Washington State's Integrated Basic Education and Skills Training (I-BEST) Program

Three-Year Impact Report

OPRE Report 2021-102

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PACE
Pathways for Advancing Careers and Education

Washington State's Integrated Basic Education and Skills Training (I-BEST) Program: Three-Year Impact Report

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Overview

This report documents the impacts three years after random assignment for Washington State's Integrated Basic Education and Skills Training (I-BEST) program. I-BEST was designed to increase low-skilled adults' access to and completion of college-level occupational training in a range of in-demand occupational areas. I-BEST was developed by Washington's State Board for Community and Technical Colleges (SBCTC) and has operated statewide since the 2006-07 academic year. The program's signature feature is a team-teaching approach where students receive instruction from two instructors in the same course: one provides job training and the other teaches basic skills in reading, math, or English. To further support students, the I-BEST programs in this evaluation included dedicated advisors to provide students with guidance on academic issues, navigating the college's procedures, and career planning. It also provided "fill-the-gap" financial support beyond typical sources, for training and associated materials.

I-BEST is part of the **Pathways for Advancing Careers and Education (PACE)** project. Funded by the Administration for Children and Families within the U.S. Department of Health and Human Services, PACE is a multi-site experimental evaluation of nine programs for low-income adults that incorporate some features of a career pathways framework. The I-BEST evaluation was conducted at three of Washington's 34 community and technical colleges: Bellingham Technical College, Everett Community College, and Whatcom Community College.

This evaluation is part of the Career Pathways Intermediate Outcomes Study, which extends the follow-up period to three years for programs in the PACE project. It extends analyses conducted for an initial I-BEST report (Glosser et al. 2018) that covered implementation and short-term (18 to 24 months) impacts on education and early career progress. Future reports produced by the Career Pathways Long-term Outcomes Study will extend the follow-up period further.

Purpose

I-BEST grew out of a concern that adult students who do not have the skills to directly enter college programs were not advancing beyond basic skills courses to college-level occupational programs, and therefore were not earning credentials. I-BEST aims to teach students basic and occupational skills concurrently so they can move more quickly into higher-paying jobs or college-level courses. Colleges in the evaluation operated I-BEST in one or more occupational areas including Automotive, Electrical, Office Skills, Nursing, Precision Machining, and Welding. This research was undertaken to evaluate whether I-BEST was successful in increasing access to and completion of college-level occupational training for low-skilled adults and whether the program's efforts led to impacts on credentials, earnings, and other life outcomes.

Research Questions

- Three years after random assignment, what were the effects of I-BEST on: educational outcomes; entry into career-track employment and higher earnings; and individual and family well-being, including income and other life outcomes?
- Did the benefits of the I-BEST program outweigh the costs from the perspectives of government, treatment group members, and society as a whole?

Key Findings

The three-year findings summarized below focus on the pre-specified confirmatory and secondary outcomes. There is one confirmatory outcome in both the education and the employment domains, which are the outcomes that we determined to be the most critical to judging the program's success. Secondary outcomes are other important outcomes related to expected changes if the program is successful.

- ***I-BEST had no impact on receipt of credentials requiring a year or more of college study—the confirmatory outcome in the education domain.***

This outcome was selected as the confirmatory outcome because it reflects the I-BEST program's goal of promoting additional progress in career pathways beyond the initial I-BEST programs. This result indicates that after completing their one- to three-quarter I-BEST program, treatment group members were not more likely than the control group members to complete additional courses that lead to higher-level credentials. The short-term impact report found that two thirds of those who attended I-BEST took courses after the I-BEST program; however, this additional coursework did not result in higher-level credentials during the three-year follow-up period.

- ***I-BEST had a large impact on receipt of any college credential.***

Almost half (48 percent) of the treatment group received some type of credential from a college, compared to 17 percent of the control group, a 31 percentage point impact. This impact on any college credential was primarily driven by an impact on shorter-term workforce awards earned through completing occupational courses. Credits earned from workforce awards are not transferable to four-year colleges.

- ***I-BEST had no detectable impact on average quarterly earnings in follow-up quarters 12-13, using administrative data—the confirmatory outcome in the employment domain.***

Though no earnings impacts were detected in quarters 12-13 using administrative data, imprecision due to small sample sizes does not allow us to rule out that I-BEST might have had substantively important effects on earnings (the uncertainty surrounding the estimate of a +$404 impact indicates a range from as large as +$973 to as small as −$165). However, the study detects statistically significant positive effects of more than $600 per quarter in immediately prior quarters (quarters 10 and 11) and in quarters 10-13 in total. Furthermore, in the survey data, the study detects sustained earnings impacts starting at +$1,029 and increasing to +$1,206 in

quarters 10-12. We also detected impacts on working in a job that paid at least $14 per hour. These results lead us to conclude that it is likely that I-BEST produced a positive impact on earnings three years after random assignment.

- ***Because of imprecision in the earnings and educational costs estimates, it is not possible to definitively assess whether the benefits of the I-BEST program are outweighed by the costs.***

Due to uncertainty in underlying estimates, cost-benefit analysis findings indicate that both positive and negative net benefits are plausible.

Methods

The I-BEST evaluation used an experimental design in which program applicants were assigned at random to either a treatment group that could access the program or a control group that could not, then compared their average outcomes. Between November 2011 and September 2014, program staff randomly assigned 315 program applicants to the treatment group and 317 to the control group. The impact study used data from a three-year follow-up survey, administrative records from SBCTC, and earnings records from the National Directory of New Hires. The study measured impacts on education and training, employment and earnings, and other life outcomes approximately three years after random assignment for all measures and up to four years for select earnings measures with available administrative data. The study included a cost-benefit analysis.

Executive Summary

Washington State's Integrated Basic Education and Skills Training (I-BEST) program is designed to increase low-skilled adults' access to and completion of college-level occupational training in a range of in-demand occupational areas. I-BEST's signature feature is a team-teaching approach. I-BEST aims to teach students basic skills and occupational skills concurrently so they can move more quickly into higher-paying jobs or college-level courses. The I-BEST programs in this evaluation also included dedicated advisors to provide students with guidance on academic issues, navigating the college's procedures, and career planning. It also provided "fill-the-gap" financial support beyond typical sources, for training and associated materials.

This evaluation of I-BEST is part of the **Pathways for Advancing Careers and Education (PACE)** project. Funded by the Administration for Children and Families within the U.S. Department of Health and Human Services, PACE is a multi-site experimental evaluation of nine programs for low-income adults that incorporate some features of a career pathways framework. The I-BEST evaluation was conducted at three of Washington's 34 community and technical colleges.

This evaluation is part of the Career Pathways Intermediate Outcomes Study, which extends the follow-up period to three years for programs in the PACE project.[1] It extends analyses conducted for an initial I-BEST report (Glosser et al. 2018) that covered implementation and short-term (18- to 24-month) impacts on education and early career progress.[2] Future reports produced by the Career Pathways Long-term Outcomes Study will extend the follow-up period further.

The I-BEST Evaluation

Developed by the Washington State Board for Community and Technical Colleges (SBCTC) and operating statewide since the 2006-07 academic year, I-BEST aims to provide occupational training and basic skills instruction in a structured career pathway for adults whose skills levels are otherwise too low to directly enter college. Without I-BEST, these students might otherwise have to enroll in basic skills courses (Adult Basic Education or English as a Second Language) to raise their skill levels to meet college entrance requirements.

[1] All outcomes are measured at least three years after random assignment. For some outcomes in the employment domain, administrative records are available for up to four years after random assignment.

[2] The short-term *Implementation and Early Impact Report* (Glosser et al. 2018) is available at https://www.acf.hhs.gov/opre/resource/washington-states-integrated-basic-education-skills-training-i-best-program-three-colleges-implementation-early-impact-report.

The key features of the I-BEST program are as follows (SBCTC 2017):

- **Team teaching and basic skills support classes.** All programs include team teaching that pairs a basic skills instructor and an occupational instructor in the delivery of occupational training for at least 50 percent of class time. As a complement to team teaching, some I-BEST programs also include separate classes taught by basic skills instructors focusing on developing students' academic foundation to succeed in occupational training.
- **Programs lasting one to three college quarters.** Most I-BEST programs range in length from one to three college quarters, and each quarter includes credit-bearing courses. Most I-BEST programs provide workforce credits earned through occupational training courses. With a focus on developing specific technical skills, these workforce credits are not transferable to four-year colleges. I-BEST programs generally do not result in academic credits, which usually are transferable to four-year colleges.
- **Workforce credentials.** Completion of I-BEST courses generally culminates in a *workforce award* (requiring 20 or more workforce credits but taking less than a year to complete) from the college. Further state licensing may be required to practice in some fields (e.g., nursing occupations).
- **Defined longer-term career pathways.** I-BEST programs themselves are relatively short by design, but each program also serves as a first step on a longer-term career pathway. If they desire, students can progress from their I-BEST courses to additional education and training, including at the college level, to receive additional workforce and/or academic credits and credentials, including associate degrees that are transferable to four-year colleges.

The I-BEST evaluation was conducted at three of Washington's 34 community and technical colleges: Bellingham Technical College, Everett Community College, and Whatcom Community College. These colleges operated I-BEST in one or more occupational areas including Automotive, Electrical, Office Skills, Nursing, Precision Machining, and Welding.

Abt Associates used an experimental evaluation design to estimate the impact of access to I-BEST on participants' postsecondary training, earnings and employment, and other life outcomes.[3] Between November 2011 and September 2014, program staff randomly assigned 632 program applicants as study participants—315 to the treatment group with access to I-BEST services and 317 to the control group without access. The analysis estimates impacts for each outcome by calculating the difference between average values in the two groups. The experiment was designed to capture the effects of the I-BEST program overall rather than the separate contributions of its components. Though other evaluations of I-BEST have been

[3] Such a design ensures that any estimated impacts can be attributed to program access rather than to unmeasured differences between eligible study sample members with access (the treatment group) and without access (the control group).

conducted (Zeidenberg et al. 2010; Jenkins et al. 2009), PACE is the first evaluation of the I-BEST program to use a rigorous random assignment research design.

The short-term report indicated that the three colleges implemented the I-BEST program as designed, including the team teaching, advising, and financial supports to the target population. In the short term, of the three quarters of the treatment group that enrolled in I-BEST, more than two thirds of them attended additional courses beyond their I-BEST courses. Within 24 months of random assignment, I-BEST increased the *total number of academic and workforce credits earned*—the short-term confirmatory outcome pre-selected to assess whether the program was on track to meet its longer-term education and earnings goals. Most of those credits were workforce credits. In the short term, the I-BEST program also increased credential attainment, almost exclusively workforce credentials, and increased enrollment in college courses, primarily workforce courses focused on occupational skills.

Key Findings from This Three-Year Impact Report

This report describes the impact of I-BEST on postsecondary education and training (including enrollment, credit receipt, and credential attainment), earnings and employment, and other life outcomes over a three-year follow-up period. It also reports the findings from our cost-benefit analysis.

To avoid overinterpreting the many false positives that could arise from all the outcomes analyzed, the PACE project structures program analyses by establishing three categories of pre-specified hypotheses: confirmatory, secondary, and exploratory. Confirmatory hypotheses center on outcomes most critical to judging the program's success in achieving its goals within the designated time period. By limiting the confirmatory analysis to a single outcome in each of two separate domains (education and training, and employment), we avoid the statistical problem that arises from "multiple comparisons." Secondary outcomes are other important outcomes related to expected changes if the program is successful and exploratory outcomes are alternative measures of the confirmatory and secondary outcomes and measures of more distal outcomes. All outcome types are clearly identified in the exhibits.

Impacts on Postsecondary Education and Training

The short-term impact report's finding of impacts on credential receipt (regardless of length) is sustained over this longer follow-up period. I-BEST's other education and training impacts at three years are mixed, however.

- ***I-BEST had no impact on receipt of credentials requiring a year or more of college study—the confirmatory outcome in the education domain.***

The study did not detect an impact of I-BEST on receiving a credential that took one or more years of college study to complete, one of the confirmatory outcomes pre-selected by the research team. At three years after random assignment, 8 to 10 percent of treatment and control group members had received such credentials (Exhibit ES-1 below). This outcome was selected as confirmatory because it reflects the I-BEST program's goal of promoting additional progress in career pathways. The result indicates that after attending I-BEST, students did not go on to complete additional courses leading to higher-level credentials.

The short-term impact report had found that in the first 24 months after random assignment, two thirds of those who attended I-BEST took additional courses. Three years out, it appears, however, that this additional coursework did not result in higher-level credentials.

- ***I-BEST had a large impact on receipt of any college credential.***

At three years, almost half (48 percent) of the treatment group received some type of credential from a college, compared to 17 percent of the control group, a 31 percentage point impact (see Exhibit ES-1 below). This impact on any college credential was primarily driven by an impact on workforce awards (requiring 20 or more workforce credits but taking less than a year to complete). The study detected an impact of 32 percentage points on the receipt of a workforce award certificate, and a 4 percentage point impact on the receipt of a workforce completion certificate (requiring less than 20 workforce credits). Given the lack of impact on longer-term credentials, it is likely that this impact is driven by the receipt of credentials that take less than a year to complete.

- ***I-BEST increased college course enrollment and credits earned, driven primarily by enrollment in occupational training courses within the first six months after random assignment.***

By the end of the three-year follow-up period, I-BEST increased full-time-equivalent (FTE) months in college by 2.4 months (see Exhibit ES-1 below). Much of this impact was driven by enrollment in occupational training courses. This finding is not surprising, given I-BEST's focus on occupational training and workforce credential receipt as opposed to academic courses that lead to associate degrees or transfer to four-year colleges.

Reflecting the one- to three-quarter durations of I-BEST programs, we found that impacts on college enrollment were strong in the initial quarters after random assignment but dissipated by the sixth quarter. I-BEST also increased the average number of college credits earned by 11 credits (Exhibit ES-1 below), with most of the impact resulting from workforce credits rather than academic credits.

Exhibit ES-1: Impacts on Credential Receipt, College Enrollment, and Credits Earned, Three Years after Random Assignment

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Credential						
Confirmatory Outcome: Receipt of credential requiring 1 year or more of college study (%)	**10.7**	**8.2**	**+2.4**	**(2.3)**	**+29.3%**	**.143**
Received any college credential (%)	**48.1**	**17.1**	**+31.0*** **	**(3.5)**	**+181.3%**	**<.001**
Received a workforce award certificate (%)	45.3	13.3	+32.0***	(3.3)	+240.6%	<.001
Received a workforce completion certificate (%)	8.7	5.1	+3.7**	(2.0)	+72.5%	.034
Associate degree (%)	0.3	0.9	−0.7	(0.6)	−77.8%	.855
Enrollment						
FTE months enrolled in academic and occupational courses	**6.3**	**3.8**	**+2.4*** **	**(0.5)**	**+63.2%**	**<.001**
Credits						
Total number of workforce and academic credits	**26.6**	**15.7**	**+10.9*** **	**(2.6)**	**+69.4%**	**<.001**
Sample size	315	316				

Source: SBCTC records.

Note: A study participant can earn multiple credentials and is included in each category that they earned a credential. Confirmatory and secondary outcomes are **bolded** and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

Impacts on Earnings and Employment

Within the three-year follow-up period, while the evidence is mixed, the I-BEST program produced evidence of a likely impact on earnings and employment.

- ***I-BEST had no detectable impact on average quarterly earnings in follow-up quarters 12-13, using administrative data—the confirmatory outcome in the employment domain.***

Quarterly earnings in quarters 12-13 (i.e., three years) after random assignment was pre-selected as one of the confirmatory outcomes. Earnings was selected as a confirmatory outcome for this follow-up study because it seemed reasonable to expect economic impacts after three years: participants would have had adequate time to complete one or more credentials and gain employment and earnings associated with those credentials. Administrative data were used for the confirmatory outcome (rather than self-reported follow-up survey data) because they provided a larger sample and is not subject to nonresponse bias. Exhibit ES-2 below shows the difference in average quarterly earnings between the treatment and control groups, as measured in administrative data.

The earnings impact for the average earnings in quarters 12 and 13 was +$404, but this impact estimate was not statistically significant. As is true in all evaluations, the impact was estimated

with uncertainty. Considering that uncertainty, the true impact could be as large as +$973 or as small as −$165.[4]

- ***Despite not detecting an impact on the confirmatory outcome (earnings based on administrative data in quarters 12 and 13), other evidence suggests that I-BEST likely had an impact on earnings in the third year after random assignment.***

Exhibit ES-2 below shows that starting in quarter 4, earnings for the treatment group increased and were larger than those of the control group, with detectable differences between the two groups emerging in the 10th quarter after random assignment. In quarters 10 and 11, we detected a positive impact on earnings, with the treatment group reaching a peak of $683 more than the control group in quarter 11. Furthermore, this positive impact in quarters 10 and 11, resulted in a $2,108 impact on earnings in the last year of the planned follow-up period for this study (quarters 10-13; not shown). However, the impact faded (and was no longer statistically significant) toward the end of this follow-up period and through quarter 16, the last quarter for which data was available for this report. [5]

In addition to the administrative records, we also have self-reported earnings data collected through the three-year follow-up survey. Like the administrative data, the survey responses also showed a positive impact on earnings in quarter 10, with the treatment group earning $1,029 more than the control group. However, unlike the administrative data impacts, which were not detectable in quarter 12, these self-reported earnings impacts were sustained at a consistent level up to +$1,206 through quarter 12 (not shown).

A range of past studies (Barnow and Greenberg 2015; Greenberg and Barnow 2019; Mastri et al. 2018; Schochet et al. 2003) have found that impact estimates based on earnings reported in administrative data tend to be smaller and less likely to be statistically significant relative to those based on survey responses. In the case of the I-BEST evaluation, the difference in administrative and survey impacts appears to be due to reports of higher earnings by the treatment group in the survey, compared to their level of earnings in the NDNH. The impact study could not determine the reason for this discrepancy.

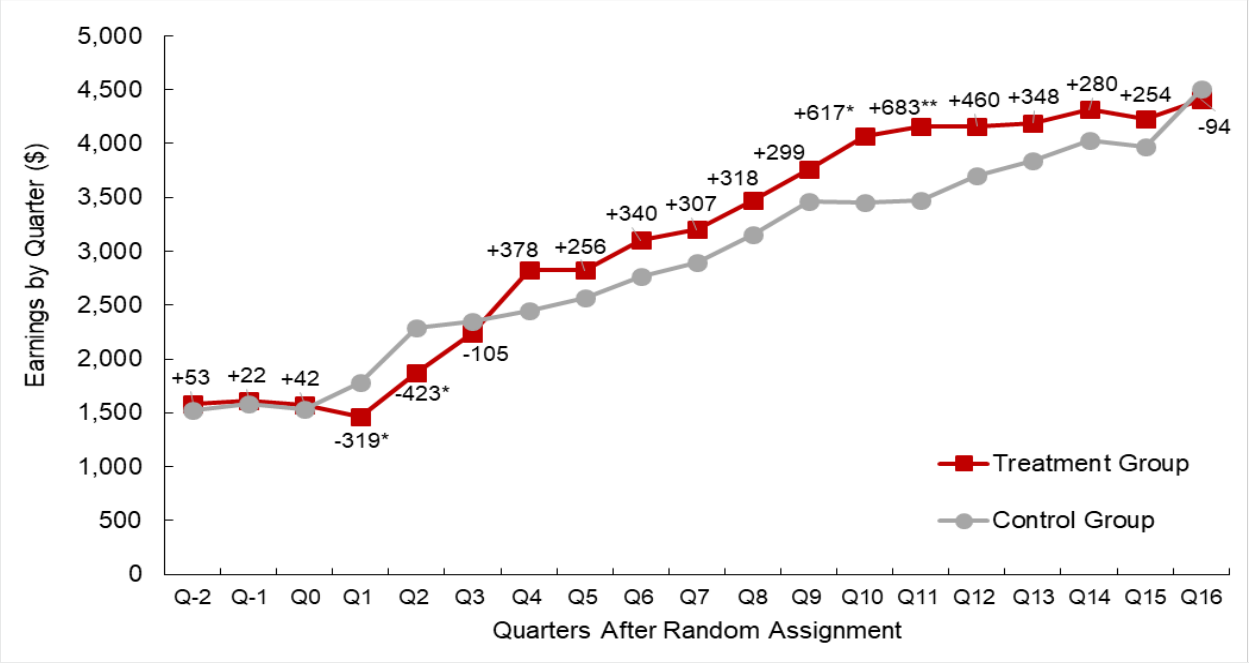
Overall, though there were no detectable impacts on the confirmatory earnings outcome, the study finds consistently positive but not consistently statistically significant earnings impacts from administrative data in the third year after random assignment; and positive and statistically significant earnings impact from survey data in the third year. These results lead us to conclude

[4] These values are the endpoints for a 90 percent confidence interval for average earnings in quarters 12 to 13.

[5] The impact study planned to focus on a three-year follow-up period, which was the follow-up period for the survey. So we pre-specified outcomes based on this time frame and refer to quarters 10-13 as the last year of the follow-up period. However, at the time the report was being produced, four years (16 quarters) of data were available from the NDNH, allowing us to examine some longer-term effects of the I-BEST program in this report.

that it is likely that I-BEST produced a positive impact on earnings three years after random assignment.

Exhibit ES-2: Impacts on Earnings by Quarter Based on Administrative Data



Source: National Directory of New Hires.

Sample size: treatment group: 310; control group: 300.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***There is some evidence of an increase in job quality.***

The study also considered several characteristics of study participants' current or most recent job as measures of job quality. We detected an impact of 8 percentage points on being employed in a job that paid $14 or more per hour and an impact of 11 percentage points on being currently employed in a job that offered health insurance (not shown). Both measures indicate that there were some improvements in the quality of the jobs that treatment group members were able to attain. However, no impacts were detected on other measures of job quality—specifically, the number of hours worked per week, a regular work schedule, or working in a supportive work environment.

Impacts on Other Life Outcomes

- ***I-BEST had no detectable impact on confidence in career knowledge, access to career supports, psycho-social skills, or on most measures of family economic well-being, including household income.***

The study used multi-item scales on the three-year follow-up survey to measure career knowledge, career supports, and psycho-social skills. There was no detectable difference between the treatment and control group on any of these measures. Nor were there detectable differences on a variety of measures of family economic well-being, including the study's pre-

selected secondary outcomes (health insurance coverage from any source, receipt of means-tested public benefits, unsecured debt of $5,000 or more, or financial distress). Despite the impacts on earnings detected by the follow-up survey, we detected no impact on survey measures of household or personal income.

Findings from Cost-Benefit Analysis

The cost-benefit analysis estimated the per-person costs of the I-BEST program and the education and training other than I-BEST accessed by the treatment group beyond the estimated costs of training and services accessed by the control group. These *costs* were compared with the *benefits* of the program; that is, increased earnings (adjusted for implied changes in fringe benefits, taxes, and public assistance). If the resulting net benefit (benefits minus costs) is positive, I-BEST provides a gain to society as a whole. The primary focus of the cost-benefit analysis is the net benefit to society as a whole, but it also examines whether net benefits are positive from each of four perspectives: treatment group members, the federal government, Washington State and local government, and the rest of society.

- ***Because of a wide range of plausible values for both earnings impacts and education costs for the I-BEST program, it is not possible to definitively assess whether the benefits of the program are outweighed by its costs.***

As discussed above, there is considerable uncertainty as to the true impact on earnings, which is the source of benefits in the cost-benefit analysis. At 16 quarters after random assignment, plausible large positive values of increased earnings would imply a positive net benefit, whereas plausible zero (or even small negative) ones would imply a negative net benefit. Positive and negative values of other key cost components are similarly plausible, which also contributes to the uncertainty in the estimate of net benefit. Using the best available point estimates, after four years, the per-participant net benefit of the program is essentially zero for society as a whole (+$37) and is moderate and positive for participants (+$3,395). However, both positive and negative net benefits are plausible, both from society's perspective and from the participants' because of uncertainty in the underlying earnings and education cost estimates.

Implications of Findings

In sum, three years out, the impact estimates show that I-BEST assisted low-income, low-skilled participants in attaining short-term workforce credentials and workforce credits (meaning they were not transferable to a four-year college). However, I-BEST had no detectable effect on receipt of credentials requiring a year or more of college study (the confirmatory education outcome). In this same time frame, I-BEST also did not have a detectable impact on average earnings in follow-up quarters 12-13 (the confirmatory earnings outcome), based on administrative records. However, the impacts on other earnings-related outcomes suggest it is likely that I-BEST produced earnings impacts by the end of the three-year follow-up period.

Because of the interest at the federal, state, and local levels in I-BEST as a strategy to improve education and employment outcomes for low-skilled adults, replications of the model are already underway in several states and localities. The PACE results, which are the first from an experimental evaluation of the I-BEST model, have a number of implications for further

development of related initiatives. Several factors related to program design and implementation may contribute to the mixed effects of I-BEST on employment-related outcomes. Based on results from both the implementation and the impact study, the following suggests programmatic areas where adjustments could potentially improve economic outcomes.

- **Stronger connections between the I-BEST programs and placement in jobs related to the training.**

Though numerous academic supports are in place in the I-BEST programs in the PACE project, most did not have consistent employment guidance or labor market connections establishing a pipeline to employment linked to the training provided. The I-BEST programs rarely had specific services designed to help students find jobs in the field related to their training. I-BEST occupational training instructors, some of whom had industry experience, sometimes provided informal, individualized job search assistance, but this kind of connection to the labor market was not consistent across the programs. Strengthening job placement services and connections with employers in the relevant industries would likely benefit I-BEST students, who are primarily focused on earning workforce credits and credentials.

- **Support and guidance to help students transition from short workforce training programs to longer academic programs that provide college credit and lead to degrees.**

For students interested in pursuing higher levels of education, it may be important to provide advising and support services that encourage a transition between short occupational training programs and longer education and training programs that likely have a stronger potential to increase earnings. After this transition, support might continue to help students complete the longer programs. Some of the I-BEST programs in the evaluation did report encouraging this transition to some extent; however, stronger and more systematic efforts may be needed, particularly for those students who had limited employment opportunities after attaining their credentials through I-BEST. Because a high proportion (almost two thirds) of I-BEST students went on to attend additional courses, guidance may be needed in selecting courses that have greater value in the labor market.

- **A consistent focus on structuring I-BEST programs around in-demand positions with high wages.**

The I-BEST programs in the evaluation covered a wide range of occupations including Welder, Office and Clerical Assistant, Nursing Assistant, and Precision Machinist. The study was not designed to determine whether I-BEST programs in certain industries perform better than others in improving employment outcomes. However, in interviews conducted for the implementation study, staff involved in the Nursing Assistant and Clerical and Office Assistant trainings reported that these programs did not necessarily prepare students for high-paying positions, and that available positions were relatively low paying. Moreover, during the study period, staff in some of the other I-BEST training programs, notably electrical, reported that job opportunities were limited in their area. Providing training in high-demand, well-paying industries is a central tenet of the I-BEST program, but realizing it appears to be an area for further attention and research.

Looking Ahead

A planned future report will examine employment and earnings over a six-year follow-up period, using both administrative and survey data. That analysis will be important in assessing the overall effects of I-BEST on employment and earnings and determining whether earnings effects observed during the three-year follow-up period fade or continue and translate into greater earnings in the long term.

1. Introduction

Workers with only a high school education or less face poor and declining employment prospects (Georgetown University Center on Education and the Workforce 2016; Pew Research Center 2014). Postsecondary training, often at community colleges, offers one strategy for improving this population's employment opportunities, especially when the training targets occupations where demand for skilled workers is high and growing (Capelli 2014; Conway and Giloth 2014; Holzer 2015). How to meet both the nation's need for a skilled workforce and the needs of low-income adults for entry-level employment and advancement to higher-skilled jobs is a topic of great interest to policymakers, workforce development organizations, educators, and other key stakeholders.

Research indicates that meeting both needs is not easy. Many low-income, low-skilled adults face considerable barriers to completing postsecondary education. Many are "nontraditional" students—that is, older, are parents, lack adequate basic academic skills, and have few economic resources (National Center for Education Statistics 1996). Further, on average, nontraditional students fare worse in postsecondary settings than do traditional students (Visher et al. 2008; Cooper 2010; Goldrick-Rab and Sorensen 2010). Institutions often provide students who need to improve their basic academic skills with developmental (sometimes called "remedial") education courses that do not result in college credits. Many of the students requiring this basic skills instruction never progress beyond it because of the significant time commitment required to raise their skills to the level needed for college-level instruction (Bailey et al. 2010; Rutschow and Schneider 2011). Others drop out due to financial setbacks or difficulties juggling school, work, and family responsibilities. Some have difficulties navigating the college environment, including course sequences and financial aid (Karp 2011).

In Washington State, the State Board for Community and Technical Colleges (SBCTC) developed the **Integrated Basic Education and Skills Training (I-BEST)** program to increase adult students' access to and completion of college-level occupational training in a variety of in-demand occupational areas. I-BEST aims to teach students basic and occupational skills concurrently so they can move more quickly into higher-paying jobs or college-level courses. The program's signature feature is a team-teaching approach where participants receive instruction from two instructors in the same course: one provides job training and the other teaches basic skills in reading, math, or English (SBCTC 2017).

Abt Associates and its partner, MEF Associates, are evaluating the implementation and impact of I-BEST in three colleges in Washington—Bellingham Technical College (BTC), Everett Community College (EvCC), and Whatcom Community College (WCC)—as part of the **Pathways for Advancing Careers and Education (PACE)** project. Funded by the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services, PACE is studying nine programs aimed at helping low-income adults access career pathways (see *Programs in PACE* box).

All nine programs in the PACE project include some features of the career pathways framework (Fein 2012). This framework posits that postsecondary education and training should be organized as a series of steps leading to successively higher credentials and employment opportunities in growing occupations. To effectively engage, retain, and facilitate learning for nontraditional students, career pathways programs integrate four program components:

(1) **Academic and non-academic assessment** to identify student needs and factors that may facilitate or hinder academic success, so advisors can make appropriate placements and referrals;

(2) **Innovative basic skills and occupational skills instruction** to make education and training more manageable for students who are likely to be balancing school and work (e.g., accelerated courses) and who may have low levels of basic skills (e.g., contextualization);

(3) **Academic and non-academic supports** (e.g., academic advising, tutoring, financial support, and referrals to support services) to help students succeed in their current academic step and to proceed to and complete subsequent steps; and

(4) **Strategies to connect participants and employers** during the program, such as internships, or post program, such as employment workshops.

Programs in PACE

- **Bridge to Employment in the Healthcare Industry**, San Diego Workforce Partnership, County of San Diego, CA*
- **Carreras en Salud**, Instituto del Progreso Latino, Chicago, IL^
- **Health Careers for All**, Workforce Development Council of Seattle-King County, Seattle, WA*
- **Integrated Basic Education and Skills Training (I-BEST) program** at three colleges (Bellingham Technical College, Everett Community College, and Whatcom Community College), Washington State
- **Pathways to Healthcare**, Pima Community College, Tucson, AZ*
- **Patient Care Pathway Program**, Madison College, Madison, WI
- **Valley Initiative for Development and Advancement (VIDA)**, Lower Rio Grande Valley, TX
- **Workforce Training Academy Connect**, Des Moines Area Community College, Des Moines, IA
- **Year Up**, Atlanta, Bay Area, Boston, Chicago, National Capital Region, New York City, Providence, and Greater Seattle

*Programs funded through the Health Profession Opportunity Grants (HPOG) Program.

^Program partially HPOG funded.

Because the nine programs vary in their target populations, mix of components, and occupational fields, PACE is evaluating each program separately.[6] This report documents the impact of I-BEST on students' educational attainment, employment and earnings, and other life

[6] PACE-related documents, including profiles and implementation and short-term impact reports for each program, can be found at Pathways for Advancing Careers and Education (PACE), 2007-2018 | The Administration for Children and Families (hhs.gov) and www.career-pathways.org.

outcomes through approximately three years after they agreed to participate in an evaluation of the program. An initial report, also produced by Abt and MEF, shared findings on implementation and short-term (18 month) impacts on education, employment, and related outcomes (Glosser et al. 2018). This evaluation, the Career Pathways Intermediate Outcomes Study, extends the follow-up period to three years for programs in the PACE project. Future reports produced by the Career Pathways Long-Term Outcomes Study will extend the follow-up period further.

This chapter describes key components of the I-BEST program at the three colleges studied in the PACE project and summarizes findings from the short-term report as context for this three-year report.

1.1 The I-BEST Program

Developed by SBCTC, the I-BEST program has been operating in all 34 public community and technical colleges in Washington State since the 2006-07 academic year. In the state, adult basic skills programs that are offered at two-year colleges, including English as a Second Language (ESL) and Adult Basic Education (ABE), serve approximately 60,000 students per year (Wachen et al. 2010).

Washington's I-BEST program grew out of a concern that adult basic skills students—adults who do not have the skills to enter college—were not advancing beyond basic skills classes to college-level occupational programs, and therefore were not earning credentials. For example, one influential study (Prince and Jenkins 2005) found that only 13 percent of students who enrolled in ESL programs and 30 percent of students who entered ABE programs in Washington State continued on to earn any college credits. Very few (4 to 6 percent of each group) earned the credit equivalent of two full-time semesters or a certificate within five years. However, ESL and ABE students who did complete a year of credits and a credential earned on average $7,000 and $8,500 per year more, respectively, than those who did not.

1.1.1 Core Components of the I-BEST Standard Program and PACE Enhancements

SBCTC created the I-BEST model with the following core components:

- **Courses are part of a structured career pathway,** defined by SBCTC (2005) as "a sequence of courses that leads directly to a postsecondary credential and to jobs that are in demand in the local labor market." Pathways ensure students do not have to "find their way on their own."
- **A team-teaching instructional approach** pairs basic skills instructors and occupational training instructors for at least 50 percent of occupational training class time.
- **Enhanced funding** from SBCTC reimburses colleges 1.75 times the regular rate for a full-time-equivalent (FTE) student to help cover the costs associated with implementing I-BEST, including development of a curriculum, instructor preparation, and supportive services such as a dedicated program coordinator.

Within this I-BEST model, each college has flexibility to create I-BEST programs in a range of occupational areas that fit its students' needs and interests and the local economy. A college must complete a comprehensive application to SBCTC to operate an I-BEST program, detailing the local demand for that specific occupational area and providing a roadmap to the full career pathway for it.

In addition to these core components, the three colleges in the PACE project received additional funding for program enhancements from the Open Society Foundations. The enhancements were available only to I-BEST students who participated in the program and who were part of the study:

- **Dedicated advising**. Each college had a dedicated advisor ("navigator") to provide students with guidance on academic issues, navigating the college's procedures, and career planning.
- **"Fill-the-gap" financial support for training and associated materials beyond typical sources.** For students who were not able to secure funding through Pell grants, Washington State Opportunity Grants, or other sources, the three colleges covered the tuition costs. They also provided funds for books, tools, other course materials, or transportation.

1.1.2 Prior Research on I-BEST

Prior to the PACE project, previous studies of Washington's I-BEST program suggested that it can improve outcomes such as credential and credit completion. In particular, studies by the Community College Research Center (CCRC) used non-experimental methods to determine the effect of I-BEST on both education outcomes and employment and earnings. These studies used SBCTC administrative data to estimate the impact of I-BEST among basic skills students who had enrolled in at least one occupational training course on their own. The studies used two different methods—a difference-in-differences approach and a propensity score matching approach—to determine the impact of Washington's I-BEST program on outcomes. Both studies found that I-BEST had a positive impact on college credit accumulation and gains on basic skills tests, mixed findings on credential completion, and no effect on wages or hours worked (Zeidenberg et al. 2010; Jenkins et al. 2009).

Given its positive effects in previous research, several states and localities have replicated the I-BEST program or some of its key components, such as team teaching, over the past decade. One major replication effort, Accelerating Opportunity (AO), was launched statewide in five states starting in 2011. A non-experimental evaluation of AO using propensity score matching and comparing outcomes of AO students to outcomes of other students enrolled in for-credit courses at the relevant institutions was conducted in four of the five states. This study found that across all four states, the AO programs consistently increased occupational credit and credential receipt. However, the impacts on employment and earnings were mixed, with positive results seen for only subgroups in two states (Eyster et al. 2018). Moreover, the benefits of AO did not outweigh the costs.

1.2 Evaluating the I-BEST Program for PACE

PACE is the first evaluation of the I-BEST program to use a rigorous random assignment research design. Because the previous studies of I-BEST used non-experimental methods to estimate program impacts, those estimates may be unreliable because of the possibility of selection bias. That is, more-motivated students may have enrolled in I-BEST and as a result—because of this factor (even after controlling for observable factors)—they may have performed better than students who did not enroll. The PACE evaluation's experimental design addresses this possible shortcoming of the past evaluations.

To develop the evaluation of I-BEST, the research team worked in collaboration with SBCTC and local community and technical colleges to identify a subset of colleges in the state that could participate. Primary criteria in selecting colleges were the scale of their I-BEST program and capacity to and interest in participating in a random assignment study. Of Washington State's 34 community and technical colleges, BTC, EvCC, and WCC took part in the evaluation.

The three colleges are not representative of all community and technical colleges in Washington, but available data from 2015-16 (the academic year after random assignment ended) indicated diversity in their size and student characteristics. As shown on Exhibit 1-1, one school (BTC)'s students had a median age similar to the statewide median, and two served a younger population (EvCC and WCC). Two had a larger share of students receiving need-based financial aid (BTC and WCC), compared to the share statewide, whereas the other's share was smaller. BTC also had a larger share of students enrolled in occupational training, compared with EvCC and WCC and the state as a whole. Like all colleges in the state, the share of students enrolled in basic skills classes was low at these three colleges. Finally, none of the three had an especially large I-BEST program: BTC (125 students annually) was similar to the state average, whereas EvCC and WCC were smaller.

Exhibit 1-1: Characteristics of Students at the Three Participating Colleges and Statewide, 2015-16

Characteristics	Bellingham Technical College (BTC)	Everett Community College (EvCC)	Whatcom Community College (WCC)	All SBCTC Colleges[a]
Students enrolled (#)	5,526	19,388	11,292	380,918
Median age of student (years)	27	23	22	26
Need-based financial aid receipt (%)	54	21	46	38
Enrolled in occupational skills training courses (%)	93	40	37	40
Enrolled in academic/transfer courses (%)	2	48	56	41
Enrolled in basic skills courses (%)	4	11	5	11
Average enrollment in I-BEST (# annually)	125	73	22	126

Source: https://www.sbctc.edu/about/facts-publications/field-guide-2017.aspx.

[a] Except for "Students enrolled," which is a total, values are averages across all 34 SBCTC colleges.

The rest of this section discusses the specific courses of study offered in the three I-BEST programs evaluated, the study procedures implemented in the three colleges, the characteristics of the study sample, and details on the local context of the colleges.

1.2.1 I-BEST Program Course Structure, Services, and Staffing Included in the Evaluation

SBCTC set the general parameters of the I-BEST model, but each college had the flexibility to design and structure its I-BEST program, particularly in the industry or industries targeted and the courses required for specific credentials. Exhibit 1-2 shows the occupational focus across all I-BEST programs in Washington while Exhibit 1-3 provides more detailed information on I-BEST programs for the three colleges in the study (BTC, EvCC, and WCC) included in the evaluation. For each I-BEST programs at the three colleges, Exhibit 1-3 provides the occupational focus of its trainings, the length of the trainings, specific courses required in each occupational area, credentials that could be earned, and possible next steps on a pathway toward additional credentials. Each characteristic is discussed below.

Occupational focus. BTC's I-BEST program offered training in Automotive, Electrical, Nursing Assistant, Precision Machining, and Welding; EvCC offered Nursing Assistant Certified, Sustainable Office Skills, and Welding; and WCC offered Clerical Assistant. Compared with the occupational focuses of all I-BEST programs across the state, the three colleges in the evaluation operate some of the most common programs, particularly Office Skills, Nursing, and trades (which includes Precision Machining). The only relatively common I-BEST programs not included in the study are Allied Health, and Child Care and Early Education.

Exhibit 1-2: Occupational Focus of I-BEST Programs across Washington State

Occupational Focus	Percentage of I-BEST Programs	Occupational Focus	Percentage of I-BEST Programs
Business/Clerical (Office) Skills	19	Welding	7
Allied Health	13	Manufacturing and Production	6
Child Care and Education	10	Environmental	4
Academic/Transfer	9	Hospitality	3
Nursing	9	Information Technology	3
Trades (Machining)	9	Accounting	2
Transportation (Automotive)	7		

Source: Abt Associates calculations from SBCTC data, https://ibestprograms.sbctc.edu/.

Note: Includes all I-BEST programs (*N*=231) across 34 community and technical colleges in Washington State in 2019.

Program length. The trainings ranged in length from one quarter to three quarters. EvCC included an optional "pre-I-BEST" quarter focused on basic skills improvements as part of two of its trainings.

Team teaching and basic skills support classes. All trainings included courses that were team taught. The team-teaching model paired a basic skills instructor and an occupational instructor in the delivery of occupational training. In addition to the basic skills instruction delivered via team teaching in occupational training classes, I-BEST programs also often

included separate classes taught by basic skills instructors focused on developing students' academic foundation to succeed in occupational training. (See Glosser et al. 2018 for more information on the operation of the I-BEST team teaching and basic skills courses).

Credits. As designed by SBCTC, the I-BEST model focuses on the attainment of workforce credits that lead to workforce credentials, usually within one or two quarters. [7] If they desire, students can progress from there to additional education and training, including at the college level, to receive additional workforce credits and credentials. Students can also earn academic credits and credentials, consisting of credit-bearing courses and degrees/certificates that are transferable to a four-year college. Basic skills or developmental courses, including I-BEST support classes, ABE, and ESL, do not count toward credential attainment.

Credentials. A range of credentials are available from an I-BEST program, depending on the college and occupational focus. Available credentials include college-awarded credentials that appear on a student's transcript; certificates of completion that indicate the student has completed a series of courses but do not appear on a transcript; and state- or industry-recognized credentials that require passing an exam administered by a public agency or licensing body. As discussed further in Chapter 3, SBCTC awards the following types of credentials: workforce completion certificate (requiring less than 20 credits); workforce award certificate (requiring 20 or more credits and less than a year to complete, but not transferable to a four-year college); and associate degree (requiring two years of coursework and transferable to a four-year college). Completion of the I-BEST course of study generally culminated in a workforce award from the college, although further state licensing might be required to practice in that occupational area (e.g., Nursing or Welding). (See Types of Courses and Credentials in I-BEST text box in Chapter 3 for more information on types of credentials in I-BEST.)

Subsequent education and training and credentials. Each of the colleges defined a career pathway in each occupational area it targeted, the first step of which was completion of an I-BEST training. This pathway mapped to available employment options. Students did not necessarily need to complete all the I-BEST courses in a training to move to additional education and training options; in some pathways, only specific courses were needed, rather than the completion of the entire I-BEST course of study.

[7] SBCTC colleges operate on quarter system, rather than semesters. A quarter system consists of four 10-week sessions: fall, winter, spring, and summer. In this format, the average full-time student takes 3-4 courses per term, or 9-12 credits. In contrast, a semester system consists of two 15-week terms: one in the fall (followed by a winter break) and one in the spring (followed by a summer break). Under this system, the average full-time student takes five courses per term, or roughly 15 credits.

Exhibit 1-3: I-BEST Training, Courses, Credits and Certifications, and Next Steps, by College

Occupational Focus, Length	Courses (team-taught courses are in *italics*)	Credits and Credential Earned (if applicable)	Example(s) of Next Step(s) on Career Pathway
Bellingham Technical College			
Automotive (1 quarter)	• *Transportation Services and Systems* • *Occupational Math* • Basic Academic Skills	• 23 Workforce Credits • Vehicle Service Technician Certificate	• General Automotive Repair Certificate • Associate in Applied Science (AAS) in Automotive Technology
Electrical (1 quarter)	• *Trade Safety* • *Direct Current (DC) Circuits (including lab)* • *Electrical Drawings and Blueprints* • *Applied Mechanics* • *Occupational Math* • Basic Academic Skills–Math • Basic Academic Skills–Electrical	• 25 Workforce Credits	• Electrician Construction Certificate • Associate in Applied Science (AAS)
Nursing Assistant Certified (1 quarter)	• *Nursing Assistant Essentials* • Basic Academic Skills • clinical placement • one-day courses in CPR and HIV/AIDS	• 12.5 Workforce Credits • Nursing Assistant Certification (requires passing state exam)	• Phlebotomy • Medical Coding • Dental Assisting
Precision Machining (2 quarters)	• *Machine Lab Safety* • *Intro to Measuring and Inspection* • *Intro to Machining* • *Intro and Advanced Manual Lathe* • *Occupational Math* • *Applied English* • *Machine Fundamentals* • *Precision Grinding* • *Blueprint Reading* • *Intro to Manual Mill*	• 45 credits • Principles of Precision Machining Certificate	• Associate in Applied Science (AAS)

Occupational Focus, Length	Courses (team-taught courses are in *italics*)	Credits and Credential Earned (if applicable)	Example(s) of Next Step(s) on Career Pathway
Welding (2 quarters)	• *Welding Safety I and II* • *Shielded Metal Arc Welding* • *Thermal Cutting* • *Gas Metal Arc Welding* • *Occupational Math* • *Applied English* • *Career Opportunities for Welders and College Success Foundations* • *Basic Academic Skills (one per quarter)*	• 30 Workforce Credits • Washington Association of Building Officials (WABO) Certification (requires passing certification exams)	• Basic Industrial Welding Skills Certificate • Associate in Applied Science (AAS) in Welding Technology
Everett Community College			
Nursing Assistant Certified (1 quarter, plus ESL/ABE pre-program quarter)	• Pre-I-BEST course • *Nursing 101* • I-BEST Basic Skills	• 18 Workforce Credits (no credits for pre-program) • Nursing Assistant Certification (requires passing state exam)	• Phlebotomy Technician Certificate • Associate in Applied Science (AAS) in Medical Assisting
Sustainable Office Skills (2 quarters)	• Beginning Keyboarding • *Computer Literacy* • *Sustainable Office* • *Job Readiness* • *Cooperative Work Experience*	• 19 Workforce Credits • Sustainable Office Certificate	• Legal Office Support Certificate • Medical Administrative Certificate • Associate in Technical Arts Degree (AAS)
Welding (1 quarter, plus ESL/ABE pre-program quarter)	• Pre-I-BEST course • *Sustainable Industrial Standards for Welding* • *Advanced Arc* • *Gas Metal Arc/Flux Cord Arc Welding* • I-BEST Basic Skills course	• 16 Workforce Credits (no credits for pre-program) • WABO Certification (requires passing certification exams)	• Advanced Tungsten Inert Gas Welding Certificate • Aerospace Fabrication & Welding Certificate • Associate in Technical Arts Degree, Welding
Whatcom Community College			
Clerical Assistant (2-3 quarters)	• *Introduction to Business Computing* • *Office Procedures* • *Introduction to Accounting* • *Customer Service for Professionalism* • Mediated labs in Accounting, Business Computing, and Office Administration[a] • Basic Academic Skills (one per quarter)	• 28 Workforce Credits • Clerical Assistant Certificate of Proficiency	• Accounting Certificate • Hospitality and Tourism Business Management Certificate • Associate in Science (AS) Degree in Business Administration

Source: SBCTC data, https://ibestprograms.sbctc.edu/.

[a] Mediated labs are self-directed computer lab courses that allow students to choose from an array of courses in a lab setting with an instructor and teaching assistants, who are available to provide support and review work. The course is semi-structured, with quiz and test dates set by the instructor.

1.2.2 Recruitment, Eligibility, and Enrollment

Participation in the evaluation required the three colleges to recruit twice as many students for their I-BEST programs, with the goal of recruiting at least 1,000 study members across the three colleges. Historically, Washington colleges would identify potential I-BEST students from among those currently enrolled in ABE and ESL who might have an interest in a more accelerated approach to achieve occupational credits and credentials. For PACE, each college was responsible for recruiting potential I-BEST participants and developed a recruitment plan that was based on historical demand for its I-BEST courses and estimates of the number of students currently in ABE and ESL.

At the outset of the study, all three of the colleges anticipated that they would continue to identify and recruit study participants primarily from these existing basic skills classes. However, as the evaluation progressed, recruitment proved challenging. As a result, each college expanded its recruitment effort to include a larger than anticipated outreach to the broader community beyond the existing ABE and ESL courses, as well as additional efforts to identify low-skill students who qualified for occupational training but who could still potentially benefit from the I-BEST program.

Interested program applicants took the Comprehensive Adult Student Assessment System (CASAS) math and reading assessments to determine whether they were eligible for their I-BEST program of interest.[8] Eligible applicants then met with I-BEST staff to confirm their interest in the program and to address any training-specific eligibility requirements (e.g., Nursing Assistant applicants were screened for tuberculosis). At these meetings, I-BEST staff introduced the program and described its services and eligibility requirements, and they explained how random assignment would govern admission to the program for the purpose of the evaluation.[9]

Between November 2011 and September 2014, program staff randomly assigned 632 applicants as study participants; 315 to the treatment group and 317 to the control group.[10]

Those assigned to the treatment group were allowed to participate in the colleges' I-BEST programs (including the PACE enhancements described in Section 1.1.1 Core Components). Those assigned to the control group could not participate in courses that were part of the

[8] The three colleges varied slightly in required CASAS reading and math scores to be eligible for I-BEST. At BTC and WCC, students were required to score between 221 (equivalent to fourth or fifth grade) and 256 (equivalent to 12th grade) on both tests. The exception was the Nursing Assistant program at BTC, which required only 211 on math (equivalent of third or fourth grade level). EvCC required students to score at least 201 on the math and reading tests (equivalent of third grade or below), but typically recommended that students should score above 211 before enrolling in I-BEST.

[9] Before being eligible for random assignment, which was necessary to obtain I-BEST services during the study intake time period, sample members were required to sign a form consenting to participate in the study and to complete two study forms (Basic Information Form, Self-Administered Questionnaire).

[10] BTC randomly assigned 315 participants; EvCC, 241; and WCC, 76. One student who was randomized to the control group left the sample at the time that outcomes were measured, resulting in a total of 631 study participants.

I-BEST program at the college where they enrolled, but they could participate in other training programs available in the community, including those at other training providers and non-I-BEST courses at the three colleges in the study.

1.2.3 Characteristics of the Study Sample

Exhibit 1-4 shows the distribution of the treatment and control group members across a set of characteristics, as of when they were randomly assigned (i.e., at "baseline"). The *p*-values in the last column reflect tests of the hypothesis that there were no systematic differences between the groups for that characteristic.

As shown, random assignment produced treatment and control groups without significant differences in observed baseline characteristics with three exceptions: age, food assistance receipt, and cash assistance receipt. These three differences were most likely due to chance, given the number of characteristics tested.[11] In conducting impact analyses, the research team controlled for any bias resulting from these and other differences by using baseline values as covariates to adjust for chance differences (described in Section 2.4.2. Impact Estimation Procedures).

Exhibit 1-4 also shows that composition of the study sample reflected the characteristics of the nontraditional student body targeted by I-BEST. Study participants had low levels of education, with 31 percent reporting less than a high school diploma or equivalent. Less than 20 percent reported having attended one or more years of college. Moreover, sample members had low incomes, with a mean annual income of $22,110 and 47 percent reporting annual income of less than $15,000. Two thirds (67 percent) were not working at the time of random assignment and only 13 percent were working full-time (35 hours or more).

Consistent with these low levels of income, 59 percent of study participants received (food) assistance from the Supplemental Nutrition Assistance Program or Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in the 12 months prior to study intake. About 21 percent of study participants received public (cash) assistance through Temporary Assistance for Needy Families in the prior 12 months.

Many study participants were older than traditional college students. More than 60 percent were age 25 or older, although 22 percent were age 20 or younger. There was a statistically significant difference in ages between the treatment and control groups at the 10 percent level. Most study participants (58 percent) were female. Slightly more than half (55 percent) identified as White, non-Hispanic, and about one quarter (26 percent) identified as Hispanic, any race.

[11] Appendix A shows the baseline characteristics for 28 variables. On average, one would expect that three out of 28 variables would have statistically significant mean differences. Regression adjustments also help to control for any effects that chance differences might have on the impact estimates.

Exhibit 1-4: Selected Characteristics of the I-BEST Sample at Baseline

Characteristic	All Study Participants	Treatment Group	Control Group	*p*-Value
Age (%)				.067
20 or younger	22.2	23.2	21.1	
21 to 24	14.9	11.1	18.6	
25 to 34	29.8	31.4	28.1	
35 or older	33.2	34.3	32.2	
Gender (%)				.231
Female	57.5	55.1	59.9	
Male	42.5	44.9	40.1	
Race/Ethnicity (%)				.346
Hispanic, any race	26.0	28.9	23.1	
Black, non-Hispanic	7.6	6.2	9.1	
White, non-Hispanic	54.9	53.1	56.7	
Another race, non-Hispanic	14.1	13.4	14.8	
Family Structure (%)				.591
Not living with spouse/partner and not living with children	47.2	48.7	45.8	
Not living with spouse/partner but living with children	16.6	14.6	18.6	
Living with spouse/partner and not living with children	17.3	18.2	16.3	
Living with spouse/partner and children	18.9	18.5	19.3	
Living with parents	28.6	27.2	30.1	.412
Current Education (%)				.497
Less than a high school diploma	30.7	28.2	33.1	
High school diploma or equivalent	40.0	42.0	38.0	
Less than 1 year of college	11.1	12.1	10.2	
1 or more years of college	9.5	10.1	8.9	
Associate degree or higher	8.8	7.7	9.8	
Family Income in Past 12 Months (%)				.551
Less than $15,000	47.3	46.5	48.1	
$15,000-$29,999	23.9	26.0	21.9	
$30,000 or more	28.8	27.6	30.0	
Mean ($)	$22,110	$23,002	$21,240	.378
Public Assistance / Hardship in Past 12 Months (%)				
Received WIC or SNAP	58.6	55.0	62.1	.092
Received public assistance or welfare	21.3	18.1	24.3	.094
Reported financial hardship	48.5	49.8	47.1	.499
Current Work Hours (%)				.993
0	66.6	66.9	66.3	
1 to 19	8.5	8.5	8.5	
20 to 34	11.7	11.7	11.6	
35 or more	13.2	12.8	13.6	
Sample size	631	315	316	

Key: SNAP = Supplemental Nutrition Assistance Program. WIC = Special Supplemental Nutrition Program for Women, Infants, and Children

Source: PACE Basic Information Form.

Note: Public Assistance/Hardship in Past 12 Months does not add to 100 percent because the categories are neither mutually exclusive nor exhaustive. See Appendix A in the appendix volume for more details on baseline characteristics.

1.2.4 Local Context

BTC and WCC are in Bellingham, which is 90 miles north of Seattle. Bellingham has a population of approximately 84,000 and is the largest city in Whatcom County, which extends north to the U.S.-Canadian border. The median household income in Bellingham in 2016 was $44,441, lower than the median for Washington State ($62,848) and the United States ($55,322). The 2016 poverty rate for the city was 22 percent. EvCC is in Everett, about 30 miles north of Seattle, in Snohomish County. Everett has a population of approximately 106,000. As in Bellingham, the 2016 median income in Everett ($50,933) was lower than in both Washington State and the United States. Everett's 2016 poverty rate was 18 percent.[12]

Overall, the local economies in both Bellingham and Everett improved during the years the study operated. When BTC began random assignment in November 2011, the unemployment rate in Bellingham was 8.2 percent. In March 2018 (the end of this three-year report's observation period), the unemployment rate was 6.5 percent. In Everett, the unemployment rate declined from 6.9 percent to 5.7 percent during this same period.[13]

1.3 Earlier Findings from PACE on the I-BEST Program

In its initial phase, the PACE evaluation assessed I-BEST's implementation and short-term impacts. Its **implementation study** examined the design and operations of I-BEST and analyzed treatment group members' participation in training and other activities. Its **short-term impact study** measured the program's effects on education and training receipt and self-reported employment and career progress at approximately 18 months (and sometimes 24 months for administrative data) after random assignment. That earlier *Implementation and Early Impact Report* (Glosser et al. 2018) provides useful context for this current report three years out. This section summarizes its key findings.

1.3.1 Earlier Results from the I-BEST Implementation Study

This section briefly summarizes the key findings on how the I-BEST program was implemented and participants' experiences in the program.

- ***Across the three colleges, almost three quarters of treatment group members participated in an I-BEST training.***

About three quarters (73 percent) of treatment group members participated in at least one I-BEST course of study. The most common trainings attended were Nursing Assistant (36 percent of treatment group) and Welding (30 percent). The least common were Automotive and Precision Machining (less than 3 percent each).

[12] These statistics from the U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates. https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2016/5-year.html.

[13] These statistics from U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates. https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2018/5-year.html.

- ***Fifty-eight (58) percent of treatment group members who participated in I-BEST obtained a workforce credential, and almost two thirds enrolled in subsequent education and training.***

Each college awarded a college-issued certificate for the completion of any of its I-BEST trainings, and 58 percent of treatment group members who participated in I-BEST received such a credential within a 24-month follow-up period, with the majority being workforce award certificates (requiring 20 or more workforce credits but less than a year to complete). A high proportion of treatment group members who participated in I-BEST continued their education beyond I-BEST, with 63 percent later enrolling in additional college courses. On average, those who attended I-BEST were enrolled in college courses for four quarters—longer than the I-BEST portion of the occupational training lasted. Approximately one quarter were still enrolled in college 24 months after random assignment.

1.3.2 Earlier Results from the I-BEST Short-Term Impact Study

The PACE research team conducting the short-term impact study designated a single measure, *total number of academic and workforce credits earned*, as the confirmatory indicator of I-BEST's success 18 months after random assignment. The short-term analyses also assessed a variety of other secondary and exploratory outcomes in the education and training and employment domains.

- ***I-BEST had a positive impact on the total number of academic and workforce credits earned at colleges.***

I-BEST had a 13-credit impact on academic and workforce credits earned. (The 13 credits translates to the lower end of one quarter of full-time coursework. As shown on Exhibit 1-3 above, credits earned by quarter varied but could range from 12 to 25 credits depending on the program of study.) Both types of credits are college-level credits (i.e., are not from non-credit basic skills courses) and are applicable toward credentials. The accumulation of these credits is a positive indicator of academic progress, either toward a credential or, for academic credits, toward transferring to a four-year program in the future. The majority (84 percent) of the credits earned were workforce credits rather than academic credits.

- ***I-BEST produced large positive impacts on credential completion, particularly workforce awards.***

I-BEST increased the completion of any credential from a SBCTC college by more than 32 percentage points, with more than 44 percent of the treatment group receiving some type of credential within the 18- to 24-month follow-up period, compared with only 12 percent of the control group (based on SBCTC college records). The majority of the I-BEST students completed a *workforce award* certificate, a category that requires 20 or more workforce credits but takes less than a year to complete. I-BEST also increased by 4 percentage points the completion of *workforce completion* certificates, which includes any certificate that requires less than 20 total workforce credits to complete.

- ***I-BEST had large positive impacts on college course enrollment, driven primarily by enrollment in occupational training courses within the first six months after random assignment.***

I-BEST increased any college enrollment (including basic skills and developmental courses) by 22 percentage points, with close to 90 percent of the treatment group enrolling in college, compared with 68 percent of the control group. I-BEST increased enrollment in credit-bearing occupational training courses by 41 percentage points (81 percent for treatment group members, compared with 40 percent for control group members over 24 months—a 100 percent increase). The large impact on occupational training course enrollment was driven by treatment group members enrolling directly in I-BEST courses, whereas the control group members would likely take basic skills courses first. The treatment group members could earn workforce credits for completing I-BEST courses, whereas control group members could not earn credits in basic skills courses. I-BEST also increased academic course enrollment by 6 percentage points.

- ***I-BEST had statistically significant impacts on receipt of advising and employment services.***

Reflecting the dedicated advisor component of I-BEST, the program had a 14 percentage point impact on receipt of any career counseling (36 percent of the treatment group members versus 22 percent of control group members). There were similar impacts on receipt of help arranging supports for school, work, or family (29 percent versus 16 percent). Though there were no official job search assistance services, I-BEST produced an impact on receipt of job search or placement services (29 percent versus 19 percent), potentially reflecting the assistance received from instructors or the advisor.

1.4 Guide to the Rest of the Report

This report assesses program impacts on college enrollment, credentials and credits earned, earnings and employment, and other life outcomes three years after study enrollment. **Chapter 2 details the study design and analytic methods**, including a discussion of the career pathways theory of change as applied to I-BEST and its implied research questions.

Chapter 3 presents the three-year impact findings on postsecondary education and training. It reports analyses of how the early gains in credentials and credits earned at 24 months evolved over time. With the extra year of follow-up allowing study participants more time to complete longer training, we identified the impact on *receipt of credentials requiring a year or more of college study* as the most important (confirmatory) outcome measure of program success in the education domain at three years.

Chapter 4 presents the three-year impact findings on earnings and employment. The short-term impact study conducted a limited analysis of impacts on labor market outcomes at 24 months because such impacts were expected to take longer to emerge. This three-year report assesses earnings and employment impacts, with *average quarterly earnings in follow-up quarters 12-13* as the most important (confirmatory) outcome measure of program success in the employment domain at three years.

Chapter 5 presents the three-year impact findings on other life outcomes such as career knowledge, availability of career supports, psycho-social skills, family economic well-being, parental engagement, and child outcomes.

Chapter 6 presents findings from the cost-benefit analysis of I-BEST. We compare the costs and benefits of I-BEST with the costs and benefits of services that were accessed by the control group to estimate the program's net benefit. We assess whether its benefits outweigh its costs from the perspectives of government, the treatment group, and society as a whole.

Chapter 7 concludes with a discussion of the findings and open questions for future research.

A separate **Appendix** volume provides technical details on analysis methods, data sources, and sensitivity analyses.

2. Methods

This chapter describes the PACE project's research design and analytic methods for the evaluation of the I-BEST program three years after random assignment. It begins with a discussion of the career pathways theory of change as applied to I-BEST and associated research questions. It then describes the evaluation design, data sources, and analysis procedures.

2.1 Theory of Change

Exhibit 2-1 on the next page depicts career pathways theory of change as applied to I-BEST. It shows how the program is hypothesized to produce effects on "intermediate" outcomes such as career knowledge and resources, which in turn will lead to effects on "main" outcomes such as hours of training and credential receipt in the short term, and eventually to gains in employment, earnings, additional educational attainment, and other life outcomes in the longer term.

Starting in the box at the left, the theory of change begins with two types of **program inputs**:[14]

- **Organization.** Organizational inputs include the three colleges, program standards and funding from SBCTC, and supplemental funding from the Open Society Foundations.
- **Participants.** This includes the characteristics of the target population, such as ABE and ESL students scoring in the specified range on the CASAS assessment and their interest in an occupational area offered by a college's I-BEST program.

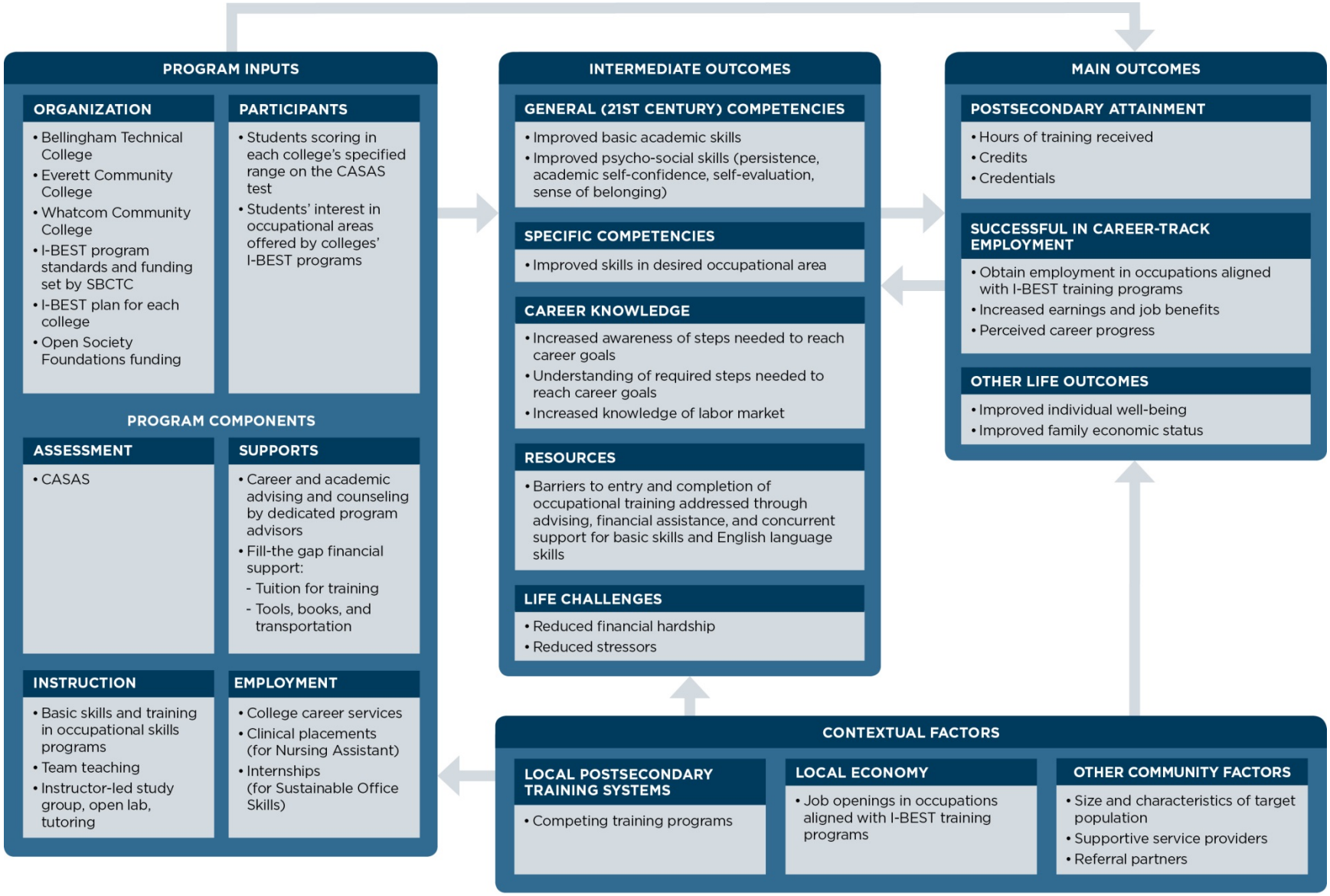
This same box includes four types of **program components** that are expected to improve participant outcomes by addressing barriers that are hypothesized to impede successful entry into and completion of occupational training:

- **Assessment.** I-BEST programs administer the CASAS to assess applicants' English and math skill levels and to determine whether they are eligible for I-BEST.[15]
- **Supports.** I-BEST supports include career and academic advising by dedicated program advisors and "fill-the-gap" financial support for tuition not covered by financial aid and for training-related tools, books, and transportation.

[14] Program inputs can include components available only to treatment group members as well as those available to both treatment group and control group members. The interaction of the former components with the latter can lead to impacts.

[15] Entities such as colleges, employment programs, and employers use CASAS to assess basic skills, literacy, and English language skills needed for academic and workplace success.

Exhibit 2-1: Career Pathways Theory of Change as Applied to I-BEST



- **Instruction.** I-BEST integrates basic skills and occupational training. Courses are team taught—basic skills instructors and occupational training instructors must be in the training classroom together at least 50 percent of the time. Some programs also offer instructor-led study groups, open labs, or tutoring.
- **Employment.** I-BEST students could access their college's general career services and career counselors. Two of the I-BEST trainings included in the study, Nursing Assistant and Sustainable Office Skills, made placements in clinical or internship settings.

The middle box shows **intermediate outcomes**—targeted improvements expected to lead to better main (longer-term) outcomes. These include improved basic academic skills; improved psycho-social skills such as grit and academic self-confidence; improved skills in occupational areas; and increased career knowledge.

In the far right box, the **main outcomes**, which are the focus of this report, are the primary targets that I-BEST seeks to change:

- **Increased postsecondary attainment**, namely accumulated hours of training and credits (as measures of progress toward a credential) and occupational training credentials.
- **Successful employment**, including obtaining employment in occupations that align with I-BEST trainings and pay at least $13 per hour ($15 per hour in King County), increased earnings and job benefits, and career advancement.
- **Improvements in individual and family finances and well-being.**

Influencing expected effects are a number of **contextual factors,** including the types and number of postsecondary training systems in the local area and strength of the local economy. Other community factors are the size and characteristics of the target population, and the number and nature of other service providers.

From this theory of change, we generated key hypotheses about the direction of expected effects that the impact study will test for statistical significance. The theory of change also implicitly assumes time horizons by which the program is expected to have effects, and thus it determines the key outcomes at any particular time of follow-up.

2.2 Research Questions at Three-Year Follow-up

Three years after random assignment, what were the effects of I-BEST on

- education outcomes?
- employment and higher earnings?
- individual and family well-being, including income and other life outcomes?

Each of these research questions is addressed, in turn, in the chapters that follow.

Exhibit 3-6: Three-Year Impacts on College-Level Math and English Performance

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Enrolled In:						
Introductory college-level math (%)	24.5	15.5	+9.0***	(3.3)	+58.1%	.006
Introductory college-level English (%)	29.4	21.8	+7.6 **	(3.8)	+34.9%	.044
Completion with Grade C or Better:						
Introductory college-level math (%)	21.3	12.7	+8.6***	(3.0)	+67.7%	.004
Introductory college-level English (%)	23.6	19.3	+4.3	(3.5)	+22.3%	.212
Sample size	315	316				

Source: SBCTC records.

Note: "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

3.3 Summary of Postsecondary Education and Training Findings

I-BEST does not have a detectable impact on *receipt of credentials requiring a year or more of college study* (the confirmatory outcome) within the three-year follow-up period. This indicates that after their I-BEST trainings, students do not complete follow-on courses that lead to higher-level credentials, as the program intended. This may affect the ability of I-BEST to achieve the intended earnings impacts (discussed in the next chapter).

However, the short-term impact report's finding of overall impacts on credential receipt (primarily credentials that take less than a year of college study to complete and likely obtained from one or three quarters in I-BEST) are sustained over the longer follow-up period at a similar magnitude as the earlier report. The three-year impact study also finds that I-BEST resulted in impacts on college enrollment and credits earned. These three-year impacts on credential receipt, enrollment, and credits earned are all for workforce courses, with no impacts on these outcomes for academic courses.

Reflecting the duration of I-BEST trainings of one to three quarters, current period impacts on college enrollment fade by 18 months after random assignment, as does the impact on credit accumulation. At the end of the three-year follow-up period, college enrollment levels are low, with no differences between the treatment and control groups. Overall, the I-BEST program does not appear to result in advancement to higher-level college work or two-year degrees.

2.3.3 Follow-up Surveys

This report focuses on outcomes measured in a three-year follow-up survey, with some reference to the 18-month follow-up survey.

18-month Survey. The earlier follow-up survey provided measures of outcomes that the theory of change indicated I-BEST might affect in the short term. Administered by telephone or in person, the 18-month survey response rate was 73 percent (76 percent in the treatment group and 71 percent in the control group, with a 4.4 percentage point treatment-control difference). Some of the short-term findings summarized in Chapter 1 are based on these data. The other use of the 18-month survey data in this report is to help impute values for missing data on job and education spells from other data sources.

Three-year Survey. We designed the three-year follow-up survey to measure outcomes that the theory of change indicated I-BEST might affect over a longer time horizon, such as employment and other life outcomes. The survey also captured detail on respondents' educational history, a limited number of psycho-social skills, and their children's experiences with school (as applicable). The response rate for the survey was 67 percent overall (70 percent in the treatment group and 64 percent in the control group, a 5.8 percentage point treatment-control difference). The median response occurred at 39 months after random assignment.[18] Appendix C provides detailed descriptions of the outcomes based on the three-year survey used in this report.[19]

2.3.4 National Student Clearinghouse

This study used data on college enrollment from NSC to impute outcomes for participants who attended colleges not part of the SBCTC system. NSC is a nonprofit organization that collects data on student enrollment, degrees earned, and other credential completion data from most U.S. institutions of higher education. Designed to aid the administration of student loan programs, NSC data are also used by researchers to study college access and persistence. As in most administrative data systems, data are subject to various coverage and content limitations. Most important, coverage of private for-profit two-year colleges is very low (under 30 percent), and NSC does not collect data from schools that are not accredited to grant degrees.

[18] More than 75 percent of the respondents completed the survey 40 months or less after random assignment. The longest lag between randomization and completion was 46 months. Additional months of follow-up potentially increase recall error and shift means for time-sensitive variables. However, the lags were fairly well balanced between the treatment and control groups, so this variation in lags between randomization and completion should not lead to false claims of program effects.

[19] The full instrument is available at http://www.career-pathways.org/career-pathways-pace-three-year-instrument/.

2.3.5 National Directory of New Hires

Wage records from NDNH are a major data source for earnings and employment analyses in this report. Maintained by the federal Office of Child Support Enforcement, NDNH includes quarterly earnings measured by state Unemployment Insurance systems and earnings of federal civilian and military employees provided by various federal agencies. The PACE project had access to these data for study sample members for two years prior to random assignment and for four years after random assignment.[20] Additional detail is provided in Appendix F.

2.4 Evaluation Design and Analysis Plan

The PACE project uses an experimental research design to estimate the impact of access to its nine programs (of which I-BEST is one) on participants' outcomes. When properly implemented such a design ensures that any estimated impacts can be attributed to program access rather than to unmeasured differences between eligible study sample members with access (the treatment group) and without access (the control group).

Maintaining the comparability of the treatment and control groups requires comparing all participants in the treatment group with all participants in the control group, regardless of whether treatment or control group members enrolled in the program. This "intent to treat" approach estimates the impact of access to the entire I-BEST program, as opposed to the impact of participating in the program. The evaluation does so by comparing the entire control group with the entire treatment group, regardless of the treatment group's actual take-up of one or many program components. In a voluntary (rather than mandatory) program such as I-BEST, the intent to treat estimate is often the most policy relevant because program operators choose to whom to offer the program rather than who enrolls in the training.

A second feature of the PACE impact study design is that both treatment and control group members can access any education, training, and support services available in the community that are not exclusive to the program PACE is evaluating. In the case of I-BEST, the evaluation estimates the effect of the program's components above and beyond what was otherwise available at the three colleges and elsewhere in their communities during the study period. For example, both treatment and control group members could potentially access their college's occupational training courses that were not part of I-BEST, subject to availability and meeting entry requirements. Thus, the control group's experiences represent what would have happened absent I-BEST.

2.4.1 Hypothesis Testing

The theory of change targets a range of outcomes. Testing for program impacts on so many outcomes causes a statistical problem: it provides the program many chances to demonstrate success; but with enough chances, even an unsuccessful program might appear to have one or two impacts. In other words, if the evaluation did not account in some way for multiple

[20] This report focuses on a three-year follow-up period, but four years (16 quarters) of data were available from NDNH.

hypothesis tests, some of its findings would reach conventional levels of statistical significance merely by chance, even if there were no real effects on any outcome. This is known as the problem of "multiple comparisons."

To avoid overinterpreting the many false positives that could arise, the PACE project structures program analyses by establishing three categories of hypotheses: confirmatory, secondary, and exploratory.

- **Confirmatory hypotheses** center on outcomes most critical to judging the program's success in achieving its goals within the designated time period. By limiting the confirmatory analysis to a single outcome in each of two separate domains (education and training, and employment), we avoid the statistical problem that arises from "multiple comparisons." Each confirmatory hypothesis has an expected direction of change, an increase or decrease in the outcome. Therefore, the research team tests each confirmatory hypothesis for significance only in the specified direction, ignoring possible effects in the other, by applying a one-tailed test of statistical significance.

  For the three-year impact study of I-BEST, we specified *receipt of credentials requiring a year or more of college study* as the confirmatory outcome in the education and training domain and *average quarterly earnings in follow-up quarters 12-13* in the employment domain. The hypothesized direction for both is an increase in the average level. For both confirmatory outcomes, we used administrative data (SBCTC records and NDNH, respectively) rather than survey data to measure impacts. We chose administrative data as the data source because the larger samples provide more precise estimates and do not have the potential for survey nonresponse bias (see Appendices B and F).

- **Secondary hypotheses** address an additional set of important indicators of program success. Secondary hypotheses also have an expected direction of change, so we apply one-tailed tests for statistically significant effects only in the specified direction. Secondary analyses for I-BEST included tests of hypotheses for additional education outcomes as well as a number of indicators of early career progress. The hypothesized direction is an increase in the average level for all outcomes, other than some measures of financial distress for which we hypothesize a decrease in the average level. The secondary hypotheses for I-BEST include an *increase in credential receipt*, *number of college credits, FTE months in college, employed at survey follow-up*, *employed at $14 or above, employed in a job requiring mid-level skills, health insurance coverage, confidence in career knowledge, access to career supports,* and a *decrease in receipt of public benefits and debt*.

- **Exploratory hypotheses** include a larger number of additional possible effects for related outcomes. Exploratory hypotheses might, but do not necessarily, speculate the direction of effects, and therefore we apply two-tailed tests. They are intended to help improve our understanding of findings from the confirmatory and secondary analyses. Some examples of exploratory hypotheses for I-BEST include changes in *quarterly earnings and employment for each quarter after random assignment*, various measures of *job quality*, and measures of *financial well-being*.

Prior to estimating I-BEST impacts, the research team published an analysis plan specifying key hypotheses and outcome measures.[21] The team subsequently assessed data quality, refined the plan, and publicly registered it on the Open Science Framework website, again prior to estimating impacts.[22] The purpose of the analysis plan and registration was to guide the work of the research team and publicly commit to particular hypotheses and an estimation approach that aligns with ACF's commitment to promote rigor, relevance, transparency, independence, and ethics in the conduct of evaluations.[23]

2.4.2 Impact Estimation Procedures

We conducted analyses to estimate the impact of I-BEST on the hypothesized outcomes above. Random assignment ensures that, on average, study sample members in the treatment and control groups will have similar characteristics at baseline. Random assignment also ensures that measured differences in subsequent outcomes provide unbiased estimates of program impacts. To address any effects that chance differences arising from random assignment might have on estimates, analysts typically estimate impacts using a procedure that compensates for chance differences in measured baseline characteristics. Such procedures also help to increase the precision of estimates.

For PACE, the research team estimated a statistical model that relates each outcome to baseline variables for the control group sample, then calculates average differences between actual and predicted values in the two groups and subtracts the control group average from the treatment group average to generate the impact estimate. Appendix A provides a detailed description of this method.

We used this approach both for continuous outcomes (e.g., total college credits earned) and for binary outcomes (e.g., yes/no questions). For survey-reported outcomes, we used weights to average outcomes. Additional details can be found in the technical appendices. The text box on the next page describes how to read the tables in the impact chapters.

[21] See Judkins, Fein, and Buron 2018.

[22] See https://osf.io/kfyxc/ for the three-year report registration, and https://osf.io/6n5ua/ for the short-term report registration.

[23] See https://www.acf.hhs.gov/opre/report/acf-evaluation-policy.

How to Read Impact Tables

The exhibits in Chapters 3-5 show the outcome measure in the left-most column (**Outcome**).

The next column (**Treatment Group**) presents the treatment group's regression-adjusted mean outcome, followed in the next column by the control group's actual mean outcome (**Control Group**). The regression adjustments correct for random variation in baseline covariates between the two groups (and thus differ slightly from the raw means) and improve the precision of the estimates.

The next column (**Impact (Difference)**) is the impact of being offered I-BEST—that is, the difference between the treatment and control group means. The **Standard Error** column is a measure of uncertainty in the estimated impact that reflects both chance variation due to randomization and any measurement error. The column labeled **Relative Impact** presents the impact as a percentage change from the control group mean. It offers a sense of how "big" or "small" the impact on the treatment group is, at least relative to the control group's level. For outcomes with no natural unit of measurement we report an **Effect Size** instead of the relative impact. The effect size is a standardized measure that defines impacts as a fraction of the pooled standard deviation across the treatment and control groups. It offers a sense of the size of the impact relative to how much the outcome varies across the full sample and allows for comparison of the size of the impact across scale outcomes.

The final column, ***p*-Value**, is the probability that the observed or a larger difference between the treatment and control groups would occur by chance, even if there was in reality no difference between the two groups.

Statistical significance

There are several common standards for judging statistical significance. In this report, tests are considered statistically significant and highlighted in tables if the *p*-value is less than .10. The smaller the *p*-value, the more likely that the observed difference between the treatment and control groups is real, rather than occurring by chance. Tests with *p*-values smaller than .10 are separately flagged:

- * for .10 (10 percent level)
- ** for .05 (5 percent level)
- *** for .01 (1 percent level)

Categories of findings

Tests of statistical significance for confirmatory and secondary outcomes are one-sided tests because we have a directional hypothesis for these impacts. The confirmatory and secondary analyses are reported using **bold text** in the tables. Tests of significance for exploratory outcomes use a two-sided test, a test we use because we do not have a directional hypothesis. Exploratory analyses are reported using regular (not bolded) text in the tables.

3. Impacts on Postsecondary Education and Training

This chapter reports the impact of the I-BEST program on postsecondary education and training in the three years since random assignment for the three participating colleges in Washington State. The chapter compares treatment and control group postsecondary training outcomes; specifically, the outcomes for those participants assigned to the I-BEST program compared to those who could not participate in the I-BEST program but could attend other education or training programs available in the community, including other courses at their college. The analysis uses SBCTC administrative records and study participants' responses to the three-year follow-up survey to report impacts on credentials, course enrollment, and credits earned.[24]

Each I-BEST program offered one or more courses of study within structured pathways, providing credentials and college credits related to in-demand occupations. As designed by SBCTC, the I-BEST model focused on the attainment of workforce credits and credentials that generally could be completed within one or two quarters of training. *Workforce award* certificates required 20 or more credits to complete. As discussed in Chapter 1, the I-BEST trainings included in the evaluation were Automotive, Clerical Assistant, Electrical, Nursing Assistant Certified, Precision Machining, Sustainable Office Skills, and Welding. Of these, Nursing Assistant and Welding were the most common during the study period, attended by 36 percent and 30 percent of treatment group members, respectively.

If they desired, students could progress to additional education and training on a career pathway. Specifically, they could earn academic credits and credentials, consisting of credit-bearing courses and credentials that counted toward a two-year degree or that were transferable to a four-year college (see *Types of Courses and Credentials in I-BEST* box below). The short-term impact report showed that almost two thirds of those who participated in I-BEST went on to attend additional courses at a SBCTC college.

As discussed in Chapter 1, the short-term impact report found I-BEST had a positive impact on the *total number of academic and workforce credits earned* by treatment group members over the 24-month follow-up period, the short-term confirmatory outcome. I-BEST also had impacts on *receipt of college credentials*, a short-term secondary outcome, driven mostly by the attainment of workforce awards from the college (see Glosser et al. 2018).

By three years after random assignment, it is reasonable to expect the completion of credentials that take longer to earn, beyond a year of study. SBCTC requires I-BEST programs to connect their trainings to additional courses of study that lead to higher-level credentials. Thus, though the three I-BEST programs evaluated here themselves emphasized the receipt of credentials

[24] The evaluation uses three-year survey and NSC data to impute enrollment, credential receipt, and credits earned for those not attending one of the 34 SBCTC colleges in Washington State. Very few study participants (less than 6 percent) attended college at a non-SBCTC institution. See Appendix B.

Types of Courses and Credentials in I-BEST

Courses

- **Basic skills**: non-credit Adult Basic Education (ABE) courses, GED coursework, and English as a Second Language (ESL) courses.
- **Academic**: credit-bearing courses that are transferable to a four-year college and are not considered basic skills. Most general education requirements fit this category.
- **Workforce**: credit-bearing occupational training courses that focus on specific technical skills.
- **College-level introductory math and English**: academic courses that are designated as having a course number of 100 or above with specific Classification of Instructional Programs.

Credentials

- **Workforce completion**: certificate that requires less than 20 credits to complete.
- **Workforce award**: certificate that requires 20 or more credits to complete (e.g., Vehicle Service Technician Certificate) or an Associate in Applied Science (AAS) degree (e.g., AAS in Welding Technology). The AAS is not fully transferable to a four-year bachelor's program.
- **Associate degree**: undergraduate Associate of Arts (AA) or Associate of Science (AS) degree requiring two years of coursework and is transferable to a four-year college.

taking less than a year, the confirmatory outcome in the education domain for the three-year follow-up is *receipt of credentials requiring a year or more of college study*. The theory of change suggests that this outcome is appropriate for assessing whether the I-BEST program is continuing to meet its postsecondary attainment goals after three years, beyond credentials that take only months to complete, and is reflecting its goal of promoting additional progress along career pathways.

3.1 Impact on Credentials

This section describes impacts on credential receipt, beginning with the confirmatory outcome. We then assess impacts for receipt of other types of credentials and credits earned as secondary outcomes.

- ***No impacts were detected on the confirmatory outcome: receipt of credentials requiring a year or more of college study.***

Using SBCTC records, we did not detect an impact on receiving a credential that took one or more years of college study to complete. At three years after random assignment, about 10 percent of treatment and control group members had received such credentials

(Exhibit 3-1).[25] This outcome was selected as confirmatory because it reflects the I-BEST program's goal of promoting additional progress in career pathways beyond the initial I-BEST training. However, this result indicates that after completing their one to three quarters in I-BEST, students did not complete additional courses that lead to higher-level credentials more often than the control group did. Although we found that two thirds of those who attended I-BEST took courses beyond their I-BEST requirements, it appears that this additional coursework did not result in higher-level credentials.

Exhibit 3-1: Three-Year Impacts on Credential Receipt

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
SBCTC Records						
Confirmatory Outcome: Receipt of credential requiring 1 year or more of college study (%)	**10.7**	**8.2**	**+2.4**	**(2.3)**	**+29.3%**	**.143**
Received any college credential (%)	**48.1**	**17.1**	**+31.0*****	**(3.5)**	**+181.3%**	**<.001**
Received a workforce completion (%)	8.7	5.1	+3.7**	(2.0)	+72.5%	.034
Received a workforce award (%)	45.3	13.3	+32.0***	(3.3)	+240.6%	<.001
Associate degree (%)	0.3	0.9	−0.7	(0.6)	−77.8%	.855
Sample size	315	316				
Three-Year Follow-up Survey and SBCTC Records						
Received any credential from any type of school (%)	54.4	22.2	+32.2***	(4.6)	+63.2%	<.001
Received exam-based certification or license (%)	**36.7**	**26.2**	**+10.5****	**(5.0)**	**+69.4%**	**.017**
Sample size	218	201				

Source: SBCTC records for college credentials, blended SBCTC and three-year follow-up survey for "any type of school" credential, and blended 18-month and three-year follow-up surveys for certifications and licenses.

Note: A study participant can earn multiple credentials and is included in each category that they earned a credential. Confirmatory outcome and secondary outcomes are **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***I-BEST had a large impact on receipt of any college credential, consistent with the pattern observed at the short-term follow-up point.***

Whereas there were no impacts on credentials that take at least a year to complete, based on SBCTC records there was a substantial impact on receipt of any college credential (Exhibit 3-1 above). Almost half (48 percent) of the treatment group received some type of credential from a college, compared to 17 percent of the control group, a 31 percentage point impact. Given the

[25] As discussed in Appendix E, we used three-year follow-up survey data to conduct a sensitivity analysis of the impacts on credentials that took more than a year of college study to complete. This analysis finds a larger impact (and one that is statistically significant). However, the survey data were determined to be problematic due to response bias and respondent error in classifying their credentials.

lack of impact on longer-term credentials, it is likely that this impact is driven by the receipt of short-term credentials (that take less than a year to complete).

These impacts on any credential were primarily driven by an impact on workforce awards (20 or more credits but taking less than a year to complete). As also shown on Exhibit 3-1 above, based on SBCTC records we detected an impact of 32 percentage points on receipt of a workforce award, with no impacts detected on receipt of two-year Associate of Arts or Associate of Science degrees. These results are of similar magnitude to the impacts observed in the short-term impact study, with the levels of credential attainment for both the treatment and control group increasing a slight amount.

Finally, based on survey data, we detected an 11 percentage point increase in certifications or licenses (awarded by an outside entity), which indicates a verifiable type of training received either at or outside of the college (Exhibit 3-1 above). About 37 percent of the treatment group received such certifications or licenses within three years of random assignment, compared to 26 percent of the control group. These results likely reflect that several of the I-BEST trainings included in the study required students to pass licensing exams to work in specified positions, such as Nursing Assistant and certain Welding positions.

3.2 Impact on College Enrollment and Credits Earned

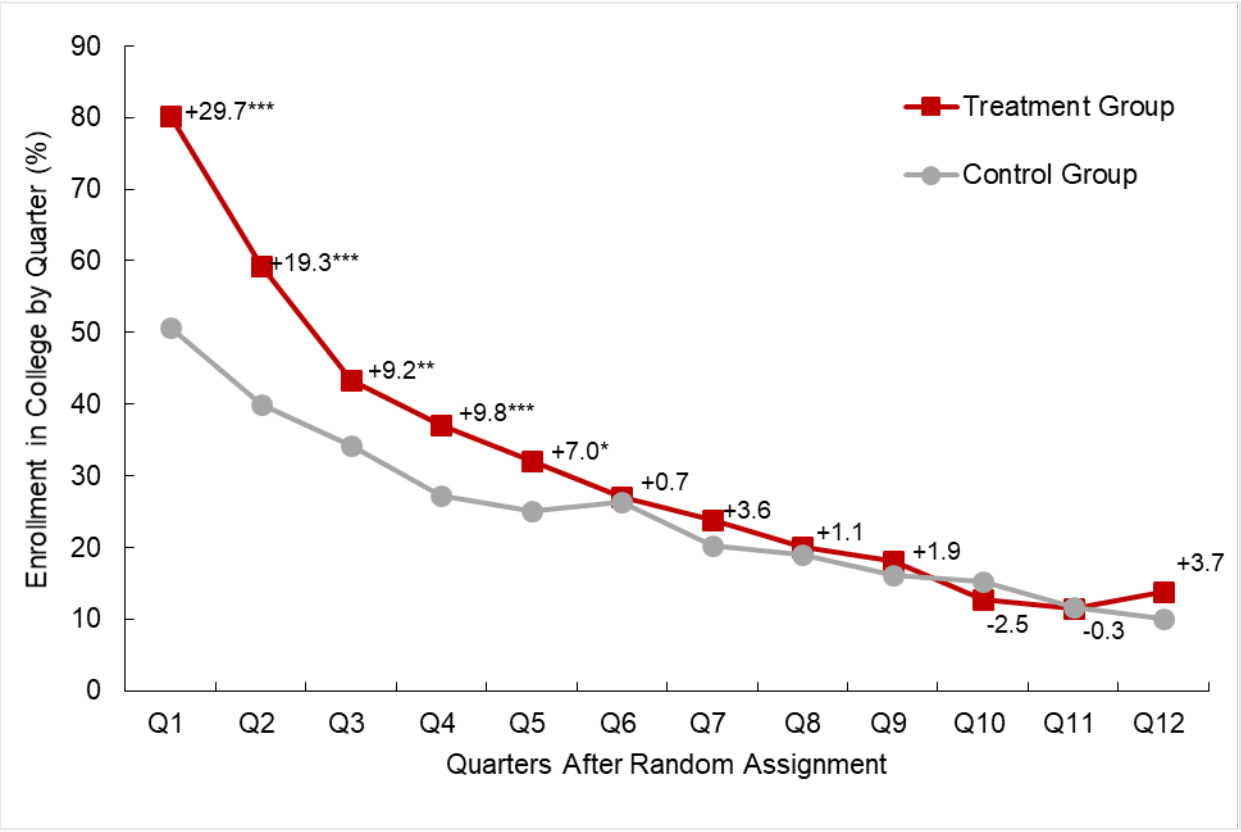
This section describes I-BEST's impact on enrollment in education and training, primarily at SBCTC colleges, and credits earned at these colleges. Both enrollment and credits are secondary outcomes for the evaluation.

- ***I-BEST increased college course enrollment, driven primarily by enrollment in occupational training courses within the first six months after random assignment.***

Exhibit 3-2 below shows the impact of I-BEST on college enrollment, based on SBCTC records, over the three-year follow-up period. Reflecting the one- to two-quarter duration of I-BEST trainings, we found that impacts on college enrollment were strong in the first quarter after random assignment (almost 30 percentage points) but dissipated by the sixth quarter. Similar to the results on credential receipt in Section 3.1, there were large impacts on enrollment in occupational training and basic skills courses in the first year, with small and sporadic impacts on enrollment in academic courses (not shown).

At the end of the three-year follow-up period, participation levels at a college were low (about 10 percent), with no differences between the treatment and control groups. Thus, I-BEST does not appear to result in advancement to higher-level college work or two-year degrees.

Exhibit 3-2: Impacts on College Enrollment by Quarter



Source: SBCTC records.

Sample size: treatment group 310; control group 300.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***I-BEST had a detectable impact on full-time college enrollment.***

By the end of the three-year follow-up period, I-BEST increased full-time-equivalent (FTE) months in college by 2.4 months (Exhibit 3-3 below).[26] Much of this impact was driven by enrollment in occupational training courses: I-BEST produced a two-month increase in FTE enrollment in occupational training but only a 0.3-month increase in enrollment in academic courses. This finding is not surprising, given I-BEST's focus on occupational training and workforce credential receipt, as opposed to academic courses that lead to associate degrees or transfer to four-year colleges. Based on survey responses, we also detected similar impacts on FTE months of enrollment in any school (which includes schools other than colleges).

[26] Full-time-equivalent (FTE) months enrolled in college is a cumulative measure for a follow-up period. It is the sum of values ranging from zero to one for each month, where the value is determined by the fraction of time a student enrolled part-time, or one for full-time, or zero for not enrolled.

Exhibit 3-3: Three-Year Impacts on Months of College Full-Time-Equivalent Enrollment

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
SBCTC Records						
FTE months enrolled in academic and occupational courses	**6.3**	**3.8**	**+2.4*** **	**(0.53)**	**+63.9%**	**<.001**
FTE months enrolled in academic courses	1.3	1.0	+0.3*	(0.23)	+28.8%	.098
FTE months enrolled in occupational training courses	4.9	2.8	+2.1***	(0.44)	+76.7%	<.001
Sample size	315	316				
Three-Year Follow-up Survey and SBCTC Records						
FTE months enrolled in any school	6.9	4.3	+2.6***	(0.73)	+59.8%	<.001
Sample size	218	201				

Source: SBCTC records for "months enrolled" outcomes, blended SBCTC and three-year follow-up survey for "enrolled in any school" outcome only.

Note: Secondary outcome is **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***I-BEST increased total college credits earned, primarily workforce credits and not academic credits.***

As shown on Exhibit 3-4, I-BEST produced an impact on the total number of workforce and academic credits earned (increase of 11 credits). This impact was driven by earning credits in workforce courses; no impact on academic credits was detected. This was expected given the small impacts on enrollment in academic courses shown on Exhibit 3-3 above.

Exhibit 3-4: Three-Year Impacts on College Credits

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Total number of workforce and academic credits	**26.6**	**15.7**	**+10.9*** **	**(2.59)**	**+69.7%**	**<.001**
Number of academic credits (applicable to 2- and 4-year degrees)	5.3	3.8	+1.5	(0.96)	+39.3%	.124
Number of workforce credits	21.4	11.9	+9.5***	(2.26)	+79.3%	<.001
Sample size	315	316				

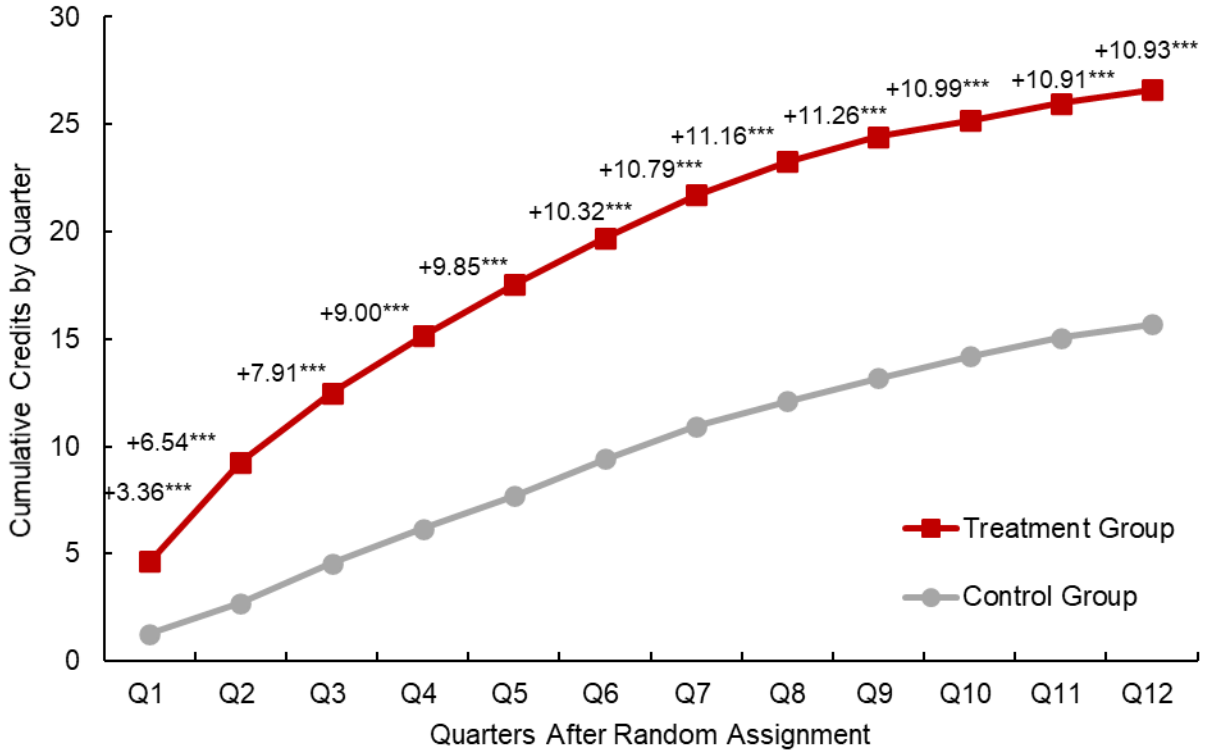
Source: SBCTC records.

Note: Secondary outcome is **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

Exhibit 3-5 shows that impacts on cumulative workforce and academic credits grew over time, particularly in the first six quarters after random assignment, reaching 11.3 credits in quarter 9 before declining slightly after that. This is consistent with the earlier findings that the impacts on college enrollment diminished by quarter 6 (see Exhibit 3-2).

Exhibit 3-5: Impacts on Cumulative Workforce and Academic Credits by Quarter



Source: SBCTC records.

Sample size: treatment group 315; control group 316.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***I-BEST increased introductory college-level math and English enrollment and completion.***

Although I-BEST did not produce impacts on academic credits earned overall, we examined whether the program increased the enrollment and completion of participants' first college-level math and English courses. These are sometimes known as "gateway" courses in that they are needed for students to progress in college. As shown on Exhibit 3-6 below, I-BEST increased college-level math enrollment and completion by about 9 percentage points each. I-BEST increased college-level English enrollment (8 percentage points), but not completion. These impacts are of similar magnitude to those reported in the short-term impact report, with the levels of enrollment and completion for both the treatment and control group increasing slightly.

Exhibit 3-6: Three-Year Impacts on College-Level Math and English Performance

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Enrolled In:						
Introductory college-level math (%)	24.5	15.5	+9.0***	(3.3)	+58.1%	.006
Introductory college-level English (%)	29.4	21.8	+7.6 **	(3.8)	+34.9%	.044
Completion with Grade C or Better:						
Introductory college-level math (%)	21.3	12.7	+8.6***	(3.0)	+67.7%	.004
Introductory college-level English (%)	23.6	19.3	+4.3	(3.5)	+22.3%	.212
Sample size	315	316				

Source: SBCTC records.

Note: "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

3.3 Summary of Postsecondary Education and Training Findings

I-BEST does not have a detectable impact on *receipt of credentials requiring a year or more of college study* (the confirmatory outcome) within the three-year follow-up period. This indicates that after their I-BEST trainings, students do not complete follow-on courses that lead to higher-level credentials, as the program intended. This may affect the ability of I-BEST to achieve the intended earnings impacts (discussed in the next chapter).

However, the short-term impact report's finding of overall impacts on credential receipt (primarily credentials that take less than a year of college study to complete and likely obtained from one or three quarters in I-BEST) are sustained over the longer follow-up period at a similar magnitude as the earlier report. The three-year impact study also finds that I-BEST resulted in impacts on college enrollment and credits earned. These three-year impacts on credential receipt, enrollment, and credits earned are all for workforce courses, with no impacts on these outcomes for academic courses.

Reflecting the duration of I-BEST trainings of one to three quarters, current period impacts on college enrollment fade by 18 months after random assignment, as does the impact on credit accumulation. At the end of the three-year follow-up period, college enrollment levels are low, with no differences between the treatment and control groups. Overall, the I-BEST program does not appear to result in advancement to higher-level college work or two-year degrees.

4. Impacts on Earnings and Employment

The career pathways theory of change as applied to I-BEST suggests that positive impacts on occupational training credentials and credits earned will lead to higher levels of earnings and employment. The short-term impact report did not assess earnings and employment impacts because the research team deemed it too early for impacts in these areas to emerge. However, it seems reasonable to expect to see economic impacts after three years, because participants would have had adequate time to complete one or more credentials and gain employment and earnings associated with those credentials. As described in Chapter 3, I-BEST did not have impacts on credentials that took a year or more of college study to complete, but it did have impacts on workforce credentials taking less than a year and on workforce credits earned.

This chapter reports whether these education and training impacts translated into impacts on earnings, employment, and other measures of job quality. The confirmatory outcome—that is, the outcome we use to determine whether I-BEST is meeting its goals three years after random assignment—is *average quarterly earnings in follow-up quarters 12-13,* which corresponds to months 37 through 42 after random assignment. We examined employment and earnings, including the confirmatory outcome, using administrative data from NDNH. We also examined earnings and other employment-related outcomes using survey data.

4.1 Impact on Earnings

This section examines the impact of the I-BEST program on earnings over the three-year follow-up period.

- ***Based on NDNH data, I-BEST had no detectable impact on the confirmatory outcome: average quarterly earnings in follow-up quarters 12-13.***

The top row in Exhibit 4-1 below shows that, based on NDNH data, the difference in average quarterly earnings in quarters 12 and 13 between the treatment and control groups was +$404 but not statistically significant. As is true in all evaluations of job training programs, the impact was estimated with uncertainty. When we incorporate that uncertainty into a range of plausible impacts, we estimate that the true impact could be as large as +$973 or as small as −$165.[27] Given the relatively large magnitude of the impact at the upper end, and that most of the confidence interval is positive, there is a possibility that I-BEST produced a positive but undetected impact.[28]

[27] These values are the endpoints for a 90 percent confidence interval for average earnings in follow-up quarters 12 to 13.

[28] The upper end of this plausible range is comparable to results from some recent studies. For instance, about two years after random assignment, impacts were +$1,011 per quarter for those assigned to the Special Education in Institutional Settings (SEIS) Education Initiative (Maguire et al. 2010) and +$937 per quarter for Per Scholas (one provider in the WorkAdvance Demonstration) (Hendra et al. 2016).

Exhibit 4-1: Three-Year Impacts on Earnings, NDNH Data

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Confirmatory Outcome: Average Quarterly Earnings in Follow-up Q12-Q13 ($)	**4,176**	**3,772**	**+404**	**(344)**	**+10.7%**	**.120**
Total earnings in last year of follow-up (Q10-Q13) ($)	16,572	14,464	+2,108*	(1,263)	+14.6%	.096
Total earnings since randomization (Q1-Q13) ($)	41,329	38,170	+3,159	(2,755)	+8.3%	.252
Sample size	310	300				

Source: National Directory of New Hires.

Note: Confirmatory outcome is **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

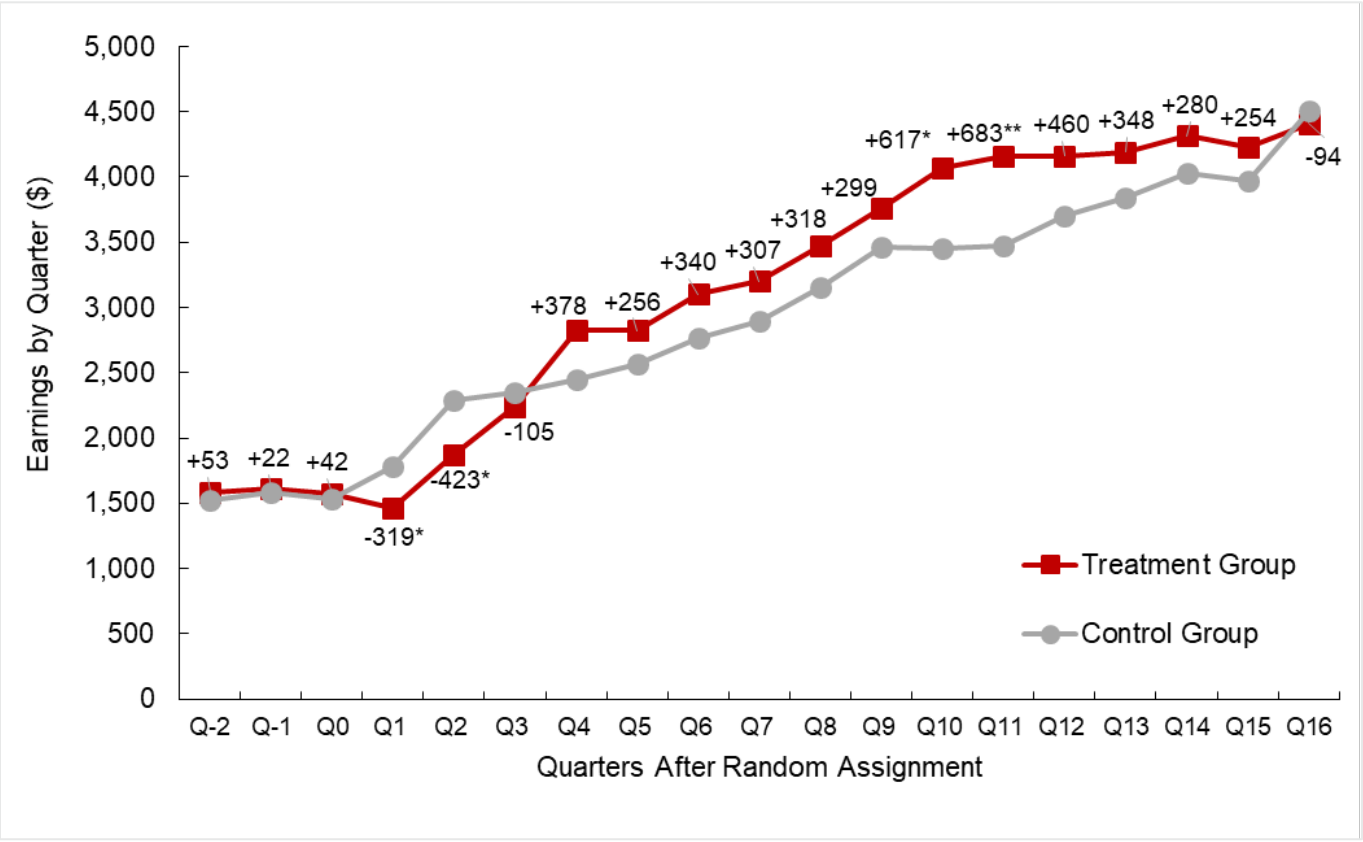
Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***Based on NDNH data, we detect a positive impact on earnings in follow-up quarters 10 and 11, but that positive impact on earnings was not sustained in subsequent quarters.***

Exhibit 4-2 below reports the earnings by quarter for a 16-quarter follow-up period.[29] As shown, following random assignment (in quarter 0) there were negative impacts on earnings in quarters 1 through 3, ranging from −$319 to −$423. This finding aligns with the participation patterns described in Chapter 3; starting in quarter 1 and continuing until quarter 6, treatment group members were significantly more likely to be enrolled in college. Starting in quarter 4, earnings for the treatment group increased and were larger than those of the control group, but there was no detectable difference between the two groups until the 10th quarter after random assignment. In quarters 10 and 11, we detected a positive impact on earnings, with the treatment group receiving $617 and $683 more than the control group in quarters 10 and 11, respectively. This impact then faded from quarter 12 through quarter 16. Because of this positive impact in quarters 10 and 11 and the positive, but statistically insignificant, estimates in quarters 12 and 13, we detected an impact in total earnings in the last year of the follow-up period (quarters 10-13).

[29] The impact study focused on a three-year follow-up period, but four years (16 quarters) of data were available from the NDNH, allowing us to examine some longer-term effects of the I-BEST program in this report.

Exhibit 4-2: Impact on Average Earnings in Successive Follow-up Quarters, NDNH Data (16 Quarters)



Source: National Directory of New Hires.

Sample size: treatment group 310; control group 300.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

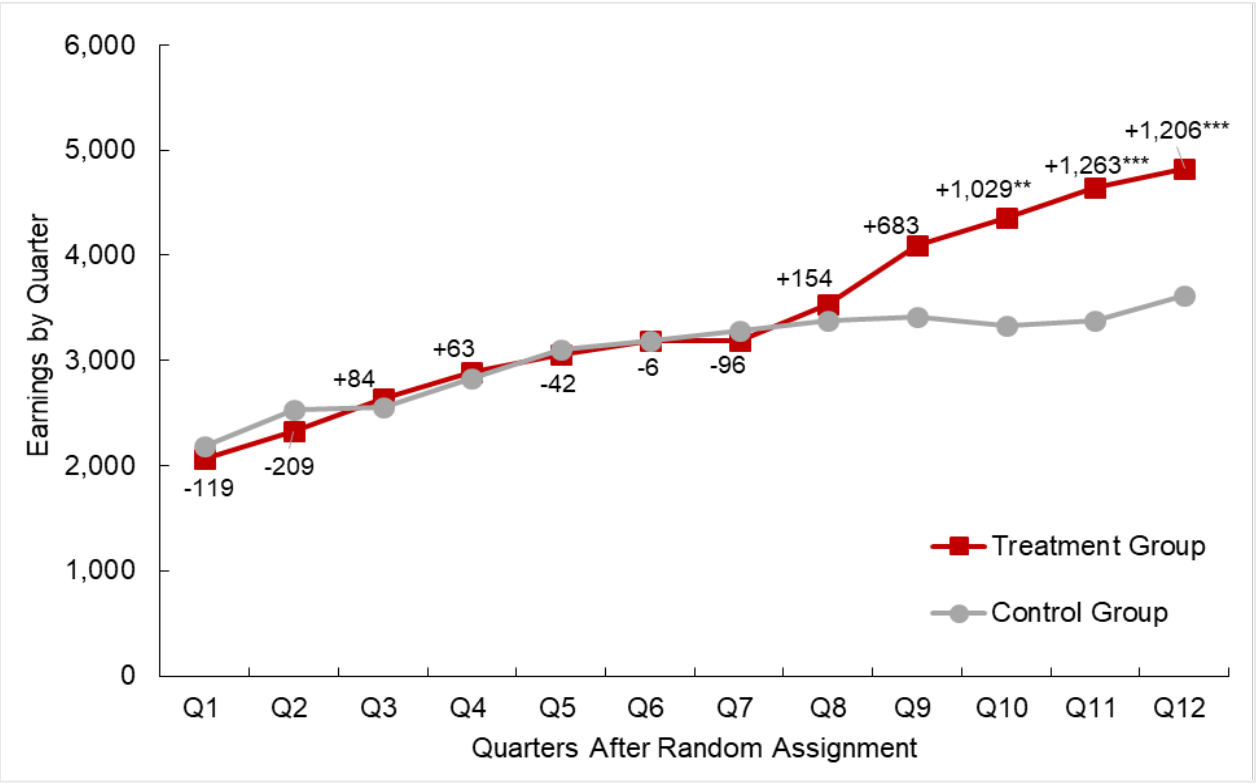
- ***Based on self-reported survey responses, we detect a sustained impact of I-BEST on earnings in the third year of follow-up.***

In addition to the administrative records from NDNH, we also used self-reported earnings data collected through the three-year follow-up survey.[30] Unlike NDNH data, where 16 quarters of data were available, survey respondents reported their earnings through only the 12th quarter after random assignment. As shown on Exhibit 4-3 below, like the NDNH, the survey responses also showed a positive impact on earnings in quarter 10, with the treatment group earning at least $1,000 more than the control group. However, unlike the NDNH impacts, which faded for quarter 12, these self-reported earnings impacts were sustained at this level through quarter 12.

[30] To calculate earnings, we used the starting wage and hours for each reported job and the last wage and hours for each job. We combined these to establish weekly earnings for the first and last weeks of a job. We then interpolated to estimate earnings for each intervening month. See Appendix C.

Specifically, we found an earnings impact of +$1,029 in quarter 10, +$1,263 in quarter 11, and +$1,206 in quarter 12. This difference across data sources is discussed below.

Exhibit 4-3: Impact on Average Earnings in Successive Follow-up Quarters, Survey Data (12 Quarters)



Source: PACE three-year follow-up survey.

Sample size: treatment group 218; control group 201.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

The finding of larger earnings impacts from a survey compared to administrative data from NDNH is well documented in the literature (Barnow and Greenberg 2015; Greenberg and Barnow 2019; Mastri et al. 2018; Schochet et al. 2003). In particular, like the I-BEST results, a range of past studies have found that impact estimates based on earnings reported in administrative data have tended to be smaller in magnitude and less likely to be statistically significant than those based on survey responses. Possible reasons for this discrepancy include nonresponse bias, measurement error (including inaccurate reporting), and the informal and some formal jobs that were not covered in the administrative records data. Researchers have generally concluded that because it is not clear which source yields better results, using both sources when possible, is preferable.

In the case of the I-BEST evaluation, the difference in NDNH and survey impacts appears to be due to reports of higher earnings by the treatment group on the survey compared to their level of earnings in NDNH. We were able to rule out nonresponse bias as a cause of this discrepancy (see Appendix G). However, the reason for higher levels of earnings reported by the treatment

group on the survey is not clear; for example, whether it is due to work in non-covered jobs not reflected in NDNH or from overstating earnings.

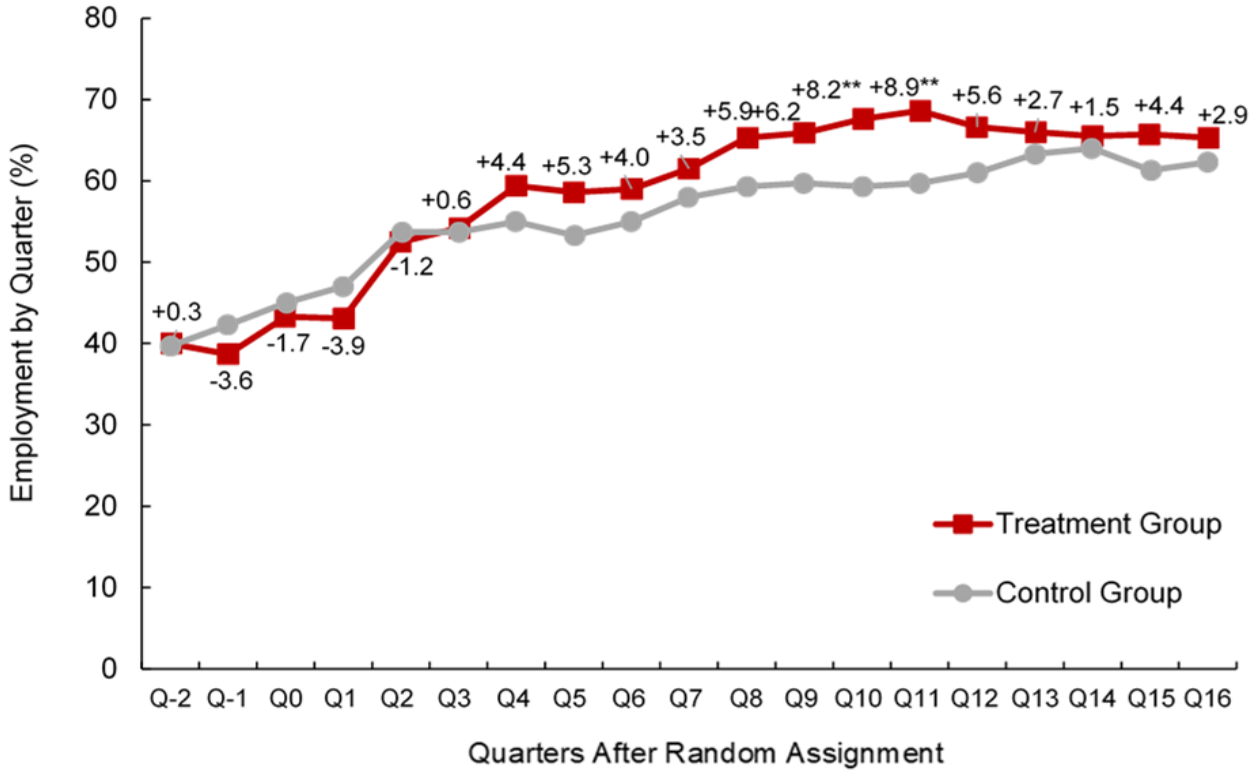
4.2 Impact on Employment and Job Quality

This section examines impacts on the level of employment based on NDNH data and three-year follow-up survey, as well as impacts on job characteristics captured survey. These offer additional information on the earnings estimates reported above.

- ***Using NDNH data, we detected employment impacts in the same quarters in which we detected earnings impacts, but not in other quarters.***

Exhibit 4-4 shows that based on NDNH data, the treatment and control groups had similar employment levels throughout much of the three-year follow-up period, except for quarters 10 and 11. I-BEST produced an 8 percentage point impact on employment in quarter 10 and a 9 percentage point impact in quarter 11. This impact then fades for quarters 12 through 16. This finding is consistent with the earnings impacts, which also began to appear in quarter 10 in both the NDNH and survey data.

Exhibit 4-4: Impact on Employment by Quarter, NDNH Data (16 Quarters)



Source: National Directory of New Hires.

Sample size: treatment group 310; control group 300.

Statistical significance levels based on two-sided tests of differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

The survey did not report on employment by quarter; it measured employment only at the end of the three-year follow-up period (quarter 12). Consistent with the impact on earnings in quarter 12 detected based on the survey responses, I-BEST increased the proportion of study participants employed at the end of the three-year follow-up period, based on those responses: 60 percent for the treatment group, compared to 53 percent for the control group, a 7 percentage point difference (Exhibit 4-5).

Exhibit 4-5: Three-Year Impacts on Employment and Career Progress, Survey Data

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Employed at survey follow-up (%)	**59.8**	**53.1**	**+6.7***	**(5.1)**	**+12.6%**	**.094**
Employed at $14 per hour or more[a] (%)	**28.0**	**20.5**	**+7.5****	**(4.5)**	**+36.6%**	**.047**
Currently employed in a job requiring at least mid-level skills[b] (%)	**8.3**	**11.6**	**−3.4**	**(3.0)**	**−29.3%**	**.871**
Works at least 32 hours per week (%)	43.2	35.3	+7.9	(5.1)	+22.4%	.120
Currently working straight day, evening, or night shifts (%)	50.2	45.3	+4.9	(5.4)	+10.8%	.362
Currently working in a job that offers health insurance (%)	40.2	29.7	+10.5**	(4.9)	+35.4%	.033
Currently working in a job with supportive working environment[c] (%)	28.0	21.4	+6.5	(4.4)	+30.4%	.137
Sample size	218	201				

Source: PACE three-year follow-up survey.

[a] $14 per hour is the 60th percentile of the wage distribution for control group members who were employed at survey follow-up.

[b] O*NET Job Zone 3 or higher.

[c] A job is considered to have a supportive working environment if the worker reports a rich combination of family-friendly policies, helpful coworkers and supervisors, high job satisfaction, generous fringe benefits, and opportunities for advancement.

Note: Secondary outcomes are **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***There is some evidence of an increase in job quality.***

The three-year follow-up survey asked study participants about several characteristics of their current or most recent job, as measures of jobs quality. As Exhibit 4-5 above shows, we detected an impact of 8 percentage points on being employed in a job that paid $14 or more per hour. We also detected an impact of 11 percentage points on being currently employed in a job that offered health insurance. Both measures indicate that there were some improvements in the quality of the job that treatment group members were able to attain. However, no impacts were detected on other measures of job quality—specifically, currently employed in a job requiring at least mid-level skills, the number of hours worked per week, a regular work schedule, and working in a supportive work environment.

4.3 Summary of Earnings and Employment Findings

The study finds that on our pre-specified confirmatory outcome—*average quarterly earnings in follow-up quarters 12-13*—there was no evidence of impact, based on NDNH data. However,

other evidence suggests that I-BEST likely had an impact on earnings in the third year after random assignment:

- Based on NDNH data, we detected positive earnings impacts in quarters 10 and 11 and for total earnings in the last year of the follow-up period (quarters 10-13).
- The confidence interval for the confirmatory outcome of *average quarterly earnings in follow-up quarters 12-13* is primarily positive, and includes the possibility of a relatively large impact.
- Self-reported earnings data from the survey showed a positive impact on earnings in quarters 10 through 12 (the last quarter for which survey data are available). Survey data also find impacts on working in a job that pays $14 per hour or more.

These results lead us to conclude that it is likely that I-BEST produced a positive impact on earnings three years after random assignment. A longer, 72-month follow-up period to be studied as part of a follow-up (which will include additional survey and NDNH data) will be important in assessing the economic effects of the I-BEST program.

5. Impacts on Other Life Outcomes

This chapter examines whether I-BEST affected other life outcomes, including those related to career knowledge, access to career supports, psycho-social skills, and family economic well-being. Its theory of change implies that outcomes in these areas will improve as a result of some of the services provided through I-BEST (particularly dedicated advisors) as well as increases in college enrollment and credential receipt that lead to more favorable earnings and employment outcomes.

5.1 Impact on Career Knowledge, Access to Career Supports, and Psycho-social Skills

This section reports I-BEST's impacts on career knowledge, access of career supports, and psycho-social skills.

- ***There were no detectable impacts on confidence in career knowledge, access to career supports, or psychosocial skills.***

The research team used multi-item scales on the three-year follow-up survey to measure study participants' assessment of their career knowledge and access to career supports (both secondary outcomes) as well as psycho-social skills. As Exhibit 5-1 shows, there was no detectable difference between the treatment and control group on any of these measures. The lack of impact across these outcomes was somewhat surprising, particularly given that there was a positive impact on perceived career progress and a negative impact on perceived stress in the short-term report (see Glosser et al. 2018). It is possible that these effects faded as time passed and I-BEST participants became more distant from its supports, particularly given that did not appear to progress to additional courses beyond the I-BEST program.

Exhibit 5-1: Three-Year Impacts on Career Knowledge, Access to Supports, Psycho-social Skills

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Career Supports						
Confidence in career knowledge[a]	**3.22**	**3.14**	**+0.07**	**(0.07)**	**+2.2%**	**.132**
Access to career supports[b]	**1.78**	**1.78**	**−0.01**	**(0.03)**	**−0.6%**	**.574**
Perceived career progress[c]	3.09	3.11	−0.03	(0.09)	−1.0%	.783
Psycho-social Skills						
Grit[d]	3.13	3.05	+0.07	(0.05)	+2.3%	.128
Core self-evaluation[e]	3.21	3.18	+0.03	(0.05)	+0.9%	.528
Index of life challenges[f]	1.66	1.67	−0.01	(0.07)	−0.6%	.853
Perceived stress[g]	2.20	2.19	+0.01	(0.08)	+0.5%	.900
Social support[h]	3.44	3.53	−0.09	(0.06)	−2.5%	.147
Sample size	218	201				

Source: PACE three-year follow-up survey.

[a] Seven-item scale tapping self-assessed career knowledge; response categories range from 1=strongly disagree to 4=strongly agree.

[b] Six-item scale tapping self-assessed access to career supports; response categories range from 1=no to 2=yes.

[c] Three-item scale on whether reaching long-range education goals and employment goals and whether on career path; response categories range from 1=strongly disagree to 4=strongly agree.

[d] Eight-item scale measuring self-assessed persistence and determination; response categories range from 1=strongly disagree to 4=strongly agree.

[e] Twelve-item scale measuring self-assessed self-efficacy; response categories range from 1=strongly disagree to 4=strongly agree.

[f] Five-item scale of situations that could interfere with school, work, job search, or family responsibilities; response categories range from 1=very often to 5=never, but were reverse coded to agree with the coding system used at baseline, so higher values indicate more frequent interference.

[g] Four-item scale measuring self-reported perceived stress; response categories range from 1=never to 4=very often.

[h] Ten-item scale measuring availability of social support; response categories range from 1=strongly disagree to 4=strongly agree.

Note: Secondary outcomes are **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

5.2 Impact on Family Economic Well-Being

- ***There were no impacts on most measures of family economic well-being.***

The theory of change suggests that a number of program elements would lead to positive outcomes on a range of family economic well-being measures, including receipt of means-tested public benefits and signs of financial distress. The expected direction of some effects is less clear at the three-year mark. For example, access to financial supports could lead to lower student debt; however, participants may have had to borrow from their families to pay for non-academic expenses while they were in school, leading to higher levels of debt.

We detected no impacts on the several financial outcomes related to family well-being as measured by the three-year follow-up survey (Exhibit 5-2). Specifically, despite the impacts on earnings detected by the survey (see Chapter 4), we detected no impacts on household or personal income. In addition, we detected no impacts on health insurance coverage (including not at an employer), receipt of means-tested public benefits, participant's student debt, or

financial distress. There was, however, a negative impact on the treatment group on the adequacy of food for the household, at 7 percentage points. Its cause is not clear.

Exhibit 5-2: Three-Year Impacts on Varied Measures of Family Economic Well-Being

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Has health insurance coverage (%)	**83.7**	**84.6**	**−0.8**	**(3.8)**	**−0.9%**	**.585**
Any means-tested public benefits (%)	**68.9**	**65.1**	**+3.8**	**(4.6)**	**+5.8%**	**.800**
Debt						
Unsecured debt of $5,000 or more[a] (%)	26.4	20.9	+5.5	(4.5)	+26.3%	.889
Average Student Debt Amount ($)						
Participant's debt	**1,878**	**1,534**	**+344**	**(609)**	**+22.4%**	**.573**
Parental student debt	48	83	−35	(79)	−42.2%	.659
Financial Status						
Any signs of financial distress[b] (%)	**49.3**	**54.5**	**−5.2**	**(4.9)**	**−9.5%**	**.145**
Adequacy of food for household (%)[c]	82.9	89.9	−7.0***	(3.5)	−7.8%	.048
Household income ($)	2,521	2,737	−216	(241)	−7.9%	.372
Personal income ($)	1,527	1,411	+117	(127)	+8.3%	.359
Sample size	218	201				

Source: PACE three-year follow-up survey.

[a] Unsecured debt is debt other than student debt and secured debt (mortgages and title loans). Spousal debt included.

[b] "Signs of financial distress" is a flag for utility disconnects, delayed health/dental care, hunger, or trouble paying bills or making ends meet.

[c] Adequacy of food for household indicates respondent reported that over the last six months household members either had enough food of the kind they wanted or enough, but not the kind of food they wanted to eat. (Other responses were sometimes or often not enough food for household members to eat.)

Note: Secondary outcomes are **bolded** and statistical significance is based on a one-tailed test; exploratory outcomes are not bolded and statistical significance is based on a two-tailed test. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

5.3 Summary of Life Outcome Findings

I-BEST does not have a detectable impact on secondary outcomes in the career support domain (e.g., confidence in career knowledge or access to career supports) or life outcomes domain (e.g., health insurance, receipt of means-tested benefits, unsecured debt, financial distress). Moreover, no impacts are detected on exploratory outcomes in these domains. Notably, despite the impact on earnings detected using survey data (see Chapter 4), no impacts on household or personal income are detected.

6. Cost-Benefit Analysis

This chapter presents a cost-benefit analysis (CBA) for the I-BEST program through 16 quarters after random assignment.[31] Following the analysis plan for the CBA presented in Dastrup, Burnett, and Buron (2017), the CBA estimates the financial ***benefits*** from the I-BEST program and compares them to the increased ***costs*** incurred to produce the benefits. A program with benefits greater than its costs—a positive ***net benefit*** (total benefits minus total costs)—is considered a gain; a program with benefits less than its costs is considered a loss.

I-BEST's primary intended *benefit* is increased participant earnings beyond what they would have in absence of the program. The CBA considers two primary categories of *costs*: direct costs associated with operating the I-BEST program and costs of participants' subsequent education and training. For both benefits and costs, the CBA considers the *difference* between the treatment and control group.

The CBA finds that, because of the uncertainty in estimated earnings impacts, it is not possible to offer a definitive assessment of whether the benefits of the I-BEST program outweigh its costs. As discussed in Chapter 4, there is considerable uncertainty as to the true impact on earnings (i.e., the benefit in the CBA). At 16 quarters after random assignment, plausible large positive values of increased earnings would imply a positive net benefit, whereas plausible zero (or even small negative) ones would imply a negative net benefit. Positive and negative values of

Key Terms in the Cost-Benefit Analysis

- **Cost:** The average cost per treatment group member minus the average cost per control group member for a given component.
- **Total cost:** The sum of all cost components.
- **Benefit:** The average benefit per treatment group member minus the average benefit per control group member for a given component.
- **Total benefit:** The sum of all benefit components.
- **Net benefit:** Total benefits minus total costs; the final combined outcome of the cost-benefit analysis.
- **Perspective:** Our primary focus is the net benefits to society as a whole. We also consider costs and benefits as they accrue separately to four societal subgroups: study participants, the federal government, Washington State and local governments, and the remainder of society.
- **Net present value:** The value in today's dollars of a series of monetary benefits and costs, realized at different points in time.

  The CBA calculates costs and benefits at the time of random assignment. Later costs and benefits are discounted (i.e., given a lower value) to account for the general principle that opportunities to spend today are more valuable than opportunities to spend tomorrow. Thus, we value both $1.03 of costs or benefits a year after random assignment and about $1.09 three years after random assignment at $1.

  See Dastrup et al. (2017) for further motivation and discussion, and Appendix I for sensitivity analysis.

[31] We use 16 quarters of earnings—the longest time period available among the outcome analyses for earnings (Exhibit 4-2)—to calculate benefits in the CBA. We use three years of education and training—the longest time frame available—to calculate costs. We argue below that costs beyond three years after random assignment are likely zero, so our calculated net benefit is not affected by the difference in the time frames of available data for benefits and costs.

key cost components are similarly plausible, and they also contribute to the uncertainty in the CBA estimate of net benefit.

Section 6.1 provides an overview of the cost-benefit framework, listing all components of the analysis and briefly noting the data sources used to estimate each component. Section 6.2 discusses estimates of costs and Section 6.3 discusses estimates of benefits. Section 6.4 calculates the net benefit per program participant (i.e., treatment group member) of the I-BEST program and discusses potential costs and benefits that are not included in the analyses.[32] A summary discussion in Section 6.5 concludes the chapter. Supplemental findings and methodological details, including a detailed discussion of data sources and necessary assumptions and approximations, are available in Appendix I.

6.1 The Cost-Benefit Framework

The cost-benefit framework applied in this chapter involves assessing costs and benefits per treatment group member, from the perspectives of specific stakeholder groups, and across society as a whole (i.e., across all stakeholders). Costs and benefits represent *differences* in average values between the treatment group and the control group—that is, the amount I-BEST adds to or subtracts from each cost or benefit component. Costs and benefits are expressed per treatment or control group member to align with the intent-to-treat impact estimates (see Section 2.4).[33] For each perspective, *I-BEST's* ***net benefit*** *is the difference between benefits and costs* from that perspective.

The remainder of this section briefly defines the key costs and benefits considered in the analysis, noting how each appears from relevant perspectives. Some components affect only one group of stakeholders, whereas others represent transfers from one group to another. In rendering an overall judgment on whether a program is cost-beneficial, policymakers often put most emphasis on the implications for *society as a whole*—that is, the sum of costs and benefits across all stakeholders. However, whether the net benefit is positive for relevant perspectives is also of interest. We consider the perspectives of program participants, the federal government, Washington State/local government, and the rest of society.

Exhibit 6-1 identifies the costs and benefits assessed in the analysis, broken out by stakeholder perspective. The first panel of the exhibit shows costs, which are broken into (1) costs of I-BEST services[34] in excess of the costs incurred by control group members for similar services and (2) costs of postsecondary education and training received other than through I-BEST. The second panel of the exhibit shows earnings and fringe benefits, the primary benefit considered in the CBA. It also shows that increased earnings result in changes in taxes and public assistance.

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[32] As discussed in Section 6.4, these additional costs and benefits not included are not readily monetized or we do not observe them and have no basis for approximating them. Examples include radiating benefits of education and training and increased income, such as improved psycho-social well-being and improved outcomes for future generations.

[33] This means the CBA reports average cost *per treatment group member* whether or not an individual received services. This includes the roughly three quarters (73 percent) of treatment group members who participated in at least one I-BEST program (see Section 1.3.1) as well as those who did not.

[34] As describe in more detail in Section 1.1, I-BEST services include the costs of I-BEST courses, dedicated advisors, and "fill the gap" financial assistance.

The overall implications for costs and benefits appear in **bolded** rows in the first and second panels, respectively.

Exhibit 6-1: Hypothesized Costs and Benefits Assessed in the CBA, by Perspective

Component	Participants	Government, Federal	Government, State/Local	Rest of Society	Society as a Whole (sum)
Costs					
I-BEST services	−	+	+	+	+
Postsecondary education and training (other than I-BEST costs)	?	?	?	0	+
Total Costs	**−**	**+**	**+**	**+**	**+**
Benefits					
Earnings and fringe benefits	+	0	0	0	+
Taxes	−	+	+	0	+
Public assistance	−	+	0	0	+
Total Benefits	**+**	**+**	**+**	**0**	**+**
Overall Gain (+) or Loss (−)					
Net Benefit = Total Benefits −Total Costs	**+**	**?**	**−**	**−**	**?**

Source: Abt Associates.

Note: Costs and benefits represent *differences* in average values between the treatment group and the control group—that is, the amount I-BEST adds to or subtracts from each cost or benefit component. Symbols in each cell indicate whether the expectation is for a net increase (+), net decrease (−), zero effect (0), or uncertain effect (?) in costs or benefits from specified perspectives. Taxes and public assistance are estimated based on earnings and fringe benefits. Details about methods and data sources are included in Appendix I.

Total costs to *program participants*[35] are negative because I-BEST increases enrollment in the participating SBCTC schools and federal and state grants (i.e., Pell or Washington State Opportunity grants) at these schools are estimated to result in net remittances to program participants. Total costs to *state/local government* should increase as they fund a substantial portion of the SBCTC coursework components of I-BEST. Similarly, costs to the *federal government* should increase because participants access Pell grants to fund education. Costs to the *rest of society* increase because the Open Society Foundation funded a portion of the I-BEST program for the PACE project. The overall implication for *society as a whole* is increased costs, because increased costs for I-BEST services and program participants' education and training outweigh decreases in other costs.

Total benefits should be positive for all perspectives (except the rest of society, which is zero). Participants' earnings are expected to increase, which results in higher taxes and lower public assistance, resulting in a positive total benefit for the federal and state and local government perspective.

The last panel of Exhibit 6-1 summarizes the expected **net benefit** from each perspective, assuming that I-BEST successfully increases earnings, but leaving open the question of how the size of the increase compares to increases in costs resulting from the intervention. *Program*

[35] Program participants refers to all people assigned to the treatment group whether or not they received I-BEST services.

participants should be unambiguously better off. Whether the Federal government has a positive net benefit depends on whether tax increases and reduction in public assistance spending that result from participant's earnings increases outweigh spending on I-BEST education and training. *State/local* government should experience a net loss, as their role in funding the program is sizeable, and is unlikely to outweigh increased tax revenue. In this analysis, the *rest of society* perspective incurs only the cost of supporting the I-BEST program. Whether the net benefit for *society as a whole* is a gain or a loss depends on whether total benefits to society as a whole, which primarily result from earnings impacts (and implied fringe benefits), are larger than total costs that result from I-BEST.[36]

6.2 Costs of I-BEST

Exhibit 6-2 below reports estimated costs for each major cost component and the overall cost total. The bottom row shows estimated total costs for the treatment group and control group; of $9,718 and $5,440, respectively. The net cost is the difference, $4,278. This section discusses each cost component and how costs are allocated across perspectives. Because the component cost estimates are subject to uncertainty, this total cost of I-BEST is also imprecise.

Exhibit 6-2: I-BEST Costs per Participant at Three Years

Component ($)	Cost Per Treatment Group Member	Cost Per Control Group Member	I-BEST Cost (Treatment − Control)
I-BEST services or alternatives available in the community	5,765[a]	63[b]	5,702
Postsecondary education and training (other than I-BEST costs)	3,953	5,377	-1,424
Total Cost	**9,718**	**5,440**	**4,278**

Source: PACE cost data interviews and I-BEST program financial records; PACE 18-month and three-year follow-up surveys; blended SBCTC and three-year follow-up survey measures, research team approximations of costs of alternative services accessed by the control group; Delta Cost Project Database, Integrated Postsecondary Education Data System; Exhibit 3-3, Exhibit 4-2 of Glosser et al. (2018), research team investigation.

[a] I-BEST services.

[b] Approximated alternative services accessed.

Note: Details on approach to approximating the control group costs are provided in Appendix I

6.2.1 Costs of I-BEST Services and Control Group Alternatives

The average cost of the I-BEST services per treatment group member was +$5,765.[37] These services included a group of core components: a structured career pathway, team-teaching

[36] As detailed in the analysis plan for the CBA (Dastrup et al. 2017), costs and benefits are subject to three types of uncertainty: sampling variability, measurement error, and a multiplicity of options for elements and parameters that must be assumed. To characterize the uncertainty associated with estimated costs and benefits, the CBA reports plausible ranges, together with the specific values estimated where this is possible (i.e., for costs and benefits estimates generated using a statistical model based on study participant-level data). Appendix I includes additional sensitivity analyses using a range of alternate values for key assumed parameters. These alternative specifications do not affect the CBA's main conclusions.

[37] To calculate a net present value of costs comparable to earnings, we discount inflation-adjusted education and training costs by 3 percent annually to account for the time value of money.

instruction that combines basic skills and job training, and supportive services such as a dedicated program coordinator (see Section 1.1). I-BEST as implemented at the three community colleges included in this CBA also provided dedicated advising and "fill the gap" financial support for students beyond typical sources as well as the core components.

Across the three community colleges, about 50 percent of I-BEST costs were for program activities; another 12 percent were for financial assistance provided to participants; and the remaining 38 percent covered administrative and overhead expenses.[38]

Many control group members were students that enrolled in the community colleges (see Exhibit 3-2). While they did not have access to the I-BEST program, they could engage in basic skills and other training at the colleges, and could receive advising and financial assistance available at the college and elsewhere in the community. Any such services provided by a college or training institutions are included in the postsecondary education and enrollment costs estimated in the next section. As documented in Section 3.1.2 of the *Implementation and Early Impact Report* (Glosser et al. 2018), treatment and control group members could access job search supports from other providers in the community (e.g., non-profit organizations, American Job Centers). However, since treatment and control group members were primarily recruited into the PACE project from SBCTC colleges, the CBA assumes that there was a relatively small difference between the treatment and control group in the use of such outside supports. The CBA approximates that the average cost per control group member of such alternative services accessed was +$63.[39]

- ***The cost of the I-BEST program was $5,702 per treatment group member.***

The cost of I-BEST is calculated as the difference between the observed average program cost per treatment group member (+$5,765) and the approximated average cost of the employment services in the community accessed by the control group (+$63). As shown in the top row of Exhibit 6-2, the cost of I-BEST services is $5,702.

Considering the I-BEST program in the context of workforce programs generally, its costs fall in the middle of costs of relatively low- and high-intensity comparison programs. I-BEST program costs are about double recent estimates of the costs of relatively low-intensity workforce programs operating under Workforce Investment Act by the American Job Centers (which

[38] The breakdown of costs is based on a treatment-group participant weighted average of costs across the three community colleges. Costs were obtained from program records and interviews with program leadership.

[39] This approximation captures control group member access to community resources beyond that of treatment group members, under the assumption that I-BEST replaced some such service use by treatment group members.

include a mix of job search and short-term training programs), but lower (sometimes markedly so) than the cost of higher intensity sectoral training programs.[40]

6.2.2 Costs of Postsecondary Education and Training Other than I-BEST

Enrollment in the I-BEST program is expected to affect enrollment in postsecondary education and training directly through the I-BEST courses and training. The program may also affect other postsecondary enrollment indirectly, both as the I-BEST program replaces mainstream enrollments (reducing enrollment at other schools) and as increased awareness of steps needed to reach career goals can increase subsequent education and training (increasing enrollment at other schools). Any changes in enrollment result in a change in costs to society.[41] This section documents the costs of enrollment in education and training outside of I-BEST.

Overall, assignment to the I-BEST program *reduced* the costs of education and training outside of the program. Although it increased the amount of education and training obtained, primarily in the form of workforce credits earned, the additional courses were largely within the I-BEST program. (The within-program costs are already included in Section 6.2.1.)

- ***The average cost of education and training other than at I-BEST was $1,424 lower (i.e., reduced costs) for treatment group members than control group members in the three years after random assignment.***

Costs for postsecondary education and training enrollment other than at I-BEST were $1,424 *lower* for treatment group members than for control group members, as of the three-year follow-up.[42] This is not surprising because I-BEST services include about half of all treatment group education and training enrollment. Costs were +$3,953 per treatment group member, compared with +$5,377 per control group member (second row of Exhibit 6-2). The impact analysis

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40 Fortson et al. (2017) conducted a study of 28 WIA programs around the country and found that the most intensively served group had average costs of $2,407 per participant, excluding their out-of-pocket costs of $1,702. I-BEST participants did not have out-of-pocket costs of training. Higher intensity workforce training programs with higher costs per participant include Project Quest, ($11,156) and those studied in the WorkAdvance demonstration ($6,231 to $7,959) (Roder and Elliott, 2019), Youthbuild ($19,824) (Cohen and Piquero, 2015), Job Corps ($24,703) (Schochet et al. 2006), and the National Guard Youth ChalleNGe program ($14,864) (Perez-Arce et al. 2012).

41 As shown below, this can include costs to participants (tuition and fees), to the federal government (primarily through Pell grants), to state and local government (the primary funders of public post-secondary institutions), and to other members of society (private donors).

42 These cost estimates are based on the FTE months enrolled in any school education and training enrollments reported in Exhibit 3-3. The I-BEST early impact report (Glosser et al. 2018) includes additional enrollment impacts for developmental courses—basic skills courses including I-BEST support, Adult Basic Education, or English Second Language classes. Treatment group members took developmental courses both within I-BEST and outside of the program. Control group members took such courses as standard SBCTC offerings. The early impact report finds a 21 percentage point impact on enrollment in these courses, and concludes that “much of the impact in the enrollment of these types of courses, particularly early on, is attributable to basic skills support courses required for I-BEST certificates.” The costs reported in Exhibit 6-2 do not include any developmental course enrollment outside of I-BEST courses. This will not affect the costs reported in the final column of 6-2 under the assumption that the impact on enrollment in developmental courses represents the I-BEST courses in which treatment group members enrolled, and that treatment and control group members had similar levels of enrollment in SBCTC developmental courses other than I-BEST.

estimates that I-BEST increased FTE months enrolled in any school by 2.6 months (last outcome row of Exhibit 3-3). Based on Exhibit 4-2 of the I-BEST early impact report (Glosser et al. 2018), the CBA estimates that I-BEST enrollment averaged 3.7 FTE months for the treatment group, resulting in an estimated enrollment difference of -1.1 months for enrollment other than in I-BEST. The cost of postsecondary education and training other than in I-BEST is this 1.1 month *lower* enrollment for treatment group members valued at a per-FTE month cost of $1,251.[43]

Because the costs of education and training are based on survey-reported enrollment outcomes combined with institution-level cost of enrollment estimates, they are estimated imprecisely. To provide a sense of the range of plausible estimates for the cost of postsecondary education and training other than at I-BEST, the CBA analysis can be applied to the endpoints of the 90 percent confidence interval of the impact estimate in Exhibit 3-3. This results in a plausible range spanning from −$3,218 to +$371 for postsecondary education and training costs other than at I-BEST.[44]

6.2.3 Costs of I-BEST by Perspective

Exhibit 6-3 reports costs by perspective. For I-BEST services, state/local government, and the rest of society (primarily the Open Society Foundation) primarily incur the cost, with the federal

Exhibit 6-3: Costs of I-BEST from Different Perspectives

Component ($)	Participants	Government, Federal	Government, State/Local	Rest of Society	Society as a Whole (sum)
I-BEST services	-859	972	2,774	2,815	5,702
Postsecondary education and training (other than I-BEST costs)	285	-343	-1,359	-7	-1,424
Total Cost	**-574**	**629**	**1,415**	**2,808**	**4,278**

Source: PACE cost data interviews and I-BEST program financial records; PACE 18-month and three-year follow-up surveys; research team approximations of costs of alternative services accessed by the control group; Delta Cost Project Database, Integrated Postsecondary Education Data System; research team investigation.

Note: Details on approach to approximating the control group costs are provided in Appendix I.

government's contribution largely consisting of net Pell grants remitted to participants, which results in a negative cost (a gain) to the participant perspective.

Since state and local governments are the main source of SBCTC funding, the reduced costs of postsecondary education and training other than I-BEST accrue mainly to this perspective.

[43] This is the weighted average cost per FTE month at all institutions at which PACE study participants reported enrollment in the PACE follow-up surveys (weighted by total PACE participant FTE months of enrollment). Enrollment at the three colleges studied in the PACE evaluation constitutes over 90 percent of all reported enrollments. See Appendix I for more detail.

[44] This approach only considers uncertainty in the unit *quantity* measure of the calculation. The unit *cost* measure by which this quantity is also estimated with uncertainty.

- ***On average, treatment group members had a $574 cost savings from I-BEST relative to control group members.***

Given the incomes of students who participated in I-BEST (Exhibit 1-4), the CBA assumes that treatment group members qualified for and received the average state and federal grant amounts of first-time enrolled students at the schools. These average Pell grant amounts are higher than out-of-pocket tuition and fees at the three SBCTC institutions in the PACE programs, resulting in credit balances that are typically remitted to students to offset other costs of education (e.g., living expenses). So treatment group members overall increased enrollment (2.6 FTE months total) due to I-BEST participation results in a cost savings of $574 from the participant perspective.

Increases in Pell grants, which are funded by the federal government, mean that education and training costs also increase for the federal government. The federal government also provides a small share of the funding through other programs for the community colleges included in the CBA. Both of these effects combined result in a +$629 per participant total cost of I-BEST for this perspective.

State/local government has an increase in costs related to the I-BEST program (+$2,774) and a decrease in costs of education and training other than at I-BEST (-$1,359), for a total cost of $1,415. This reflects the relatively large share of state/local funding for the I-BEST program, which was offset in part by a decrease in education and training costs at programs other than I-BEST. Costs to the rest of society perspective (+$2,808) primarily represent the funding for I-BEST provided by the Open Society Foundation, since private donors do not represent a material source of revenue for the SBCTC institutions.

- ***The estimated cost to society as a whole of I-BEST is $4,278, but this estimate is imprecise.***

Summing across perspectives, I-BEST has an estimated cost to society as a whole of +$4,278. Again, because of uncertainty in each of the component costs, this estimate is imprecise. For example, estimating postsecondary education and training other than I-BEST costs using the 90 percent confidence intervals for the underlying impact estimate indicates that total costs as low as +$2,484 and as high as +$6,073 are plausible. As detailed in Appendix I, these confidence intervals are driven by sample variability in the underlying enrollment data (as reported in Chapter 4) and the institution-level cost measures of that enrollment.[45] Like the measured earnings impacts, the underlying variance and relatively small sample size may not be large enough to precisely measure costs.

A key question for interpreting the cost-benefit analysis findings is whether all costs associated with the intervention have been incurred. Specifically, the CBA is based on three years of information on education and training receipt, which is compared to 16 quarters of earnings information. If costs resulting from random assignment to the treatment group continued to accrue beyond three years, the CBA would be understating costs. However, our analysis (based

[45] The other component, the costs of I-BEST services, has measurement error associated with being based on a single observation of data and a multiplicity of options for elements that cannot be estimated, but must instead be assumed.

on Exhibit 3-2) concludes that all I-BEST-related costs were likely incurred within three years of random assignment.[46]

6.3 Benefits of I-BEST: Earnings Impacts

Earnings increases over the 16-month follow-up period represent the primary potential benefit of I-BEST.

- ***The net present value of treatment group members' total earnings through quarter 16 was an estimated $3,097 higher than control group members'. However, this estimate is imprecise because it inherits the uncertainty of the earnings impacts reported in Chapter 4.***

The first row of Exhibit 6-4 reports the net present value (at random assignment) of earnings impacts through 16 quarters after random assignment for treatment and control group members.[47] This section reports earnings through quarter 16 here, and Section 6.4 provides additional discussion of how future earnings differences could affect the CBA's conclusions.

Exhibit 6-4: Net Present Value of Quarterly Earnings after Random Assignment, by Perspective

Component ($)	Participants	Government, Federal	Government, State/Local	Rest of Society	Society as a Whole (sum)
Net present value of total earnings after random assignment (Q1-Q16)	3,097[a]	0	0	0	3,097
Fringe benefits	744	0	0	0	744
Taxes	-206	510	65	0	369
Public assistance	-750	854	0	0	104
Total Benefit	**2,885**	**1,364**	**65**	**0**	**4,314**

Source: National Directory of New Hires; National Bureau of Economic Research TAXSIM model (Feenberg and Coutts 1993); Washington State Department of Revenue (for sales tax calculations); Consumer Expenditure Survey by Income Quintiles (Table 1203). See Appendix I for public assistance estimation sources.

[a] This impact estimate has standard error of $3,058, and an associated *p*-value of .546.

The analysis in Chapter 4 found a positive, but not statistically significant, impact on earnings. This imprecision of the estimate implied that the true impact could range from a small negative impact to a relatively large positive impact. The CBA re-estimates this impact using the net discounted sum of total earnings (which places greater value on early earnings differences than did the impact reported in Chapter 4) for all follow-up quarters (Q1 through Q16). The resulting estimate is +$3,097, with the earnings gains accruing to both the society as a whole and the participants perspectives. The 90 percent confidence interval for this estimate spans from

[46] Two facts support this conclusion. First, all study members have completed their engagement with the I-BEST program itself. Second, the quarter-by-quarter analyses reported in Exhibits 3-2 and 3-5 suggest that any meaningful differences in education and training enrollment between the treatment and control groups occurred before quarter 12. Appendix I provides additional discussion.

[47] This number differs from the number reported in Section 4.1 because the CBA uses the longest follow-up period used in Chapter 4 (Exhibit 4-2) and also discounts earnings in later years by a total 5 percent a year: 3 percent for the time value of money plus 2 percent for inflation.

−$2,938 to +$9,132. This range includes values that result in total benefits that are clearly greater than I-BEST's total cost of $4,278, as well as negative values that would represent an additional loss to society beyond the program's total cost.

The estimate implies an additional +$744 in the value of fringe benefits that accompany these earnings gains.

- ***Treatment group members' earnings gains are somewhat offset by a resulting increase in taxes and decrease in public assistance, which have a combined value of −$956.***

Changes in earnings affect the receipt of public assistance and payment of taxes. From a society as a whole perspective, public assistance and taxes represent transfers from one subgroup of society (e.g., $206 in taxes paid by participants) to another ($206 received by government), and so mostly net each other out. The rows reporting the estimates of taxes and public assistance in Exhibit 6-4 above show a gain to society of $369 due to the employer portion of payroll taxes and a gain to society of $104 from savings in costs of administering public assistance, both accruing to the federal government perspective. From the participant perspective, increases in earnings imply a total $956 decrease in personal resources (marginal effective tax) due to increased taxes and decreased public assistance. (Additional details on our approach to estimating these marginal effective taxes are provided in Appendix I.)

6.4 Net Benefit of the I-BEST Program

Through 16 quarters—four years—after random assignment, the results of the cost-benefit analysis are inconclusive. The CBA's best estimate is that the net benefit to society as a whole of the I-BEST program—the sum total of its costs and benefits—is +$36 per treatment group member (i.e., essentially break-even). However, *the CBA does not provide clear evidence on the sign and magnitude of net benefit* because there is considerable imprecision in some of the underlying estimates.

Exhibit 6-5 below builds up this estimate from component costs and benefits introduced in prior sections. The total benefit to society of the I-BEST intervention is $4,315, which is close to the $4,278 total cost. This results in an overall estimated gain to society of $36 per treatment group member (i.e., essentially zero).

Exhibit 6-5: Cost and Benefit of I-BEST through Quarter 16 after Random Assignment: Net Benefit, by Perspective

Component ($)	Participants	Government, Federal	Government, State/Local	Rest of Society	Society as a Whole (sum)
Total Cost	−574	629	1,415	2,808	4,278
Total Benefit	2,821	1,364	130	0	4,314
Net Benefit = Total Benefit – Total Cost	**3,395**	**735**	**-1,285**	**-2,808**	**36**

Source: Exhibits 6-3 and 6-4.

Some of the uncertainty in individual costs and benefits estimates can be characterized by 90 percent confidence intervals (where these intervals can be estimated).[48] The +$4,278 total cost to society as a whole includes the education and training other than I-BEST cost of −$1,199, for which a plausible range of estimates (based on the 90 percent confidence interval of the underlying enrollment impact estimate) is −$3,218 to +$371. On the benefits side, the earnings impact estimate of +$3,097 has an associated 90 percent confidence interval ranging from −$2,938 to +$9,132. Values near the end-points of these ranges carried through to estimate I-BEST's net benefit could result in meaningfully large losses (negative net benefit) or large gains (positive net benefit). For example, recalculating the net benefit at the ends of the 90 percent confidence interval for earnings results in a net benefit of −$8,372 on the low end and +$8,446 on the high end.[49]

- ***The estimated net benefit to participants was $2,821 in the 16 quarters after random assignment.***

The CBA estimates that I-BEST results in a positive net benefit from the participants perspective. However, because of uncertainty both in education and training costs and in earnings benefits, both positive and negative values are plausible, and so these findings are not definitive.

- ***These estimates include only components of costs and benefits that the CBA can observe or approximate from survey responses and that can be readily monetized.***

In addition to effects on earnings and related implications for taxes and public assistance, it may be that the I-BEST intervention has intangible benefits that are not monetized through increased earnings (see the theory of change, Exhibit 2-1). The impact analysis included some shorter-term benefits that the CBA does not attempt to monetize, as reported in Chapter 5.[50]

There are other items that could be included in the CBA, but were not measured by the PACE project. Examples include changes in access to additional public assistance (such as subsidized childcare, free and reduced-price school lunch), state and local programs to assist low-income individuals, and longer-term changes in the generosity of payments from Unemployment Insurance or Social Security.

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48 We are able to estimate confidence intervals for these elements of our analysis because our estimates of earnings impacts are made using study participant-level data and our estimates of education and training costs are made with participant-level data on reported enrollment combined with institution-level cost estimates. Additional sources of uncertainty include measurement error in estimates for which we cannot estimate the magnitude of the error. Such error is inherent in cost analyses that measure the cost of a single program and approximations based on point estimates and population frequencies (as detailed in Appendix I).

49 This simple recalculation applies the average ratio of fringe benefits, taxes, and public assistance shown in Exhibit 6-4 to the alternative earnings impact estimates and leaves costs unchanged. A more sophisticated analysis would simultaneously account for the uncertainty in both benefit and cost component estimates and correlation between costs and benefits. Such an analysis would not alter the conclusion that the uncertainty in the underlying component estimates precludes definitive findings about the sign and magnitude of net benefit.

50 I-BEST does not have a detectable impact on secondary outcomes in the career support domain or life outcomes domain. Moreover, no impacts are detected on exploratory outcomes in these domains.

Finally, we do not include some technical adjustments that are sometimes included in cost-benefit analysis, because these adjustments would be trivially small in this analysis and would not alter conclusions (Appendix I provides additional discussion). These include changes in overall economic efficiency due to changes in government spending (marginal excess tax burden, or deadweight loss) and adjustments to participant earnings to account for decreased leisure time or costs associated with increased employment (e.g., for childcare, transportation, or wardrobe; treatment group members did not experience differential incidence of employment). See the analysis plan (Dastrup et al. 2017) for additional discussion.

6.5 Summary of Cost-Benefit Analysis

The CBA inherits the imprecision of the estimates of the impact of I-BEST on earnings discussed in early chapters. Consistent with conventional statistical analysis, Chapter 4 considered whether there was clear evidence that impacts were greater than zero—and concluded that the evidence was not sufficient to clearly conclude that I-BEST increases earnings. Similarly, the CBA concludes that there is not clear evidence that benefits are greater than costs.

This result is not surprising. While, like earnings, costs are estimated with imprecision, I-BEST costs are clearly positive. Thus, benefits would need to be more than clearly positive to yield a clear conclusion that benefits are greater than costs. The CBA is based on imprecise impact estimates for both earnings and the costs of education and training. Absent more precise estimates of those impacts, it is not possible to offer a definitive assessment of whether the net benefit of the I-BEST program is positive.

To give a sense of the range of uncertainty, using the high end of the margin of error for earnings for the 16 quarters (the longest follow-up period used in Chapter 4), after four years, the net benefit to society as a whole per treatment group member would be moderately large and positive (+$8,446). Using the low end of the range, the net benefit to society as a whole per participant would be moderately large and negative (−$8,372). The range of plausible estimates is similar to estimates from cost-benefit analyses of other evaluations of workforce training programs.[51]

In sum, our best estimate for per-participant net benefit of the I-BEST program is essentially zero for society as a whole (+$37) and moderate and positive for participants (+$3,395), but neither perspective is based on precise enough estimates to conclude that the program's benefit is greater than its cost.

[51] Examples include estimated net losses to society per program participant of $5,203 for WIA-funded training (observed over 30 months) and net gains of $8,840 for WIA intensive services and $3,636 for WIA-funded intensive and training services together (Fortson et al. 2017). In contrast to our findings to date for I-BEST, some workforce training programs have found large and positive effects. Although costs outweighed benefits for the overall Job Corps sample, larger sustained earnings gains for older youth (ages 20 to 24) resulted in a $26,229 net gain to society (Schochet et al. 2006). A recently published analysis of WorkAdvance found that three of four sites had positive net benefits to society over a five-year observation period: Towards Employment produced a net benefit of $5,487; Madison Strategies Group, $12,363; and Per Scholas, more than $25,959 (Schaberg and Greenberg 2020). (These results are adjusted to 2014 dollars for comparability with results for I-BEST in this chapter.)

7. Discussion and Conclusions

Since its inception, Washington State's I-BEST model has garnered the attention of educators, policymakers, and researchers as a promising model to support educational and occupational advancement for adults with low basic skills and limited English proficiency. I-BEST grew out of a concern that basic skills students were often not advancing beyond those courses to college-level occupational programs, and therefore were not earning credentials. To better serve this low-skilled population, the I-BEST program modified instructional staffing, pairing basic skills instructors and occupational training instructors for team teaching in occupational training courses. The I-BEST programs evaluated here also assisted students with school-related expenses and offered advising support. Without I-BEST, students whose college entrance test scores were too low for them to enroll directly in their desired occupational training program would have had to enroll instead in and successfully complete remedial classes to increase their basic skills to the required levels.

7.1 Key Research Findings on I-BEST

The evaluation provides the first experimental evidence on I-BEST from a range of occupational programs at three of Washington State's 34 community and technical colleges. Though not representative of all I-BEST programs statewide, these results greatly strengthen prior evidence on Washington State's I-BEST program. This report, which shows impacts over a three-year follow-up period, has several critical findings:

- ***Three years out, I-BEST does not have a detectable impact on receipt of credentials requiring a year or more of college study (the confirmatory education outcome), although impacts on short-term credentials were observed.***

Though more than two thirds of the treatment group attended additional courses beyond I-BEST's one, two, or three quarters of courses, those courses do not lead to higher-level credentials as I-BEST intended. We do observe large impacts on attainment of credentials taking less than a year, continuing the result observed in the short-term impact report. These short-term credentials are *workforce awards* (requiring 20 or more credits but less than a year to complete) primarily from the I-BEST occupational trainings. I-BEST also boosts college enrollment, primarily during the first six months after random assignment. It also increases the receipt of workforce credits during the three-year follow-up period.

- ***I-BEST does not have a detectable impact on average quarterly earnings in follow-up quarters 12-13 (the confirmatory outcome), based on administrative data; but other evidence suggests that I-BEST likely had an impact on earnings in the third year after random assignment.***

Based on NDNH data, we do not detect impacts on earnings in quarters 12-13 (three years) after random assignment. However, there is evidence of an earnings impact based on other measures:

- Based on NDNH data, we detect positive earnings impacts in quarters 10 and 11 and for total earnings in the last year of the planned follow-up period (quarters 10-13).

- The confidence interval for the confirmatory outcome of average earnings in quarters 12 and 13 is primarily positive, and includes the possibility of a relatively large impact.
- Self-reported earnings data from the survey show a positive impact on earnings in quarters 10 through 12 (the last quarter for which survey data are available). The survey also found impacts on working in a job that pays $14 per hour or more.

Overall, though there is not a detectable impact on the confirmatory earnings outcome, the study finds consistently positive but not consistently statistically significant earnings impacts from administrative data in the third year after random assignment, and positive and statistically significant impacts on earnings from survey data in the third year. These results lead us to conclude that it is plausible, but not definitive, that I-BEST produced a positive impact on earnings three years after random assignment.

Because of uncertainty around the estimates of I-BEST costs and benefits (primarily education and training costs and earnings), the CBA does not provide clear evidence that benefits are greater than costs. Through 16 quarters after random assignment, the CBA estimates that combined costs of the I-BEST program are approximately equal to its benefits from a societal perspective, though the net benefit was positive from the participants' perspective. However, uncertainty in the estimates indicates that large and positive or large and negative net benefits are both plausible. Absent more precise estimates of impact, definitive cost-benefit estimates are not possible.

The results from the PACE project are generally consistent with past research on Washington's I-BEST program. Chapter 1 described previous, non-experimental studies of the I-BEST program in its early years of operation. Those studies found that compared to outcomes for other basic skills students at the college under study who enrolled in an occupational training program on their own, I-BEST increased college credit accumulation and gains on basic skills tests, but had mixed effects on credential completion and credit receipt and had no effect on employment-related measures including wages or hours worked (Zeidenberg et al. 2010; Jenkins et al. 2009). Moreover, a replication study in four states found that I-BEST consistently increased occupational credit and credential receipt, compared to other students enrolled in for-credit courses at the relevant college. However, the impacts on employment and earnings were mixed, with positive results seen for only subgroups in two of the states (Eyster et al. 2018). All these studies do have several limitations due to their less rigorous methodology and, particularly for the replication study, their fidelity to the I-BEST model. Nonetheless, their overall consistency with the PACE results is noteworthy.

7.2 Implications of Findings

Because of the interest at the federal, state, and local levels in I-BEST as a strategy to improve education and employment outcomes for low-skilled adults, replications of the model are already underway in several states and localities. The PACE results, which are the first from an experimental evaluation of the I-BEST model, have a number of implications for further development of related initiatives. Several factors related to program design and implementation may contribute to the mixed effects of I-BEST on employment-related outcomes. Drawing from both the implementation and impact study, the following suggests programmatic areas where adjustments could potentially improve economic outcomes.

- **Stronger connections between the I-BEST programs and placement in jobs related to the training.**

Though numerous academic supports are in place in the I-BEST programs in the PACE project, most did not have consistent employment guidance or labor market connections establishing a pipeline to employment linked to the training provided. The I-BEST programs rarely had specific services designed to help students find jobs in the field related to their training. I-BEST occupational training instructors, some of whom had industry experience, sometimes provided informal, individualized job search assistance, but this kind of connection to the labor market was not consistent across the programs. Strengthening job placement services and connections with employers in the relevant industries would likely benefit I-BEST students, who are primarily focused on earning workforce credits and credentials.

- **Support and guidance to help students transition from short workforce training programs to longer academic programs that provide college credit and terminate in degrees.**

The impacts presented in this report show that I-BEST assisted low-skilled participants in attaining workforce credentials and workforce credits (meaning they were not transferable to a four-year college). However, I-BEST had no detectable effect on supporting receipt of credentials that took at least a year of college study or associate degrees. Moreover, though the evidence is mixed, it appears that the credentials attained in I-BEST's short trainings did not translate into employment in jobs that could potentially generate large economic gains.

For students interested in pursuing higher levels of education, it may be important to provide advising and support services that encourage a transition between short occupational training and longer education and training programs with a stronger potential to increase earnings. Then support might continue, to help students complete them. Some of the I-BEST programs in the evaluation did report encouraging this transition to some extent; however, stronger and more systematic efforts may be needed, particularly for those students who had limited employment opportunities after attaining their credentials through I-BEST. Because a high proportion (almost two thirds) of I-BEST students went on to attend additional courses, guidance may be needed in selecting courses that could lead to credentials with greater value in the labor market and support in completing them.

- **A consistent focus on structuring I-BEST programs around in-demand positions with high wages.**

The I-BEST programs in the PACE evaluation covered a wide range of occupational areas including Welding, Office Skills and Clerical Assistant, Nursing Assistant, and Precision Machining. The study was not designed to determine whether I-BEST programs in certain industries perform better than other programs in improving employment outcomes. However, staff involved in the Nursing Assistant and Clerical and Office trainings reported that these programs did not necessarily prepare students for high-paying positions, and that available positions were relatively low paying. Moreover, during the study period, staff in some of the other I-BEST areas, notably Electrical, reported that job opportunities were limited in their area. Providing training in high-demand, well-paying industries is a central tenet of the I-BEST model, but realizing it appears to warrant further attention and research.

7.3 Open Questions

This three-year impact report found that I-BEST did not produce impacts on either of its confirmatory outcome measures: *receipt of credentials requiring a year or more of college study* or *average quarterly earnings in follow-up quarters 12-13* (based on NDNH data). However, I-BEST did increase receipt of credentials taking less than a year to earn; and there is evidence of earnings gains, particularly based on the follow-up survey responses.

A planned I-BEST six-year impact report will examine employment and earnings using both NDNH and survey data over this longer follow-up period. That analysis will be important in assessing the overall effects of I-BEST on employment and earnings and determining whether any of the earnings effects observed during the three-year follow-up period fade or continue and translate into longer-term and economically beneficial impacts.

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