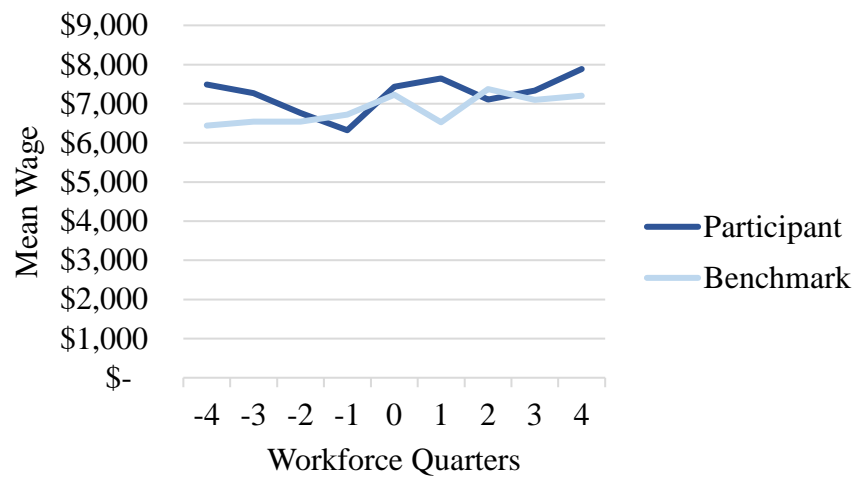


Table 9. Participant and Benchmark Mean Wage by Quarter: Participant N=110, Benchmark N=284

Participant Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr.	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	4,683	4,463	4,284	3,346	4,581	5,917	5,081	5,219	4,197	29
7/1-9/30/2014	5,098	5,206	4,422	2,843	3,781	5,573	5,209	5,227	5,522	24
10/1-12/31/2014	9,928	9,568	9,000	9,299	10,426	9,391	8,930	9,293	10,756	57
<b>Mean Wage</b>	<b>7,491</b>	<b>7,271</b>	<b>6,758</b>	<b>6,321</b>	<b>7,435</b>	<b>7,642</b>	<b>7,103</b>	<b>7,332</b>	<b>7,885</b>	
										<b>Total=110</b>
Benchmark Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr.	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	6,117	6,566	6,850	6,704	6,914	6,618	7,615	7,286	6,932	123
7/1-9/30/2014	5,435	5,516	4,903	4,841	4,734	4,699	5,706	5,265	6,351	42
10/1-12/31/2014	7,128	6,870	6,808	7,395	8,432	7,067	7,711	7,557	7,779	119
<b>Mean Wage</b>	<b>6,440</b>	<b>6,538</b>	<b>6,544</b>	<b>6,718</b>	<b>7,227</b>	<b>6,523</b>	<b>7,373</b>	<b>7,101</b>	<b>7,201</b>	
										<b>Total=284</b>

Figure 4 illustrates that participants had slightly higher median wages than benchmark students four quarters prior to their completion of the training program. Participants experienced a decrease in median wages in the quarter prior to entering the program. Both participants and benchmark students experienced gains in median quarterly wages over the post-completion period (Table 10), but, the key metric is that, on average, TAACCCT participants earned \$609 more than benchmark students for the four-quarter period post completion. Without more rigorous estimation,—it is unclear to what extent this difference can be attributed to participation in the program or to other factors.

Figure 4. Participant and Benchmark Average Median Wage by Quarter  
Participant N=110, Benchmark N=284

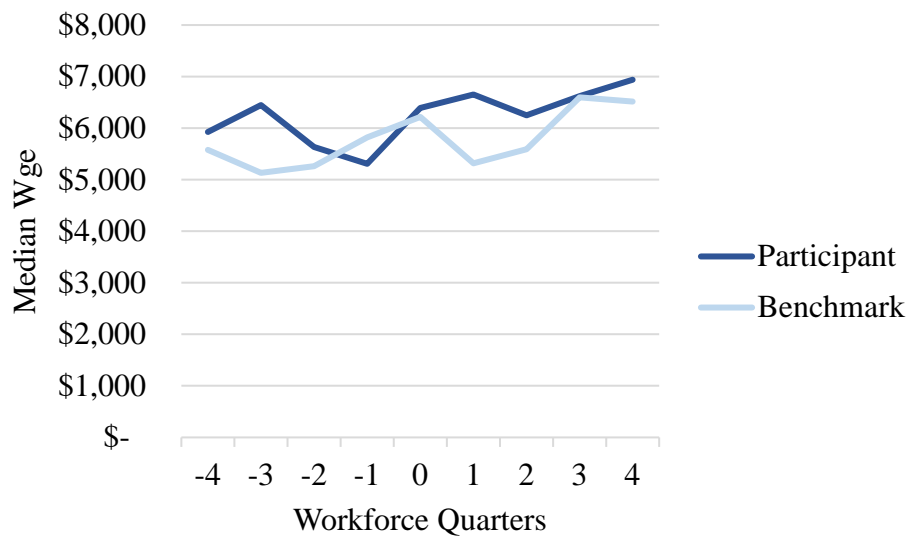


Table 10. Participant and Benchmark Median Wages by Quarter Participant N=110, Benchmark N=284

Participant Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr.	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	2,158	4,114	2,503	2,237	3,719	4,946	3,602	4,190	3,536	29
7/1-9/30/2014	4,354	4,487	5,127	2,701	2,937	5,087	5,661	5,585	4,841	24
10/1-12/31/2014	8,499	8,457	7,445	7,968	9,211	8,179	7,840	8,295	9,554	57
<b>Average Median Wage</b>	<b>5,923</b>	<b>6,446</b>	<b>5,636</b>	<b>5,308</b>	<b>6,394</b>	<b>6,652</b>	<b>6,247</b>	<b>6,621</b>	<b>6,939</b>	
										<b>Total=110</b>
Benchmark Completion Quarter Dates	Qtr. -4	Qtr. -3	Qtr. -2	Qtr. -1	Completion Qtr.	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Total Participants
4/1-6/30/2014	5,571	5,380	5,928	6,125	6,804	5,619	6,113	7,404	6,671	123
7/1-9/30/2014	5,178	5,372	4,710	5,014	4,119	4,573	4,617	5,161	5,100	42
10/1-12/31/2014	5,725	4,793	4,775	5,796	6,359	5,276	5,393	6,270	6,859	119
<b>Average Median Wage</b>	<b>5,577</b>	<b>5,133</b>	<b>5,265</b>	<b>5,823</b>	<b>6,220</b>	<b>5,321</b>	<b>5,590</b>	<b>6,597</b>	<b>6,517</b>	
										<b>Total=284</b>

## Discussion

The limitations of the available data shaped the outcomes of this evaluation. Outcomes are influenced by incomplete data reporting, and varying definitions and reporting systems for similar student activities. For example, certification organizations that are external to TCC typically do not have agreements that will allow TCC access to information regarding the certificates awarded to TCC students. Therefore, TCC IR data does not include these certifications. The limitations of OESC providing data in aggregate form only greatly limits the level of analysis and hinders attempts to understand and explain the available aggregated data.

## Conclusions

The impacts of TCC's TAACCCT program could not be measured with the level of rigor proposed for reasons explained in the report. Experimental and quasi-experimental estimation were ruled out because of limitations to the college and labor market outcomes data. To the extent that comparisons between the TAACCCT participants and students selected as "benchmark" students at TCC are reasonable approximations, TAACCCT participants may have continued enrollment at TCC at lower rates and at 4-year institutions of higher education at the same rate as benchmark students. At the same time, participants appear to have been employed at higher rates and earned more than benchmark students, whether using weighted mean or median quarterly wage measures. More and better data, as well as more rigorous estimation would be required to determine the extent to which these differences can be attributed to participation in the TAACCCT program at TCC.