

Contra Costa Community College District

Design it–Build it–Ship it (DBS) Final Evaluation Report

Funded by the U.S. Department of Labor Employment and Training
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DISCLAIMER

Any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Labor, District, or the DBS Consortium.

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EXECUTIVE SUMMARY

Description of the Design it–Build it–Ship it (DBS) TAACCCT Grant Initiative

Design it–Build it–Ship it (DBS), a regional workforce development consortium funded by the Department of Labor’s Trade Adjustment Assistance Community College and Career Training (TAACCCT) initiative, targeted the San Francisco East Bay Area and was developed by the Contra Costa Community College District (4CD) with Los Medanos College as lead agency. DBS included 11 community colleges, local workforce investment boards (WIBs), two four-year universities, and local employers and industry professionals. The initiative targeted the following regional high-growth industries: Advanced Manufacturing, Transportation and Logistics, and Biosciences.

The DBS grant included several ambitious goals and objectives, including the following:

- Train 2,017 participants through enhanced instructional programs that include supportive services.
- Build new college-based certificate pathways, including stackable certificates.
- Establish a regional infrastructure for working with industry, align regional training priorities, strengthen integration of WIB/community college systems, and promote stackable certificates across the region.
- Create a digital infrastructure supporting assessments, career maps, and staffing systems.

Program developers applied evidence-based practices to the DBS initiative. Colleges used cohort-based designs; emphasized contextualized, applied mathematics, English, and digital literacy skills aligned with the requirements of industry and with progression to transfer-level courses; and provided student supports, including counseling, embedded tutors, case management services, and job placement support. DBS promoted regional collaboration activities to build connections and alignment among segments that traditionally operate in silos: college systems, businesses/employers, and workforce development systems. This was done through career pathway development workshops, regional professional development activities, and the creation of industry-driven partnerships.

DBS participants (students) represented the diversity of the East Bay. Most (72%) participants were male; about one fifth (21%) were Latino/a, 16% were Asian, 14% were African-American, and 25% were white. In addition, 5% were veterans, 5% were TAA eligible, and 5% were people with disabilities. The mean age of DBS participants was 29 years. DBS served a range of individuals with barriers to employment throughout the East Bay, a region that covers three counties and five college districts.

Evaluation Design

IMPAQ conducted the third-party evaluation of DBS, which consists of two core components: an implementation study and an outcomes study. The implementation study addresses the following research questions:

- What were the key elements of the DBS initiative and how did they develop over the grant period?

- What types of programs and courses were offered? What types of, and how many, participants were served?
- What were the key features of the network of DBS stakeholders?
- How did the DBS initiative bring partnering agencies together to collaborate around common goals?
- How will DBS efforts be sustained beyond the life of this particular grant?

The implementation study is a descriptive analysis of DBS development, accomplishments, challenges, and lessons, and is based on rich qualitative data from observations of DBS activities, annual site visits (interviews and student focus groups), and telephone interviews with industry, workforce, and other regional partners. Program documents and college records informed our descriptions of the DBS programs and participation. A key component of the implementation study is a social network analysis (SNA), which relied on primary data from a questionnaire to examine collaboration and information sharing among DBS partnering agencies.

The outcomes study addressed three main questions:

- To what extent did participation in DBS-supported career and technical education (CTE) programs lead to an increased likelihood of employment, especially in a field related to the student’s course of study?
- To what extent did participation in DBS-supported CTE programs lead to a promotion or an increase in earnings/wages?
- To what extent did participation in DBS-supported CTE programs lead to an increase in the receipt of a certificate or degree, transfer to a four-year college/university, or further training?

The outcomes study used a comparison group design to examine education and employment outcomes for DBS participants. We selected comparison groups from similar CTE programs within the 11 DBS colleges, consisting of students who were demographically similar to DBS students but not enrolled in DBS-funded programs. Evaluators collected the following types of outcome data: student baseline and outcomes surveys, state unemployment insurance (UI) wage data, and state community college management information systems (MIS) data (enrollment, course completion, degree attainment, transfer). To describe DBS students’ post-program experiences and to provide the context for assessing the effectiveness of the programs, we documented changes in outcomes among DBS students over time. To investigate DBS program effects, we applied a comparison group design, in which the outcomes of DBS students were compared to the outcomes of non-DBS students. Differences between DBS and comparison group students were estimated using statistical models, controlling for demographic and other background characteristics where feasible.

Implementation Findings

Through the implementation study, we found that DBS met its training objectives, serving a wide range of individuals with challenges to employment, and supported increased collaboration across the region aimed at building strong career pathways.

Key elements of the DBS initiative included (1) new and improved college training programs focused on preparing students for jobs or career advancement in the three priority sectors; (2) targeted student support services, including contextualized basic skills instruction, counseling, and job search assistance; and (3) regional collaboration among college staff and faculty, workforce development professionals, and industry representatives.

Multiple grant partners worked together to promote grant goals. The *Career Ladders Project* provided technical assistance on career pathway development, including the development of pathway maps describing entry and exit points for students, and connections to certificates or degrees, jobs, careers, and advanced educational trajectories. *Collaborative Economics* and *Business U* delivered professional development on regional industry (demand)-driven strategies for workforce development. *WIBs* coordinated case management services with colleges and helped convene and facilitate meetings among colleges and industry. *Employers* worked with colleges to provide input on training programs, and offer internships and job opportunities to students. *Deputy sector navigators (DSNs)* are industry-focused positions, based at colleges, charged with connecting college and industry. These positions are funded by a separate state grant but integrated well with DBS.

The DBS program started with colleges developing programs and college representatives (DBS coordinators) meeting to develop and improve career pathways and maps. Employer engagement plans began in Year 1 but employers were not meaningfully participating (leading regional partnership activities) until Years 2 and 3 of the grant. There were some differences in approaches by sector: Advanced Manufacturing and Transportation and Logistics groups formed region-wide cluster partnerships between industry and service providers, and the Biosciences partners joined the East Bay Biomedical Manufacturing Network (EBBMN), a pre-existing partnership of employers, training providers, and economic development partners in the East Bay, rather than launch a new regional partnership.

DBS college programs include the following examples:

Transportation and Logistics programs offered accelerated training and certificates in forklift, warehouse operations, and project management skills. These programs had a strong focus on résumé building and job searching. In the area of *Advanced Manufacturing*, students participated in process and machine technology programs, for example. These programs used funds for upgrading equipment and software. Colleges implementing *Biosciences* programs developed summer bridge programs and learning communities in which students moved through courses together and acted as supports and tutors for each other. DBS also funded new and upgraded equipment, labs, and curricula.

The DBS grant served more than 2500 participants—a diverse range of individuals throughout the East Bay, including a population with barriers to employment in need of DBS services. Thirty percent had an education level no higher than a high school diploma or GED.

The DBS network of stakeholders consisted primarily of DBS colleges, districts, employers, and workforce development agencies. DBS leveraged existing partnerships that existed prior to DBS. The colleges, lead district (4CD), and DSNs acted as “brokers” within the networks, connecting people and organizations that otherwise likely would not have collaborated. DBS effectively tapped into existing resources and (non-DBS) grant funded initiatives in the region.

DBS promoted collaboration across the region through career pathway development workshops, cluster leadership teams, regional industry-driven partnerships, and the leveraging of resources. DBS combined efforts with other grant-funded initiatives (EBBMN network, DSNs). Partners encountered some **challenges** to regional collaboration. These included working across systems, with instructors challenged to be responsive to both industry and academic systems; the lack of centralized web-based information sharing systems; and limited time and resources for faculty to collaborate across campuses and attend professional development events.

We found a great deal of evidence that **DBS efforts will be sustained** beyond the life of the grant, including:

- Survey respondents reported that they expect to continue to collaborate after the grant ends.
- DBS efforts continue with support from leveraged funding, WIBs, and employers.
- Colleges have institutionalized programs or core components of programs, such as equipment and facilities.
- The DBS network was “decentralized,” suggesting that DBS efforts did not depend on only a few key individuals. This finding has positive implications for sustainability of grant efforts, as the consortium’s efforts are not likely to fall apart if one or a few individuals exit the network.

Outcomes Findings

Outcomes findings were mixed and inconclusive regarding the effects of the DBS program on specific student educational and employment indicators. Overall, few significant differences were found between the DBS and comparison groups. Significant differences were found when data were disaggregated by industry sector.

Highlights of employment outcomes findings include:

- Employment rates among DBS students increased considerably over time after enrolling in the program: from 49.2 percent in the quarter after baseline (time of enrollment in the study) to 61.4 percent by the fourth quarter after baseline. This increase was driven students in the Advanced Manufacturing and Transportation and Logistics sectors.

- There is limited evidence that DBS students gained in employment more than the comparison group did. For example, the UI data suggested that DBS students were more likely than the comparison students to be employed for at least one quarter during the year following baseline (69.4% vs. 60.5%).
- Transportation and Logistics students had the lowest employment rates at baseline, but saw the largest pre/post increase in employment. Individuals in this group were more likely to face multiple barriers to employment *before DBS training*.
- Wages and earnings of DBS students increased over time following participation in the program. Wages and earnings of students who took DBS-supported courses tended to be higher than those of the comparison group soon after program participation, *but these gains did not seem to persist*.

Educational outcomes findings include:

- Many DBS students continued with their post-secondary education and training at community colleges; 55.0 percent were still enrolled in a community college the semester after baseline, and 33.0 percent were enrolled in a community college three semesters after baseline.
- DBS students in Advanced Manufacturing continued to enroll in community colleges at similar rates as comparison students, whereas DBS students in Biosciences and Transportation and Logistics enrolled at lower rates than the comparison group.
- By three semesters post-baseline, 16.6 percent of DBS students had obtained a degree or certificate from a community college. Over time, the number of DBS students who attained certificates and academic degrees increased, but the gains were modest and no greater than those among the comparison group.
- Overall, a small proportion of DBS students had transferred to a four-year college. The transfer rate among DBS students was not significantly different from that of the comparison group.

Conclusions

Overall, DBS was successful in meeting its original grant training goals and in expanding regional collaboration for workforce development. DBS brought much-needed job training and education (wrapped in support services) to low-income individuals who often faced multiple barriers to employment. The initiative provided the catalyst to expand and enhance existing collaborative relationships to build career pathways across the region. Evidence shows that DBS promoted a real shift in culture, vision, and perception. Instead of individuals' thinking and planning being limited by their college or organization, these different stakeholders have adopted a model for working together and approaching economic development *regionally*. Results were mixed and inconclusive regarding the DBS program effects for individual participants. Our analysis highlights the vast diversity of DBS participants' backgrounds and goals.

Some methodological challenges to the evaluation include:

- Lack of a clear definition of the treatment. It was difficult for evaluators to always know which specific regional efforts and/or college strategies were linked directly to the DBS initiative and which were supported by another initiative and/or funding source.
- Low response rates on surveys present threats to external validity of survey findings. However, analyses of survey data are used to complement analyses of UI wage and CCCCCO data, which were much more complete.
- It was infeasible to match individual participants with individual comparison group participants, which would have made the outcomes analyses more rigorous. Because we did not use experimental methods, we cannot claim causality between the DBS program and outcomes.

Based on our evaluation, IMPAQ presents **several recommendations** for funders of future workforce development and career pathway programs:

- Consider lengthening the grant cycle to allow for the slower pace of change in academic institutions.
- Encourage grantees to use funds *first* to expand industry engagement, *then* to develop or enhance college training programs; in order to get more robust employer input early in the grant.

The following recommendations may be considered by future funders *and* grantees:

- Provide more institutional support for college faculty to collaborate regionally. Ensure that instructors are aware of, and have access to, stipends and arrangements for substitute instructors for faculty release time. Convene regular cross-campus meetings for faculty, so that a culture of ongoing collaboration becomes the norm.
- Consider focusing the grant program on a narrower set of priorities. This will allow for depth of services and concentrating in on a specific issue or area. A more focused approach would also make the initiative easier to evaluate.

DBS was part of a larger movement of encouraging regional collaboration toward building career pathways and bolstering workforce development nationwide. Overall, DBS provides several promising practices for breaking down silos and leveraging resources to build regional collaboration among key workforce development partners. First, the initiative built on existing professional relationships and expanded upon those, instead of attempting to develop new collaborations (between colleges and industry, for example) from scratch. Second, DBS brought high quality professional development to the colleges and partners through independent TA providers that had knowledge of the colleges and the regional industries, and who brought valuable tools and resources (e.g., career pathway mapping templates) to the initiative. Third, DBS worked toward a common salesforce approach to business and industry, to avoid duplication of efforts and to streamline communication between education, workforce, and businesses.

Finally, the DBS consortium effectively leveraged existing and new funding and resources (e.g., other grant funded initiatives with common goals) in the region.

1. INTRODUCTION

In recent decades, many American workers have been negatively affected by offshoring (outsourcing), global trade, and a disconnection between our education systems and industry (Levine, 2012; Ebenstein, Harrison, & McMillan, 2014). Furthermore, since the Great Recession of 2008, workers have been displaced, become unemployed, and needed new, specialized training to re-enter the workforce (Farber, 2015). In an effort to combat the effects of jobs and industries moving overseas, plant and factory closings, and massive layoffs, the Obama administration has invested targeted resources in job training and career pathway programs nationwide, including major infusions of funds into American community colleges. Part of this effort is the Trade Adjustment Assistance Community College and Career Training (TAACCT) Grant Program. In 2012, the Department of Labor awarded \$500 million in TAACCT grants “to create and expand innovative partnerships between community colleges and businesses to train workers with the skills employers need.”¹ The grant provides funds to colleges to enhance and improve career training programs that generally can be completed in two years or less and that lead to employment in high-skill, high-wage occupations and/or advanced educational credentials (certificates, degrees, transfer to four-year colleges and universities).

Design It–Build It–Ship It (DBS)

Design it–Build it–Ship it (DBS) was a regional workforce development consortium funded by TAACCT, which targeted the San Francisco East Bay Area and was developed by the Contra Costa Community College District (4CD) with Los Medanos College as lead agency. The consortium included 11 community colleges, local workforce investment boards (WIBs), two four-year universities, local employers and industry professionals, and other community partners.

Through careful analyses of labor force data, DBS developers found that jobs were leaving the East Bay region due to plants shutting down and other layoffs that began before, but were accelerated by, the 2008 recession. In examining labor market, educational, and demographic data in the region, program developers designed DBS to focus on the industries of **Advanced Manufacturing, Transportation and Logistics, and Biosciences/Biotechnology**.² Despite recent job losses in the region, these industries were identified as areas of stable job growth, and of needing well-trained employees that local community colleges were well positioned to educate with grant-funded support.

The lack of formal alignment between college programs and industry, and among community colleges, is one of the critical barriers to economic development that DBS aimed to improve.

DBS sought to address multiple challenges that influence the prospects of training participants and the economic health of the region. These include a lack of “middle skill” employees with the

¹ DBS is a Round 2 TAACCT award. More information is available at <http://www.doleta.gov/taacct/grantawards.cfm>

² These three industries are referred to as “priority sectors” or “industry clusters” throughout the report. We use the terms “cluster” and “sector” interchangeably.

technological skills necessary for serving industry needs; gaps in workers' basic math and English skills, including English as a second language; a substantial drop in wages due to positions, companies, and industries moving overseas and employees being forced to take jobs at much lower pay; and difficulty matching hard-to-employ individuals with jobs/careers in the three target sectors. Finally, the lack of formal alignment between college training programs and industry, and *among* community colleges, is one of the critical barriers that DBS aimed to improve.

A core strategy of DBS, to address these challenges, was to build “a regional ‘career path’ system with stackable certificates across the ten³ DBS community colleges.”⁴ Building strong career pathways, based at colleges but tied closely to industry, can address workforce development challenges by improving preparation of the workforce (future employees) *and* by responding to business needs. Effective career pathways prepare students for multiple opportunities (e.g., employment, advancement in careers, advanced certificates or degrees, transfer to four-year university, graduate school) within—or across—industry sectors. Career pathways involve not only technical training and contextualized (applied) basic skills, but also transferable and “soft” skills, which include competencies such as job searching, navigation of employment and educational systems, and collaboration and teamwork (DOL Career Pathways Toolkit).

DBS was designed to take a two-pronged approach to building a coherent career pathway and workforce system in the East Bay: (1) improve college training programs, and (2) develop a regional intermediary system with industry, colleges, and workforce represented. The DBS grant included several ambitious goals and objectives, such as:

- Training 2,017 participants.
- Building new college-based certificate pathways, including stackable certificates.
- Establishing an East Bay Skills Alliance to serve as “a regional infrastructure for working with industry, aligning regional training priorities, and strengthen integration of WIB/community college systems, and promote stackable certificates across the region.”
- Creating a digital infrastructure supporting assessments, career maps, and staffing systems.⁵

Evidence Base

Program developers applied evidence-based practices to the DBS initiative. DBS colleges used cohort-based designs, including linked courses, block scheduling, instructional teams, and a program of study as the foundation for local, sector-based, learning communities. Colleges also emphasized contextualized, applied mathematics, English, and digital literacy skills aligned with the requirements of the industry and with progression to transfer-level courses. Finally, colleges expanded student supports, including counseling, embedded case management services, and job

³ Originally, 10 colleges were involved in the grant. In Year 3, an 11th college joined the consortium.

⁴ See DBS grant narrative in Appendix A.

⁵ For more details about the DBS goals and objectives, see Appendix A.

placement support. Evidence of the success of these strategies was drawn from previous studies of career pathways and regional economic development (Burghardt and Gordon, 1990; Suarez & Melendez, 2001; Zeidenberg, Cho, & Jenkins, 2010). The literature cited in the grant reflects what the California region has seen successfully implemented in its Career Advancement Academies (CAA). DBS developers cited evidence from recent CAA studies. Beginning in 2007, CAA has funded 29 colleges statewide to implement contextualized career-focused programs to increase career and technical education (CTE) completion for low-income adults. By 2012, CAA had served more than 7,000 students. The external evaluation revealed that in the first three years of CAA, “low income students with limited basic skills exhibited increased course success rates (75%) and course retention rates (90%) compared to their peers.”⁶ Seven of the DBS consortium colleges were funded under CAA as well.

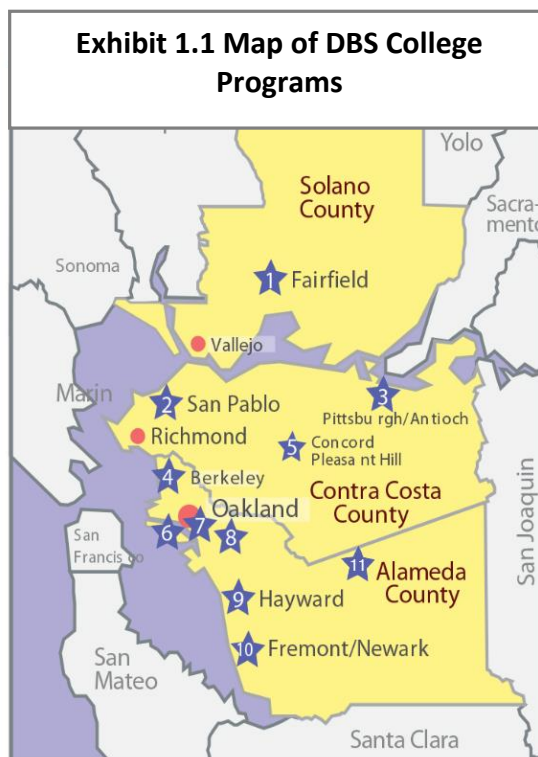
DBS College Programs

The 11 DBS colleges spanned a vast geographical area including three counties and five community college districts (Exhibit 1.1). DBS-funded programs included a mix of the evidence-based practices described above (e.g., enhanced student support services, student cohorts, job placement assistance).

For example, students in the **Transportation and Logistics** programs obtained accelerated training and certificates in forklift operations. They also learned operations, warehouse, and project management skills. Furthermore, these college programs assisted students with resume building and job searching. In the area of **Advanced Manufacturing**, students participated in process and machine technology programs, for example. These programs used funds for upgrading equipment and software. Colleges implementing **Biosciences** programs developed summer bridge programs and learning communities in which students moved through courses together and acted as supports and tutors for each other. For biotech, DBS funded new and upgraded equipment, labs, and curricula.

DBS Participants

DBS college programs targeted a range of individuals across the East Bay, including



Design it - Build it - Ship it Consortium Community Colleges
 1. Solano Community College 2. Contra Costa College 3. Los Medanos College 4. Berkeley City College 5. Diablo Valley College 6. College of Alameda 7. Laney College 8. Merritt College 9. Chabot College 10. Ohlone College 11. Las Positas College

⁶ Cited in DBS grant as Career Ladders Project; <http://www.careerladdersproject.org/videoa/mainpages/caa.html>; Public/Private Ventures (2010); “California Advancement Academies Evaluation Final Report.”

individuals with low formal education levels to those with college—and, in some cases, advanced—degrees. DBS served veterans and students with criminal records. The college programs attracted students who generally lived close to the campus, so programs varied and were somewhat tailored to local needs and populations.

Regional Partners

In addition to the 11 college-based training programs, DBS included multiple regional partners:

- An industry cluster coordinator and regional workforce coordinator were hired to support “cluster partnerships”: regional forums for businesses and public sector partners to convene and set priorities for growing the competitiveness of the cluster.
- Technical assistance (TA) providers supported colleges and cluster development activities. *Career Ladders Project*, an expert in career pathways, led workshops for college faculty and staff to develop regional pathway maps and assisted with the planning and maintenance of the cluster partnerships. *Collaborative Economics* provided training in industry-led partnerships and helped facilitate regional cluster partnership meetings. *Business U* provided professional development in common salesforce strategies (online communications tools and database management) for attracting industry partners.
- Deputy sector navigators (DSNs),⁷ positions funded by the CCCCO *Doing What Matters* initiative, work with community colleges and employers to align workforce training and career pathways in the state. DSNs were housed at three DBS colleges and each was working in one of the DBS target industries, which created a critical opportunity for synergy between the two efforts.
- DBS also partnered the East Bay Biomedical Manufacturing Network (EBBMN), funded through the Jobs and Innovation Accelerator Challenge grant,⁸ a multi-agency federal grant program designed to support the advancement of high-growth, regional industry clusters. EBBMN led the cluster development work within Biosciences in the East Bay.
- Workforce investment boards (WIBs) and American Job Centers (AJCs) in five counties also participated in DBS. At a regional level, the Contra Costa and Alameda County WIBs took an active role in the cluster partnerships. Many AJCs also developed or enhanced their relationships with specific DBS colleges and programs through the grant.
- Employers were a key constituency of the grant, as consumers of college training programs and as partners in shaping implementation. Several employer partners were champions within the cluster partnerships, helping to recruit additional employers and taking the lead on action items identified by the larger group. Employers also had relationships with individual colleges and programs, serving on advisory boards, providing input into curricula, visiting campuses to talk with students, providing internships, and hiring graduates.

⁷ Additional information about the DSN is available at <http://doingwhatmatters.cccco.edu/WEDDGrants/GranteeRoles.aspx>

⁸ Additional information about the federal Jobs and Innovation Accelerator Challenge grant program is available at <https://www.eda.gov/challenges/jobsaccelerator/>

Evaluation Design

To evaluate the DBS initiative, IMPAQ used a mixed-methods research design with two major components—an implementation study, which includes a social network analysis (SNA); and an outcomes study. The evaluation addressed the following research questions:

Implementation study questions:

- What were the key elements of the DBS initiative and how did they develop over the grant period?
- What types of programs and courses were offered? What types of, and how many, participants were served?
- What were the key features of the network of DBS stakeholders?
- How did the DBS initiative bring partnering agencies together to collaborate around common goals?
- How will DBS efforts be sustained beyond the life of this particular grant?

Outcomes study questions:

- To what extent did participation in DBS-supported career and technical education (CTE) programs lead to an increased likelihood of employment, especially in a field related to the student's course of study?
- To what extent did participation in DBS-supported CTE programs lead to a promotion or an increase in earnings/wages?
- To what extent did participation in DBS-supported CTE programs lead to an increase in the receipt of a certificate or degree, transfer to a four-year college/university, or further training?

The implementation study is a descriptive analysis of DBS development, accomplishments, challenges, and lessons, based on rich qualitative data from interviews and focus groups, observations of DBS activities, and document reviews. Data collected from colleges and program records informed our descriptions of the DBS programs and participation. In addition, a key component of the implementation study is the social network analysis, which relied on data from a questionnaire to examine collaboration and information sharing among DBS partnering agencies (e.g., workforce, colleges, employers, community organizations).

The outcomes study used a comparison group design to examine education and employment outcomes for DBS participants. In close collaboration with DBS college coordinators, IMPAQ evaluators selected comparison groups from similar CTE programs within the 11 DBS colleges; these groups consisted of students who were demographically similar to DBS students but not enrolled in DBS-funded programs. IMPAQ, in partnership with 4CD, the 11 DBS colleges, and our subcontractor, the Research and Planning (RP) Group, collected the following types of outcome data to assess DBS program effects:

- Student surveys, which assessed self-reported educational (enrollment, transfer, certificates obtained) and employment outcomes (employment in field of training, wages); administered at baseline, 3-month follow-up, and 12-month follow-up
- Student records (enrollment, transfer, credit attainment, degree/certificate completion, etc.) from the California Community College Chancellor's Office (CCCCO) management information system (MIS); pre- and post-DBS program enrollment
- Unemployment insurance (UI) wage data from the California Employment Development Department (EDD), which includes employment status and wage information; pre- and post-DBS program enrollment

Each of our methods and data sources is described in detail in the Appendices.

Organization of This Report

This final evaluation report begins with an introduction, a brief description of DBS and its core components, and an overview of the evaluation design. In the next section, we describe the implementation of DBS, including major grant activities, college programs and students served, collaboration across the region, successes, challenges, and sustainability of grant efforts. In Section 3, we present findings from the outcomes study, primarily addressing the effects of DBS on individual participants' educational and workforce outcomes. In Section 4, we present a summary of findings, suggestions, and recommendations, with implications for policy and future research. Finally, the appendices include all of our data collection instruments and protocols, as well as detailed descriptions of our methodologies and procedures.

2. IMPLEMENTATION STUDY

To understand how DBS promoted collaboration and improved training programs across the region, we conducted a mixed-methods implementation study. Qualitative data sources informing the study include meeting and event observations; interviews with college staff and faculty and student focus groups conducted during site visits; telephone interviews with grant leadership (4CD), DBS consultants, workforce development, and industry partners; and reviews of program documents. Information about the programs developed and participants served are based on college and DBS program data. To measure collaboration among education, workforce development, and industry partners in the region, we also conducted a social network analysis (SNA) based on data collected through a collaboration questionnaire, administered to DBS stakeholders in Years 2 and 4 of the grant.

The implementation study addressed the following research questions:

- What were the key elements of the DBS initiative and how did they develop over the course of the grant?
- What types of programs and courses were offered? What types of, and how many, participants were served?
- What were the key features of the network of DBS stakeholders?
- How did the DBS initiative bring partnering agencies together to collaborate around common goals?
- How will DBS efforts be sustained beyond the life of this particular grant?

The findings presented here are descriptive in nature—including narrative, quantitative, and graphic elements that tell the story of the grant implementation with a focus on perceived successes, challenges, and lessons learned. A detailed explanation of the implementation research methods is provided in Appendix B.

Key Elements of the DBS Initiative and Their Development over Time

The DBS consortium used the TAACCCT grant funds for the following key elements:

- Create new and improved college training programs (e.g., updated curriculum, specialized equipment/ technology, and hiring faculty).
- Provide targeted student support services such as embedded tutors, contextualized basic skills instruction, and counseling.
- Facilitate and promote regional collaboration among college staff/faculty, workforce development professionals, and industry representatives.

College Training Programs

The types of CTE programs created or improved with the grant funding varied with regard to certificates/credentials offered and course designs. This variation resulted from each college having independently developed its own DBS programs based on the specific needs, interests,

and capacity of the local campus community. In all, the 11 participating colleges offered 71 unique courses and more than 250 course sections during the study period.

DBS colleges used grant funds to purchase specialized equipment and technology, hire qualified instructors, and develop or upgrade curricula and instructional tools. College staff/faculty also designed program-specific student support services tailored to the needs of the population served. Another key element of the DBS initiative was collaboration among college staff/faculty, workforce investment professionals, and representatives from industry in the three industry clusters. The mechanism for fostering such collaboration was professional development through facilitated activities dealing with career pathway development and employer engagement.

Career Pathway Development

Career pathways involve progressive levels of education and training leading to industry-recognized credentials in specific occupations. DBS partnered with the Career Ladders Project (CLP) to provide technical assistance (TA) for the development of career pathway connections within colleges and between college programs addressing the same clusters in the region. CLP hosted a series of High Impact Pathway (HIP) Institutes, in-person workshops that brought together college staff/faculty and workforce partners to map out, by cluster, what each DBS program would offer and how those programs could be linked to opportunities for employment or higher education. In addition, as a follow-up to these workshops, CLP provided some targeted TA sessions at individual college campuses to further support the career pathway development process.

Employer Engagement

DBS promoted demand-driven strategies within the region's college-based training and workforce development programs. The DBS consortium employed two consultants to form cluster partnerships that would engage employers in regional collaboration and pathway development efforts. The consortium also contracted with two TA providers (Collaborative Economics and Business U) to deliver professional development on demand-driven engagement strategies.

Development of the DBS Program Elements over Time

Year 1

In Year 1 (see timeline in Exhibit 2.1), grant-funded activities focused on program development at the college level. By the end of Year 1, some colleges had begun recruiting and enrolling students; others were focused on curriculum and program development. In addition, the grant leadership (4CD and the two consultants) convened the partner colleges to engage in coordinated planning to promote the shared vision that the DBS programs form the basis of a regional career pathway system. Each college hired or identified DBS coordinators to oversee grant-funded activities. The DBS consultants formed small cluster leadership teams (CLTs) to plan the launch of the cluster partnerships. By the end of Year 1, DBS college coordinators were meeting on a monthly basis, CLP conducted the first HIP Institute, and the consortium held initial cluster "meet-ups" for business services professionals from throughout the region.

Year 2

In Year 2, the DBS consultants continued to organize CLTs to design and launch demand-driven cluster partnerships for each of the three sectors. The CLTs received technical assistance in developing industry-led cluster partnerships from Collaborative Economics, a strategic advisory and consulting firm. The Advanced Manufacturing and Transportation and Logistics clusters launched their partnership in Year 2. The CLTs recruited industry champions to sponsor the launches and convene the partnerships. DBS consultants and workforce partners assisted with facilitation. The Biosciences CLT decided to join the East Bay Biomedical Manufacturing Network (EBBMN), a pre-existing partnership of employers, training providers, and economic development in the East Bay, rather than launch a new organization.

The consortium also convened other cross-systems events in Year 2 to coordinate the efforts of the colleges, workforce development partners, and economic development agencies to communicate with businesses in the region. One such event was a “common salesforce” training session, which provided cross-training to business services representatives on the various public sector systems that interact with business, and how to successfully pitch services to business. Another was a meeting of the East Bay Workforce Intermediary Strategy Group, a group designed to oversee workforce development in the region.

Colleges continued to design and implement new and updated CTE programs. Most of the participating colleges began offering DBS courses during Year 2 of the grant (2013–14) (see Exhibit 2.2).

Year 3

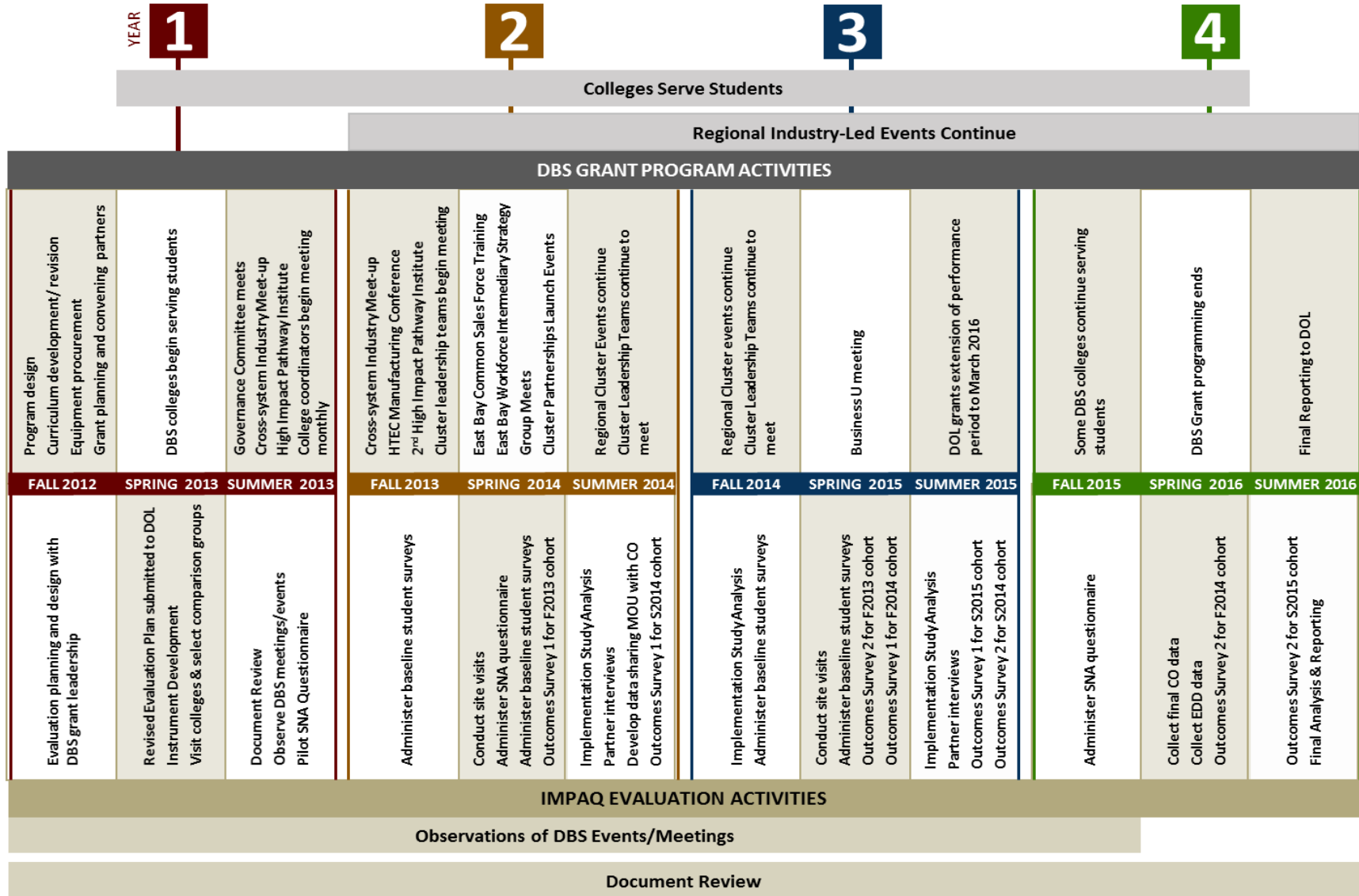
By Year 3 of the grant period (2014–15), all 11 DBS colleges offered courses in the priority sectors. The collaboration activities sponsored by the DBS grant continued and interview respondents reported that these activities had indeed promoted a shared vision of the career pathway development process. The industry-led partnerships continued to meet quarterly throughout the grant period. Some of the draft pathway maps developed through the CLP workshops were disseminated to industry partners for input. To support the common salesforce strategy, the consortium contracted with Business U, a TA provider with expertise in business engagement, to provide professional development and technology tools. The consortium also began work on an external web portal designed to serve as a central location for information about the regional career pathways and provide links to specific college programs. The goal was for this portal to include an integrated back-end platform to match students to work-based learning opportunities, coupled with automation to support stakeholders and partners in successful collaboration and reporting.

Year 4

The last cohort of study participants was served in Year 4 of the grant (2015–16). The cluster partnerships and the EBBMN continued to meet regularly. The remaining grant-funded activities related to the collection of CCCCCO and EDD data for the purposes of evaluation and final reporting to DOL.

When looking across the four years of implementation, it is important to note that DBS is not a single model or program. The initiative encompasses many different elements that took significant time and effort to develop. These key elements include new and enhanced CTE programs, targeted student support services, contextualized basic skills instruction, and collaboration among institutions of higher education, workforce systems, and employers across the region.

Exhibit 2.1 DBS Timeline



DBS Programs and Participants

The DBS TAACCCT grant funded the development and enhancement of a variety of CTE programs at the 11 East Bay colleges. Examples include the following:

- Transportation and Logistics programs included “FLOW” (forklift, logistics, operations, and warehousing) at Contra Costa College and a Project Management Series at Chabot College. The Chabot program was part of its community education offerings. Participants did not need to be registered students at the college and could complete training in one summer. At the College of Alameda, the Alameda Transportation and Logistics Academic Support (ATLAS) program offered members of the community accelerated programs in Green Diesel, Office Administration, and Warehouse Operations and Logistics. Students completing these programs have the opportunity to obtain OSHA, hazmat, and forklift driving certificates.
- In the area of Advanced Manufacturing, examples include Industrial Maintenance at Laney Community College and Mechanical Technology at Diablo Valley College. For these programs, colleges used grant funds to purchase and update machinery and equipment, upgrade software, create contextualized math courses, and develop and institutionalize new certificates. In addition, colleges used DBS funds for counseling services and to expand relationships with local employers to secure internships for students.
- In Biosciences, examples include Histotech at Merritt College and a variety of biotechnology courses at Berkeley City College, Ohlone College, and Contra Costa College. Some colleges developed “bridge to biotech” summer programs, in which students could get introduced to, and prepare for, the biotech programs at the colleges. Solano College used DBS funds to offer expanded courses under the Bay Area Consortium for Water and Wastewater Education (BACWWE) program, in which students took courses at actual water processing plants. DBS biotech programs funded new and upgraded equipment, labs, and curricula.

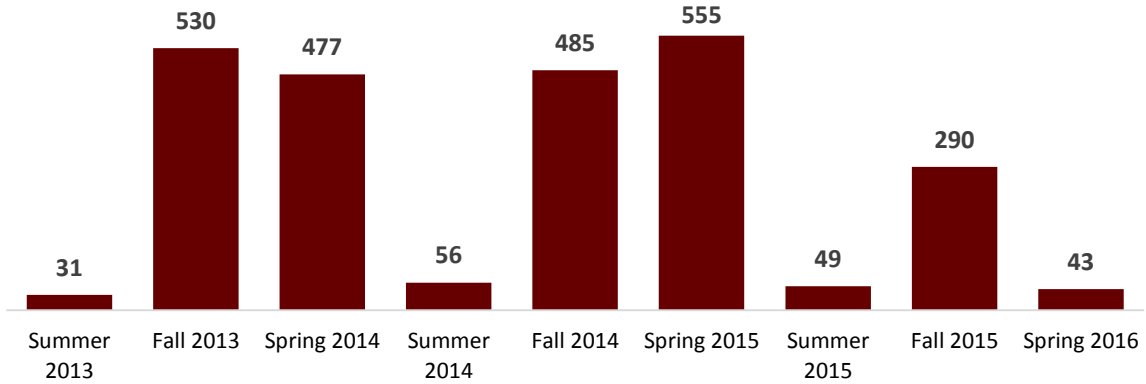
DBS Student Enrollment

Because of the wide variation in the focus of grant-funded programs, there is associated variation in the type of students served by each program. Below we describe the number of students served, the types of courses in which they enrolled, and DBS participant background characteristics.

Participating colleges identified 2,516 students enrolled in DBS programs between Summer 2013 and Summer 2016 (Exhibit 2.2).⁹ Total enrollment exceeded the originally proposed goal of 2,017.

⁹ The total number of DBS students reported here (2,516) represents the students whom the DBS program staff were able to verify as participants in confirmed DBS classes as of May 2016. This count may differ from the provisional enrollee counts reported elsewhere over the course of the grant. Some students took more than one DBS class or took both DBS and comparison classes in one or more semesters. In our sample, the student is assigned to only one treatment status. The students were counted once for the earliest semester in which they were enrolled in

Exhibit 2.2 DBS Students Served, by Semester



Approximately half (48.8%) of the 2,516 DBS students were enrolled in courses focusing on the Advanced Manufacturing sector; 31.0 percent were in Biosciences; and 14.6 percent were in Transportation and Logistics (Exhibit 2.3). A small share (5.7%) of students were enrolled in programs that did not clearly fall into one of the three priority sectors, but were relevant to employers in all target sectors and were supported by the DBS initiative.¹⁰ We also found that 6.0 percent of program participants were enrolled in what the colleges classified as basic skills or remedial courses during the same semester in which they took the DBS courses.

Exhibit 2.3 DBS Program Enrollment by Cluster

Enrollment Category	Number of Students Enrolled (N=2,516)	Percent Enrolled
By Priority Sector		
Advanced Manufacturing	1,227	48.8
Transportation and Logistics	366	14.6
Biosciences	780	31.0
Others	143	5.7
Enrolled in basic skills class	152	6.0

Source: IMPAQ calculations based on the program data and CCCC student records.

Contextualized Basic Skills

Aside from official college courses, DBS students received support in basic math and English skills in a variety of ways. To understand how the DBS college programs supported basic skills

the DBS class. If the students took both comparison and DBS courses, the student was classified under DBS unless the student had already submitted one or both follow-up surveys. A discussion of such scenarios is included in Appendix C.

¹⁰ These students were enrolled in the Computer Information Systems (CIS) class at Berkeley City College. This CIS class did not fit clearly into one of the industry clusters but was supported by the DBS grant because of its relevance across sectors.

development, IMPAQ surveyed college coordinators about how basic skills were addressed in the DBS programs at their colleges. A summary of results by semester is displayed in Exhibit 2.4.

Exhibit 2.4 How DBS Addressed Basic/Contextualized Skills

	N/A (#1)	Existing Course (#2)	Integrated (#3)	Supplemental Instruction (#4)	New Course (#5)	New Course in Process (#6)	Total
Spring 2013	1	0	0	0	0	0	1
Summer 2013	3	0	0	0	0	0	3
Fall 2013	5	10	19	2	0	2	38
Spring 2014	2	10	11	10	0	0	33
Summer 2014	3	1	0	0	0	0	4
Fall 2014	3	8	9	10	0	0	30
Spring 2015	3	7	6	9	1	0	26
Summer 2015	2	0	0	1	0	0	3
Total	22	36	45	32	1	2	138

Note: numbers in the table represent the number of programs of study

For 22 programs, coordinators reported that the issue was “not applicable” or basic skills were not addressed in the program. In most of these cases, a certain level of math knowledge and demonstrated aptitude were prerequisites to the program; therefore, students without basic skills did not participate. In 36 cases (programs), DBS programs referred students to existing college courses (option 2). At one college, students were given assessments upon entering the program, and then were referred to appropriate classes. Another example is that students were often referred to a tutoring center on campus.

The most common (N = 45) approach to basic skills development was integrating contextualized math or English skills into the DBS course (option 3). For example, at one college, students in the DBS program take a “Math for Lab Sciences” course, which is a contextualized math class that teaches the skills necessary for the calculations students will need to do in the DBS program. At another college, math tutors were embedded in math and science classes. As another example, one college has a DBS-funded water/wastewater program that includes a contextualized math course integrated into the program.

In 32 cases, colleges offered a “boot camp” or other supplemental course or program to support students’ basic skill development. These programs were largely recommended to students (i.e., not required) and were not-for-credit options. One of the Biosciences programs reported that it offered a chemistry and a biology boot camp for Chemistry 1A students. Finally, for a very small number of cases, the DBS college programs had either developed a new course to address basic skills or were in the process of doing so. For example, one college reported that it created a course called “Report Writing for Officers” as a result of the grant.

Participant Characteristics

The characteristics of the adults served by the DBS grant reflect the diverse communities in the East Bay region, and show that the DBS-supported programs reached individuals who were out of work and had barriers to success in employment or training. As shown in Exhibit 2.5, participants in the DBS students were mostly males (72.7%), with a mean age of 29.2 years. The students were racially diverse, with the largest group being white (31.2%), followed by Hispanic (24.5%), Asian (19.7%), and African American (15.3%). Most DBS students were unmarried (80.2%) and had no dependents (65.0%). Thirty percent had an education level no higher than a high school diploma or GED.

Exhibit 2.5 DBS Student Demographic Characteristics at Baseline

Student Characteristic		Percentage
Male		72.7
Single		80.2
No dependents		69.2
Veteran		8.6
Mean age (in years)		29.2 (SD=11.23)
Ever received financial aid		63.5
Race	White	31.2
	Black or African American	15.3
	Hispanic	24.5
	Asian	19.7
	Two or more races	9.2
Education level	No postsecondary	29.9
	Some college/college certificate	46.8
	2-year AA or AS degree	7.1
	4-year degree or higher	16.1

Source: IMPAQ calculations based on the baseline survey.

Many DBS students were not employed at baseline,¹¹ but some were working full time (17.5%) or part time (35.0%) when they enrolled in the program (Exhibit 2.6). About one third (34.8 %) were unemployed (seeking a job) and 12.7 percent were not in the labor force (not looking for work). More than half of the DBS students reported an annual household income of \$25,000 or less (51.6%). The DBS programs enrolled a disproportionately higher percentage of low-income individuals than those represented in the general population of the counties served by participating colleges. In these counties, the median household income was over \$67,000, and the median per capita income was over \$29,000 during the 2010–14 period.¹² In addition, 8.8

¹¹ *Baseline* refers to the term (e.g., Fall 2013) during which the student enrolled in the study or first enrolled in a DBS-funded college course.

¹² The U.S. Census Bureau reports, based on the 2010–14 American Community Surveys, that the five-year estimates (in 2014 dollars) for median household income and per-capita income were \$73,775 and \$36,439, respectively, in Alameda County; \$79,799 and \$38,779 in Contra Costa County; and \$67,341 and \$29,132 in Solano County. <http://www.census.gov/quickfacts/table/PST045215/06095,06013,06001>

percent of the DBS students reported receiving CalFresh (SNAP), and 4.4 percent had Medicaid. A total of 14.1 percent reported receiving at least one of the following means-tested public assistance programs: CalFresh, CalWORKs (TANF), Medicaid, or Section 8.

When asked about their goals for enrolling in their community college program, more than half of the DBS students reported goals of getting a certificate or degree (59.8%) and finding a better job (53.3%). Less than one third hoped to transfer to a four-year college (30.8%).

Exhibit 2.6 DBS Student Employment Characteristics at Baseline

Student Characteristics		Percentage
Any income-based public benefit		14.1
Annual household income	Less than \$25,000	51.6
	\$25,000 to \$50,000	22.0
	More than \$50,000	26.4
Employment status	Working full time	17.5
	Working part time	35.0
	Unemployed/seeking job	34.8
	Unemployed/not looking	12.7
What is your current goal?*	Find job/get a better job	53.3
	Get a certificate/degree	59.8
	Transfer to 4-year college	30.8

Source: IMPAQ calculations based on the baseline survey.

*Note: Figures exceed 100% because students could select more than one goal.

Student Characteristics by Cluster

The demographic profiles of DBS students were not uniform across the three clusters. The differences in the student populations across the sectors likely reflect the underlying variation in the DBS course designs and goals. As shown in Appendix G, DBS students in Advanced Manufacturing were more likely to be male, white, or Hispanic, and to report getting a certificate or degree as their goal; those in Transportation and Logistics were more likely to be older, African American or Hispanic, have lower incomes, and to report finding a job (or better job) as their goal; and those in Biosciences were more likely to be female, Asian or white, have a higher level of prior education, and to report transferring to a four-year college as their goal. These systematic differences in the student profiles across the clusters are important to keep in mind as we discuss their education and employment outcomes in Section 3.

Key Features of the Network¹³ of DBS Stakeholders

To implement training programs and launch cluster partnerships, DBS engaged a diverse group of partners from throughout the region. The social network analysis (SNA) suggests that DBS promoted new collaborations and allowed organizations and individuals to build upon existing

¹³ “Network” is a methodological term describing the combination of individuals and organizations that make up the DBS consortium.

relationships. The SNA also uncovered variation in the types of relationships (new or existing) and type of active partners within each cluster.

Network Participants

Based on our analysis, the DBS network included 222 individuals from industry, the DBS colleges, 4CD, the DSN grant, workforce development organizations, educational institutions, economic development agencies, and other partnering organizations. Nearly a third (29.7%) worked for a *DBS college, 4CD, or organizations that formally consult (DBS consultants)* on the grant, including TA providers and the EBBMN (Exhibit 2.7). These three types of organizations were largely responsible for grant implementation and received most of the grant funds. Notably, just over two thirds of the stakeholders received no or minimal direct funding from the grant, suggesting that DBS reached a broad group of constituencies in the region.

Exhibit 2.7 Individual Stakeholders Involved in DBS, by Cluster

Type of Organization	Consortium		Advanced Manufacturing		Biosciences		Transportation & Logistics	
	N	%	N	%	N	%	N	%
Employers	81	36.5	38	33.0	23	24.5	21	24.7
DBS College	52	23.4	25	21.7	27	28.7	19	22.4
Workforce Development Organizations	25	11.3	16	13.9	11	11.7	16	18.8
Other Community Organizations	18	8.1	8	7.0	2	2.1	9	10.5
Educational Institutions	17	7.7	8	7.0	13	13.8	4	4.7
Economic Development Agencies	12	5.4	10	8.7	6	6.4	8	9.4
DBS Consultants & Partners	8	3.6	5	4.4	6	6.4	3	3.5
4CD	6	2.7	4	3.5	4	4.3	3	3.5
Deputy Sector Navigators	3	1.4	1	0.9	2	2.1	2	2.4
Total	222	100.0	115	100.0	94	100.0	85	100

Each of the clusters had a diverse membership with regard to organizational affiliation, with some variation between clusters. For example, more individuals and employers collaborated in the Advanced Manufacturing cluster than in the other two. According to one deputy sector navigator, a large number of employers in Advanced Manufacturing already participated in an active regional professional association, which DBS could leverage. The Transportation and Logistics network was the smallest, with relatively fewer college staff and relatively more workforce, community, and economic development partners. This is likely because fewer DBS colleges offered programs in this cluster. The Transportation and Logistics industry was also not as organized regionally when the grant started. Although collaboration in the cluster grew over the course of the grant, it was concentrated among fewer people.

Types of Relationships

Network participants formed 481 relationships; almost half (49%) were between people who had not worked with each other prior to the grant (Exhibit 2.8). Several college staff reported in

interviews that DBS improved relationships with people they already knew. Thus, DBS helped increase the number of relationships in the region, but also built upon a prior network of relationships.

Exhibit 2.8 Stakeholders Who Collaborated before DBS, by Cluster

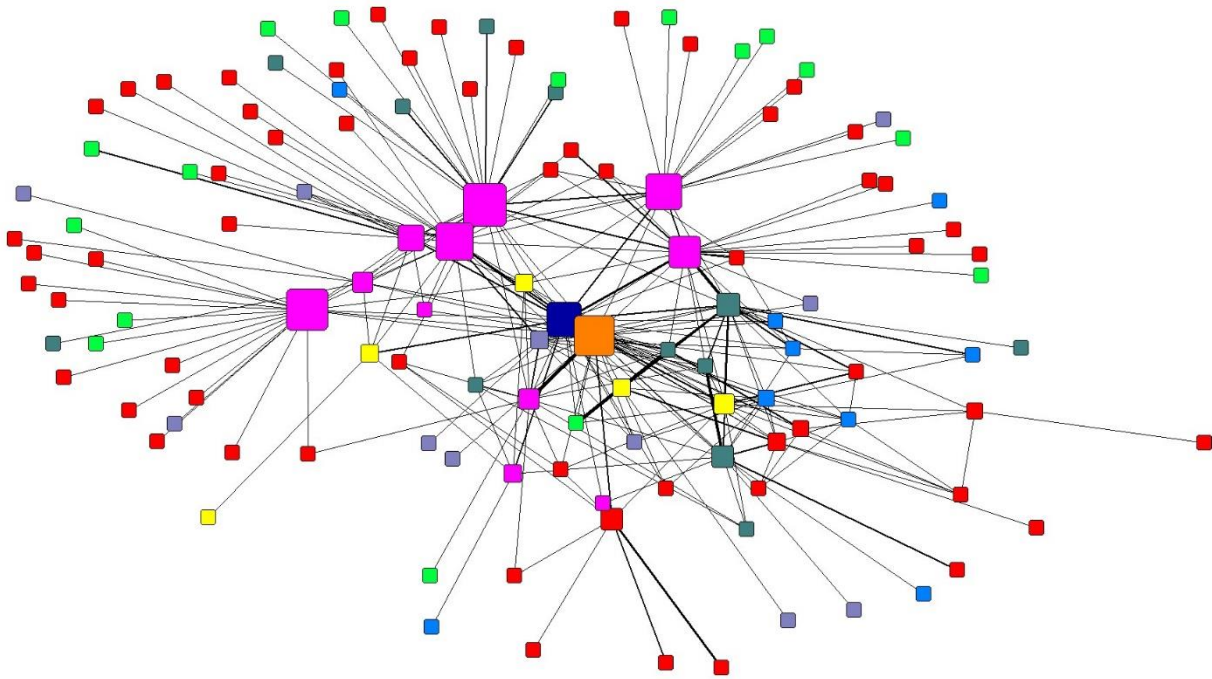
Prior Collaboration	Consortium		Advanced Manufacturing		Biosciences		Transportation & Logistics	
	N	%	N	%	N	%	N	%
Yes (previous relationship)	219	46.1	136	50.8	72	49.7	51	35.9
No (<i>new</i> relationship)	238	49.5	124	46.3	70	48.3	80	56.3
Not sure	3	0.6	0	0	1	0.7	1	0.1
Missing	21	4.4	8	3.0	2	1.4	10	7.0
Total reported relationships	481		268		145		142	

The Advanced Manufacturing and Biosciences clusters had a roughly even distribution of new and prior relationships. By contrast, the Transportation and Logistics cluster had a smaller proportion of prior relationships (36%), suggesting that DBS was particularly beneficial to this cluster in increasing collaboration and helping stakeholders to become aware of one another.

Network Structure

To illustrate collaboration among partners in the consortium, we produced a social network map for the DBS consortium and a map for each of the clusters (see Exhibits 2.9 through 2.12). In the maps, the colored squares or “nodes” represent organizations, and lines connecting nodes represent collaboration between organizations. Larger nodes signify organizations that act as “brokers”; these brokers connect organizations that are not directly collaborating with each other. Thicker lines signify stronger ties—or greater collaboration—between the organizations.

Exhibit 2.9 DBS Consortium-Wide Network Map

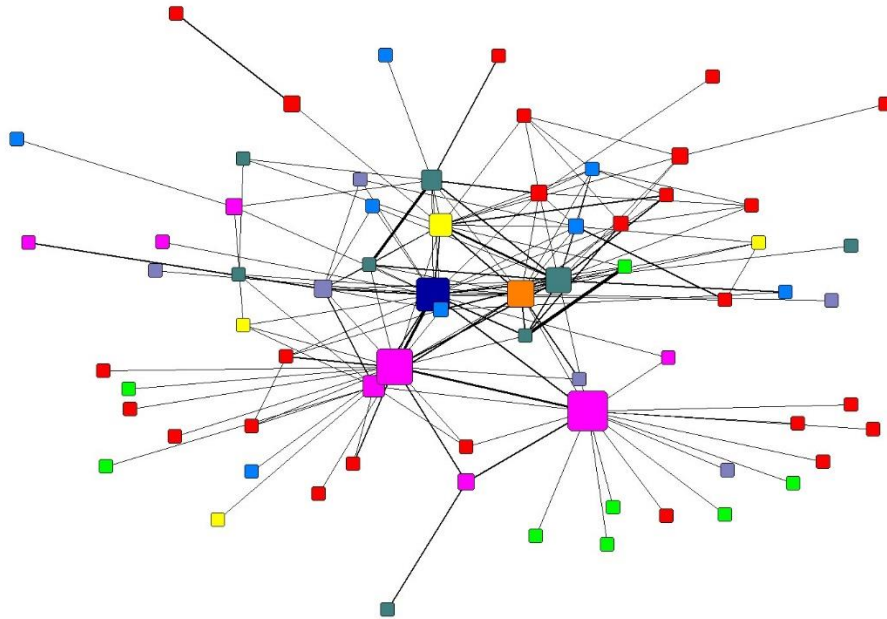


DBS College	■	Other	■	Employer	■
DSNs	■	Economic Development	■	Education	■
Workforce Development	■	4CD	■	DBS Consultants & Partners	■

In the consortium-wide and cluster network maps, the 4CD and DBS college nodes are relatively large, indicating that they connected partners in the region who otherwise may not have been collaborating. These college nodes have several relationships with employer and community partner nodes that are not connected to any other nodes in the network, and thus are the link between these partners and the rest of the network. The DSNs also played this linking role, particularly in the consortium-wide network. This suggests that the DSN’s role as an industry-specific regional contact for college and industry was highly beneficial for the DBS network, which is notable given that the DSNs are funded by a separate state initiative.

In general, most employer, workforce development, education, and community partners are located on the periphery of the network maps, connected to one or two other partners (although there is some variation by cluster).

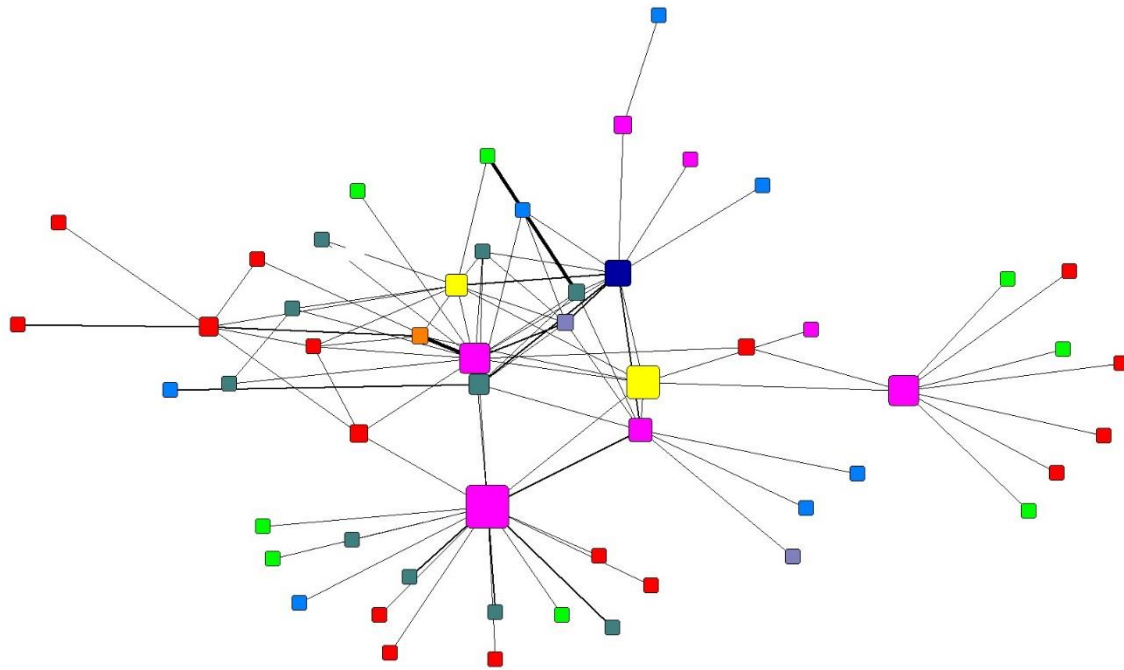
Exhibit 2.10 Advanced Manufacturing Cluster Network Map



DBS College	Other	Employer	
DSNs	Economic Development	Education	
Workforce Development	4CD	DBS Consultants & Partners	

In Advanced Manufacturing, a small number of employer nodes are moderate in size, reflecting these employers’ roles as the “champions” of the cluster partnerships, committed to recruiting additional employer partners and collaborating with service providers. This cluster also had a relatively large workforce development node, representing one of the WIBs. The emergence of a WIB as a broker reflects the WIBs’ investment in the priorities of DBS, a specific accomplishment of the grant, especially as the WIB participation in the Advanced Manufacturing network was largely voluntary.

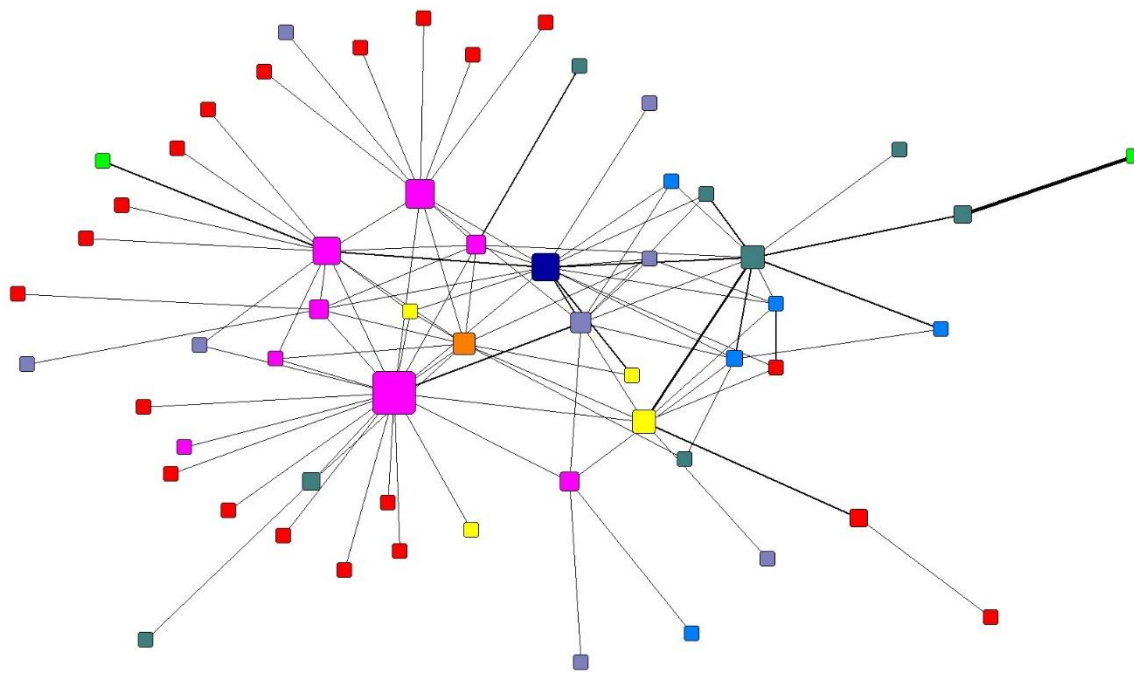
Exhibit 2.11 Transportation and Logistics Cluster Network Map



DBS College	Other	Employer	
DSNs	Economic Development	Education	
Workforce Development	4CD	DBS Consultants & Partners	

The Transportation and Logistics cluster also has a small number of employer nodes that are moderate in size. Similar to the Advanced Manufacturing sector, these employers play the role of “champions” of the cluster partnerships, and work to recruit additional employer partners and collaborate with service providers. Unique to this cluster is a large “DBS Consultant & Partner” node, which represents one of the TA providers (the Career Ladders Project). TA providers were active participants in the consortium-wide network and other cluster networks, but within Transportation and Logistics, they provided specific value as a liaison among some of the colleges, workforce agencies, and other partners.

Exhibit 2.12 Biosciences Cluster Network Map



DBS College	■	Other	■	Employer	■
DSNs	■	Economic Development	■	Education	■
Workforce Development	■	4CD	■	DBS Consultants & Partners	■

In Biosciences, the East Bay Biomedical Manufacturing Network, one of the moderately sized “DBS Consultant & Partner” nodes, was already established as a champion of cluster development, so the cluster did not need to identify “employer champions” to develop a new partnership for DBS. Thus, employer nodes do not stand out as a network feature. This cluster map also had a relatively large workforce development node. As mentioned earlier, the emergence of WIBs as brokers reflects their strategic investment in the priorities of DBS.

How DBS Promoted Collaboration across Systems

The DBS consortium was successful in bringing community colleges, workforce development, and industry partners together to collaborate on regional needs through two mechanisms: workshops that focused on career pathway development and cluster partnerships that focused on industry engagement. These collaborative activities (described briefly earlier in this section) resulted in improved capacity within the region to serve employer and student needs, as well as successful efforts to leverage other resources. This section describes how collaboration took place, and some of the challenges consortium partners experienced.

Career Pathway Development

Through the grant-sponsored CLP HIP Institutes, the consortium provided organizational support for under-resourced colleges to engage with each other and critical partners from workforce and economic development, with whom they typically have little contact. As one consultant from CLP explained:

“The community colleges are just so lean that they don’t have a lot of people working on outreach to economic development or communicating with the WIB. ... We [CLP] have the time, and ... resources to help plan and get everyone together ... for creating a regional infrastructure.”

Opportunities for Peer Learning

“Through the Career Ladders Project we are able to talk to other colleges and see what they’re doing. We should do it more often!”

HIP Institutes also provided faculty with the necessary time and space to access expertise and engage in peer learning. For example, one faculty member explained:

“CLP did help me get ideas about what I could do. All these stackable pathways for going from one level to another—it’s new. I learned from other people. I had it in my mind to do this, but [the HIP Institutes] gave me a better idea of how to proceed.”

For colleges, the HIP Institutes helped illuminate the importance of building these bridging relationships. One faculty member said that the institutes “opened our eyes to what industry has to offer.”

Two distinct types of collaboration were supported through the HIP Institutes: collaboration *across* colleges and districts and collaboration *within* individual colleges. By facilitating activities to foster these two types of collaboration, the CLP helped establish the *shared vision* required for a regional career pathway system to develop.

Collaboration across Community Colleges and Districts

The HIP Institutes facilitated collaboration across colleges, districts, and counties. In general, community college faculty lack sufficient opportunity to collaborate interdepartmentally, let alone across

colleges and districts. These facilitated workshops helped colleges broaden the geographic reach of their programs and create regional awareness of the array of programs offered in the region.

Industry, Workforce and Colleges Working Together

“I think the biggest accomplishment has been that these three legs of a stool are now working together [industry, workforce, and colleges] to keep the stool standing. I think there’s more exchanging ideas, more understanding, and working towards the betterment of the job situation in the East Bay.” (Employer Champion)

Interview respondents reported that the analysis and mapping out of program offerings created opportunities for innovation and redesign. Discussions that took place at the HIP Institutes

eventually resulted in the identification of curricular gaps in the region. As one biotech faculty member stated:

“We do all the breakout sessions where we get to talk about issues that are coming up in our areas. One of them is the clean room, and we found out that no one has any clean room experiences for their students. It allowed us to identify this really large key skill gap that we’re now more urgently working to close.”

College faculty and staff valued the opportunity to collaborate with other colleges and reported no longer feeling that they were “competing” for students and resources, but that instead the colleges were operating in partnership. CLP facilitated meetings that allowed colleges within one district to discuss improved referral systems. As the dean from one college remarked:

“Collaboration across different colleges is awesome. I feel much more connected to the other institutions; I know what they’re doing. I’ve been able to get to know their faculty. We’ve funneled students to one another. Without this grant we wouldn’t be where we are in terms of relationships.”

Champions of Career Pathway Development within Colleges

A critical role in career pathway development is that of full-time faculty who can champion this complex and iterative process at the college level. The CLP team provided guidance and resources, but the process had to be championed from within each college to be effective.

Benefits of a Regional Approach

In the Bay Area, it is common for individuals to seek employment in a neighboring county, without regard to college district boundaries. By taking a regional approach to career pathway development, the DBS colleges were positioned to better address both industry and student needs.

Champions persistently pushed for changes in curriculum and followed up on the approval processes for new certificates and pathways that would be of value to four-year institutions and employers. Some interview respondents commented that it would be easier to push for institutional change at their colleges if the individuals leading the change were in a position of authority. For example, one person suggested that the DBS grant fund a “director” position at the campuses instead of a “coordinator.” This comment illustrates the need for champions to not only have the will to innovate and implement new programs, but also to have the administrative power to make change within their institution.

Establishing a Shared Vision

The HIP Institutes, combined with the efforts of the college-level champions, helped colleagues develop a shared vision for regional reform. In Year 2, when the career pathway planning process was in its early stages, faculty noted the progress they had made with regard to establishing that vision:

“I have been in this job for two years. When I first came, everyone was just learning this stuff, and now the faculty, too, are talking about nesting, stacking certificates, how to get students the first entry to a job and still show them the path to the next thing. That shift is very important.”

The shared vision of a regional career pathway system is a prerequisite to its development. By the same token, sharing a vision with colleagues from other institutions serves as a support mechanism for college faculty trying to move newly designed CTE programs through the curriculum approval processes.

Industry Engagement

There was an expressed need across the clusters for “better points of contact between industries and colleges.”¹⁴ College staff and employers reported that grant-sponsored collaboration activities have led to better and more useful information sharing.

Employers valued the opportunity that industry-led partnerships provided for them to express their needs and concerns and believed they were being heard by the colleges. Employers also valued having an influence on the college curriculum and opportunities to develop local talent. For example, one Advanced Manufacturing employer reported that she had an opportunity through DBS to convince a college to include more emphasis on soft skills and quality control in the curriculum. Another employer reported that the collaboration with the community colleges was a way to diversify the workforce, a company goal. He explained:

“We want more and more people from a disadvantaged background to come and join the workforce, but we haven’t prepared them [in] how to do the interview. I sent a couple of people from my company to [college X] to do a mock interview session [and demonstrate] ‘this is the way we’ll interview.’ These are the ‘dos and don’ts’ for an interview. ... These are the things that are number one.”

From the college perspective, communication to and from industry became more strategic and informative. For one college, attending industry-led partnership meetings led to new insights about how to improve programs for students. The DBS coordinator explained:

“You know, we have [industry] advisory committees [at our college]. ... It’s a whole bunch of people that love the college and love the faculty and have deep relationships and a lot of good, nice, fun, collegial kinds of conversations occur. But when we went out in the community and sat at the [industry-led meetings], we found out that not everybody was as wildly excited about our programs.”

Many colleges found that specialized workforce development positions were critical to the demand-driven approach to industry engagement. One college used grant funds to support an employment coordinator, who met with industry regularly and provided firsthand knowledge to

¹⁴Interview respondent from the CLP.

students about job opportunities. At another college, DBS funds were used to hire an employer liaison who attended cluster partnership meetings and increased employer partnerships with the college. Such liaisons can advocate for colleges and students; for example, these industry liaisons encourage employers to consider hiring students with a “lower” credential (an AA instead of a BA, or a certificate instead of an AA), provided they are well trained and prepared for the position in other ways.

Leveraging Other Resources

Early in the grant, DBS leadership strategically partnered with the DSNs to build regional alignment among education, workforce, and industry in the three target industry clusters. As the SNA indicated, the DSNs played a central role in the consortium, even though their positions were not funded through the TAACCCT grant. Interview respondents perceived the DSNs as a critical component of the TAACCCT-funded DBS initiative, indicating that the implementation of the two grants was well integrated.

DBS also engaged the grant director of the East Bay Biomedical Manufacturing Network (EBBMN) early in the writing of the grant application. The EBBMN eventually took responsibility for the Biosciences cluster partnership. The partnership between the leaders of the DBS and the EBBMN grants was successful because it avoided duplicative efforts in the region but also because the EBBMN has strong credibility with employers and industry, making it well positioned to continue these efforts beyond the life of the TAACCCT grant.

In addition, DBS led to greater collaboration with workforce agencies, although the type and degree of collaboration was not uniform across the consortium. Some colleges reported positive changes in their relationships with workforce partners due to DBS-sponsored collaboration activities. For example, one college has a cohort of WIOA¹⁵-eligible students working for a bio-manufacturing certificate. This is the first time the program has implemented a cohort approach for this population; this was a direct result of discussions at DBS events. WIBs also participated in the cluster planning process and regularly attend cluster partnership meetings. One WIB has taken over coordinating the Advanced Manufacturing Partnership, signifying a strong commitment to this work going forward.

Taken together, the improved relationships among colleges, industry, and workforce have resulted in greater collaboration and increased capacity in the region to tackle economic issues that cut across systems.

Challenges to Regional Collaboration

Although there were many positive results from the collaboration activities sponsored by the DBS grant, there were also multiple challenges to regional collaboration around career pathway development. The challenges included working across systems, limited institutional support for collaboration, and communication and information sharing.

¹⁵ Workforce Innovation and Opportunity Act, <https://www.doleta.gov/wioa/>

Working across Systems

Community college faculty found it challenging to create new certificates and degrees that were responsive to industry needs while also addressing the academic requirements of the community college system. The difficulty colleges may have in trying to “wedge” CTE programs that meet the immediate needs of industry into a system designed for longer-term academic study can negatively affect students. For example, one DBS coordinator worked with a CBO to recruit production workers for Tesla, but Tesla could not work around the college’s class schedule. Students often feel that they cannot pass up particular employment opportunities and may drop their courses to pursue these opportunities.

Lack of Institutional Support for Collaboration

Although grant funding was available to support faculty participation in many collaborative activities, grant funding alone was insufficient to address all the institutional barriers to collaboration. Some faculty members encountered difficulties obtaining release time or stipends for this work, or were overwhelmed by the workload involved. This left some faculty feeling frustrated and under-supported. One faculty member described the challenge this way:

Tensions between Academic and Employment Goals
College faculty and staff may feel torn between supporting students’ employment goals and encouraging them to complete their training and obtain their certificates/credentials.

“It takes a lot of time. All the classes I had to review and make sure they were up to date with current software, and matching skills required outside of the course curriculum. The research part, the development, and the logistics part, passing it through committees—I had to do that.”

Other college staff had similar sentiments with regard to outreach to industry and community partners. Some training programs have only one or two adjunct instructors, and spending time on networking or collaboration meetings means missing class time or lab hours with students. Even if the grant provides release time, dedicated instructors are often reluctant to sacrifice valuable time with students.

Communication and Information Sharing

Access to information about employment opportunities and available talent is essential to workforce development. At DBS colleges, job and employment opportunities are disseminated to students primarily through faculty members. However, this brokering of information can also mean that faculty function as gatekeepers to employment opportunities. This challenge is more apparent within the Biosciences cluster, in which, in comparison to the other two clusters, faculty were more reluctant to share employer contacts with each other and preferred to create a “conditional marketplace” in which individual faculty members could bring employers in to review curriculum, but would maintain “ownership” of that employer contact. In addition, in the Biosciences field in particular, employers typically use temporary or staffing agencies to recruit employees. This can present another challenge to the sharing of employment information, as staffing agencies present another gatekeeper of information that must be included in the

Biosciences cluster partnership, and in regional collaborative activities, to ensure that employment information is shared with all stakeholders.

Another communication challenge was the lack of a common salesforce approach to employer engagement among DBS stakeholders. With the vast number of agencies in the region conducting outreach to business, employers can become overwhelmed by requests. A need for a common salesforce approach was identified during the grant proposal stage.

Faculty May Act as Gatekeepers to Employers
Faculty may view their relationships with employers as proprietary and be reluctant to share them, thereby controlling access to information and opportunities.

Even though DBS increased information sharing compared to what was in place before the TAACCCT grant, college staff, partners, and students continue to face challenges to information access. Many college staff we interviewed advocated for a more user-friendly, centralized information repository in the form of a single website where students could learn about programs in the region. Similarly, employers expressed the need for a central web portal where industry could post openings and students could post résumés.

One of the DBS grant goals was to develop a regional web portal linking job seekers to college training programs and employers. The consortium attempted to use the existing CalJOBS¹⁶ website for this purpose. However, DBS leadership discovered that existing systems would not adequately meet the needs of the consortium, and partnered with Business U (in Year 3) to provide the infrastructure and training for a coordinated web-based system that consortium members could use to share employer contact information and that could connect end users (employers and job seekers) to relevant information (job opportunities and training programs). At the time of IMPAQ's last round of data collection (summer 2015), the web portal was not fully realized; however, our understanding is that the infrastructure has been built for sharing employer contacts.

Sustainability of DBS Grant Efforts

Our analyses revealed that DBS partners have plans for continued collaboration. In particular, the SNA describes the centralization of the DBS networks, which has implications for sustainability. Additionally, grant efforts can be sustained through leveraged resources and the institutionalization of DBS program components at the college level. In this section, we also describe some potential challenges to sustainability.

Plans for Continued Collaboration

A major challenge to sustaining collaboration is that once the grant ends, many individuals in key roles, such as 4CD staff, TA providers and college coordinators, will no longer receive funding to

¹⁶CalJOBS is a state-funded job search site; <https://www.caljobs.ca.gov/vosnet/Default.aspx>

facilitate regional collaboration. With these changes come the risk of weakening relationships between the organizations and people who have been involved with DBS for the past four years.

Our SNA results provide promising signs that partners will continue to collaborate. Of all reported relationships within the DBS network, 84 percent were considered by the respondent to be very likely or likely to continue after the grant (Exhibit 2.13). Similarly, 90 percent of relationships related to Advanced Manufacturing, 86 percent of those related to Biosciences, and 86 percent related to Transportation and Logistics were considered by respondents very likely or likely to continue.

Enduring Relationships
More than four of five relationships are expected to continue after the grant ends.

Exhibit 2.13 Number of DBS Ties Reported as Likely to Continue

Rating	Consortium-Wide		Advanced Manufacturing		Biosciences		Transportation & Logistics	
	N	%	N	%	N	%	N	%
Very likely	295	61.3	178	66.4	104	71.7	74	52.1
Likely	108	22.5	63	23.5	21	14.5	48	33.8
Neutral	39	8.1	13	4.9	14	9.7	8	5.6
Unlikely	17	3.5	5	1.9	2	2.8	3	2.1
Extremely unlikely	1	0.2	0	0.0	0	0.0	0	0
Missing	21	4.4	9	3.4	2	1.4	9	6.3
Total	481	100.0	268	100.0	145	100.0	142	100.0

The SNA also examined the extent to which the amount of brokering varied from partner to partner within a network. When brokering is *centralized*, a small portion of key partners connect with other partners who are not directly connected to each other. If those brokers leave the organization, collaboration within the network may become fragmented or the network as a whole may collapse. In *decentralized* networks, collaboration is not dependent on a small set of key partners, and can better adapt when individual brokers leave the network.

The degree of network centralization falls on a 0–100 scale, with 0 indicating complete decentralization and 100 indicating complete centralization. The centralization of the DBS consortium-wide network (9.83) is relatively low, as is the centralization of the cluster-level networks: Advanced Manufacturing (10.15), Biosciences (13.68), and Transportation and Logistics (10.16). In the context of DBS, low centralization is an asset because an environment is in place where new brokers can emerge as organizational partners enter and exit the network. The partnerships put in place by DBS are not overly dependent on a few critical individuals, and will not collapse if a few individuals leave the network.

Other evidence that collaboration fostered through the grant will continue is that cluster partnerships plan to continue meeting. The Advanced Manufacturing and Transportation Cluster Partnerships plan to sponsor a joint summit, “Make it & Move it,” in fall 2016. Going forward, one of the local WIBs is providing facilitation of the Advanced Manufacturing partnership and the

DSN will play a facilitating role in the Transportation and Logistics partnership. Although these activities are not industry-led, as in the model advocated by Collaborative Economics, the cluster partnerships will continue beyond the life of the DBS grant. In Biosciences, EBBMN, an industry-led organization, will continue to lead cluster development activities.

Leveraging of Other Resources

DBS partnerships with DSNs and EBBMN benefited the sustainability of collaboration in the region because these partners can extend and improve upon the work started by the DBS consortium. The DSN positions and EBBMN are funded for the next few years and have objectives similar to those of DBS—namely, building regional collaboration to support workforce and industry needs.

College participation in the cluster partnerships also led to new and sustainable degree and certificate programs, such as a quality control program and a proposed supply chain logistics certificate at College of Alameda. A DSN described the development process for a new certificate and reported that there was interest from the companies involved in the partnerships. The partners held a marketplace event

“to determine the needs, flesh it out a little more, and then write a grant proposal to the state Chancellor’s office to start the new program. That happened, and the new program is in place to begin in fall of 2016. They wrote the grant, they got the grant funding, and the partnership served as the vehicle for the need to be identified and for the team to come together to write a grant and respond.”

Clearly, the regional collaboration jump-started through the DBS grant has led to new funding opportunities. The cluster partnerships helped the East Bay secure a SlingShot grant, a workforce development grant from the State of California. Contra Costa County has also received a Career Pathways Trust (CPT) grant from the California Department of Education, which will involve many former DBS partners. The goal of this grant is to build on collaboration in the East Bay among community colleges, high schools, and industry. Of particular importance is that CPT adds a strong K-12 element, which is key to exposing the future workforce to options in the region at a young age.

Institutionalized Change at Participating Colleges

At multiple colleges, DBS provided the resources and time for faculty to develop updated curricula, modules, products, or methods of delivery that the college could continue to offer students with little to no cost. These investments have planted seeds for new programs to flourish at the community colleges. Many college faculty pointed out that the larger investment, both in terms of financial costs and faculty time, was in the upfront costs for curriculum and career pathway development activities supported through the DBS grant.

Colleges used DBS funds on capital projects and equipment to expand capacity to serve students and update training content. For example, one college purchased magnetic models, and the coordinator explained:

“We have these wonderful magnetic models that students can actually build a whole helix. That is so great, and it’s perfectly reusable forever. We may use up our consumables, and other things may fall apart, go away, but things like that I love, because on an ongoing basis that’s going to make life better for those students.”

At another college, grant funds were used to expand a welding facility and significantly increase the number of students served. Instructors reported that these building upgrades should last approximately 20 years.

These examples illustrate how the DBS grant has resulted in institutionalized programs that can be supported through student enrollment and new funding sources.

Potential Challenges to Sustainability

Although many college staff and partners reported that DBS contributed to increased collaboration and that this improved collaboration will continue to some extent, partners face several obstacles to sustained collaboration with industry. In particular, the structure of the grant limited the consortium’s ability to fully develop cluster partnerships. First, most of the TAACCCT funds were distributed to the community colleges, which left little funding to support industry engagement. The result was a motivated, but self-selected, group of employer volunteers—meaning that the partnership was driven by the individuals from industry who happened to be interested in regional collaboration, and not by the cross section of employers required to achieve the broader goals of DBS. As one partner noted about the cluster partnerships:

“[T]he people we have around the table are like the early adopters and they’re doing it more out of community leadership, and something altruistic in them. ... I think that [the] goal of moving these partnerships forward is that we reach the next level of businesses where we’re not just reaching the civic entrepreneurs and the altruistic leaders.”

Another consequence of the college-focused funding was that the launch of the cluster partnerships occurred relatively late in the grant. Multiple partners noted that if the partnerships had launched earlier, they would be more fully developed, and therefore more likely to be self-sustaining.

The sustainability of regional collaboration is also challenged by the absence of a *single* workforce intermediary in the region. Research on best practices¹⁷ has found that having a workforce intermediary is key to maintaining collaboration at a regional level. As one partner explained:

“[C]oordination across entities that really serves the Community Colleges, the K12 districts, and the workforce system, and these really complicated systems ... that having a backbone organization, a third party neutral convener ... is a success factor.”

¹⁷ <http://www.jff.org/sites/default/files/publications/FinancingWI.pdf>

Despite attempts made to identify a single entity, DBS leadership discovered that multiple organizations could play such an intermediary role. It became evident that a more realistic and effective approach to serving the intermediary purpose was to focus on building the *cluster* partnerships, which acted as intermediaries within their industry sectors. Although leadership and responsibility for convening key stakeholders and regional collaboration have been shared among several individuals, a single workforce organization accountable for the alignment of various systems could better ensure the long-term success of multi-sector career pathway development in the region.

In general, the ambitiousness of the grant may have left the DBS partners stretched too thin to pursue all their objectives with equal time and resources. One partner suggested that this may be the case, saying:

“Then another key [to success is] not overcommitting yourself in a way that you do a bunch of things partially. You do some things really well but maybe there’s some other pieces that could and should move forward but don’t because of the lack of attention to them.”

Summary

The DBS initiative has indeed promoted regional collaboration among education, workforce development, and industry partners on career pathway development in the East Bay. The colleges developed a significant number of new and enhanced CTE programs in the three priority sectors. In addition to the programs developed, the colleges implemented a variety of student support services and ultimately served 2,516 participants over the course of the grant.

The collaborative relationships developed across education institutions, the workforce system, and industry in the region have been productive and rewarding for those involved. Most of these relationships are likely to be sustained beyond the life of the DBS grant. With support, the shared vision for a regional career pathway system can be sustained so the work toward that ambitious goal can continue. Several challenges were encountered during the grant implementation, and those challenges point to possible areas for future work. DBS had many ambitious goals and objectives that were not all fully realized during the grant period; however, critical steps have been taken to begin accomplishing these objectives. The DBS consortium did not identify or establish a *single* workforce intermediary that will coordinate the regional effort beyond the life of this particular grant. Instead, it will be the responsibility of multiple groups and individuals to sustain the workforce development efforts that began under the grant. In addition, the web portal development began late in the grant, and the web-based system connecting relevant users and information had begun construction but was not fully complete by the end of the grant period.

3. OUTCOMES STUDY

A central component of the DBS initiative was its support for the strategic CTE programs offered at the 11 participating campuses in the target sectors of Advanced Manufacturing, Transportation and Logistics, and Biosciences. Although no specific eligibility criteria were used to screen participants, the DBS-supported programs were designed to serve dislocated or unemployed individuals, who often faced multiple barriers to success in workforce and training. The primary and immediate goal of DBS-sponsored CTE programs was the placement of participants in employment, particularly in the target sectors.

The evaluation assessed the effectiveness of the DBS support programs, guided by the following research questions:

- To what extent did participation in DBS-supported CTE programs lead to an increased likelihood of employment, especially in a field related to the student's course of study?
- To what extent did participation in DBS-supported CTE programs lead to promotion or an increase in earnings/wages?
- To what extent did participation in DBS-supported CTE programs lead to an increase in the receipt of a certificate/degree, transfer to a four-year college/university, or further training?

To address these questions, we first described how employment and other career and education-related indicators changed for students of the DBS-supported CTE programs ("DBS students") since their participation in these programs. The purpose of this descriptive analysis is to document the students' post-program experiences and to provide context in which the effectiveness of the programs would be evaluated.

To further investigate the role of DBS programs on the outcomes identified above, we used a comparison group design, in which the outcomes of DBS students were compared to the outcomes of a group of similar individuals ("comparison group"). With this study design, the effects of the DBS programs were measured by the differences in outcomes between the two groups. The comparison group included students enrolled in CTE classes that were not supported by DBS but were deemed comparable to DBS courses in terms of the types of training offered and the characteristics of participants.¹⁸ When feasible, the group differences were estimated using statistical models, controlling for demographic and other background characteristics.

¹⁸ The evaluation team selected comparison courses at the 11 participating colleges, in collaboration with DBS college coordinators. The selection criteria for comparison courses were (a) courses targeted similar skills and sectors as DBS courses and (b) courses typically targeted students who were demographically similar to DBS students. Examples of comparison classes selected include respiratory therapy, welding, and automotive technology (see Appendix D for full list of comparison programs).

Evaluation Sample

The evaluation sample consisted of students whom we organized into four “cohorts”: Fall 2013, Spring 2014, Fall 2014, and Spring 2015.¹⁹

Overall, there were 3,837 students in the evaluation study sample: 2,516 DBS students and 1,321 comparison students. DBS and comparison group students were similar at baseline (when they first enrolled in the DBS program) on many characteristics, including employment status. But there were some differences between groups on age, race, marital status, low-income status, and veteran status.²⁰ Although these differences were statistically significant, the sizes of differences were relatively small (Exhibit 3.1).²¹

Exhibit 3.1 Student Demographic Characteristics at Baseline

Student Characteristic		DBS (%)	Comparison (%)	Difference
Male		72.7	73.5	-0.8
Single		80.2	84.4	-4.2 **
Veteran		8.6	4.1	4.5 **
Mean age (in years)		29.2	28.1	1.1 *
White		31.2	32.5	-1.3
Black or African American		15.3	10.1	5.2 **
Hispanic		24.5	25.2	-0.7
Asian		19.7	18.8	0.9
Education level	No postsecondary	29.9	31.1	-1.1
	Some college/college certificate	46.8	46.3	0.5
	2-year AA or AS degree	7.1	8.2	-1.0
	4-year degree or higher	16.1	14.5	1.6
Working full/part time		52.5	51.7	0.8
Any income-based public benefit		14.1	9.0	5.1 **
Annual household income less than \$25,000		51.6	5.3	5.3 **
What is your current goal?	Find job/get a better job	53.3	33.6	19.7 **
	Get a certificate/degree	59.8	52.6	7.2 **
	Transfer to 4-yr college	30.8	36.3	-5.5 **

Source: IMPAQ calculations based on baseline surveys.

Notes: * indicates statistically significant difference between comparison and treatment groups at the 0.05 level using the χ^2 test. ** indicates a statistically significant difference between comparison and treatment groups at the 0.01 probability level using a χ^2 test. Significance is repeated for each row if a given variable contains multiple levels—e.g., income and employment status. Percentages are calculated out of total valid responses. Therefore, the denominator of these percentages fluctuates slightly for each characteristic. The numbers of students responding are roughly around 2,400 to 2,450 for DBS and around 1,310 for comparison students.

¹⁹ To be included in a cohort, students had to be enrolled in a DBS or comparison course at one of the colleges during that semester and to have completed a baseline survey at that time.

²⁰ The difference in veteran status was likely driven by the DBS program at Las Positas College, which served only veterans.

²¹ We also estimated effect size differences, controlling for cohort effects. We found that the receipt of public aid, being African American, veteran status, and the goal of finding a job had relatively large effect sizes (0.25 or greater).

DBS programs were specifically geared toward those interested in improving their career opportunities, and their future goals reflected that. A higher percentage of DBS students than comparison students reported finding a job or getting a better job as a future goal (53.3% vs. 33.6%, respectively). There was no difference between groups in employment status, but a higher percentage of comparison students were unemployed (not working *and* not seeking a job) (19.6% comparison and 12.7% DBS students) at baseline.

Overall, although the comparison and DBS groups were not notably different, there are some important differences between the groups in the study sample, which persist in the subsequent analyses. For the analyses of baseline equivalence of the estimation samples, see Appendix G.

Data Sources

We used multiple data sources to investigate the effectiveness of the DBS initiative, including (1) the baseline participant survey, administered in person during the DBS or comparison class sessions; (2) online follow-up surveys of participants at 3 months and 12 months after the completion of their first DBS or comparison course, conducted by the evaluation team;²² (3) student records provided through the California Community Colleges Chancellor's Office (CCCCO); (4) UI wage records from the California Employment Development Department (EDD); and (5) program data collected directly from the participating colleges. In addition, our analyses were informed by interviews with the DBS program staff and partners.

Of the 3,837 students in the sample, baseline surveys were collected for 3,761 students. A total of 1,020 students responded to the 3-month follow-up surveys, and 1,075 responded to the 12-month follow-up surveys. CCCCCO records were matched for 3,268 students²³ and UI wage records were matched for 3,678 students.

Post-Program Employment

The primary and immediate goal of DBS-supported training programs is to increase employment among their participants, particularly in the three target sectors. In this section, we investigate the extent to which this program goal was met.

We first describe how employment among DBS students changed since their participation in the program. To investigate the effects of DBS programs, we investigated whether post-program

²² Online follow-up surveys were conducted at 3 and 12 months after the completion of the class session (e.g., Fall 2013 students' initial course ended in December of that year. These students took a 3-month follow-up survey in March 2014 and a 12-month follow-up in January 2015.). The evaluation team collected follow-up survey data from students in four cohorts: Fall 2013, Spring 2014, Fall 2014, and Spring 2015.

²³ Baseline surveys were conducted with all students in the study sample (3,837); however, some surveys could not be individually identified, resulting in 3,761 students with matched baseline surveys. Similarly, not all student records from the statewide CCCCCO databases were matched, most likely due to inconsistencies in student ID numbers. Although we excluded unmatched data from the primary analysis, the tables in the appendices report on numbers for the full set of data received for baseline surveys, follow-up surveys, and CCCCCO data, regardless of whether student IDs matched. For more details about data loss for the analytic sample, see Appendix C.

employment among DBS students was higher than that of comparison group students. In these analyses, we also highlighted differences in post-program employment across the three priority sectors (Advanced Manufacturing, Transportation and Logistics, and Biosciences).

For these analyses, we used UI wage data and participant surveys. Employment status measures constructed from the two data sources were not directly comparable (see text box), and they were used to triangulate findings.

Employment Rates

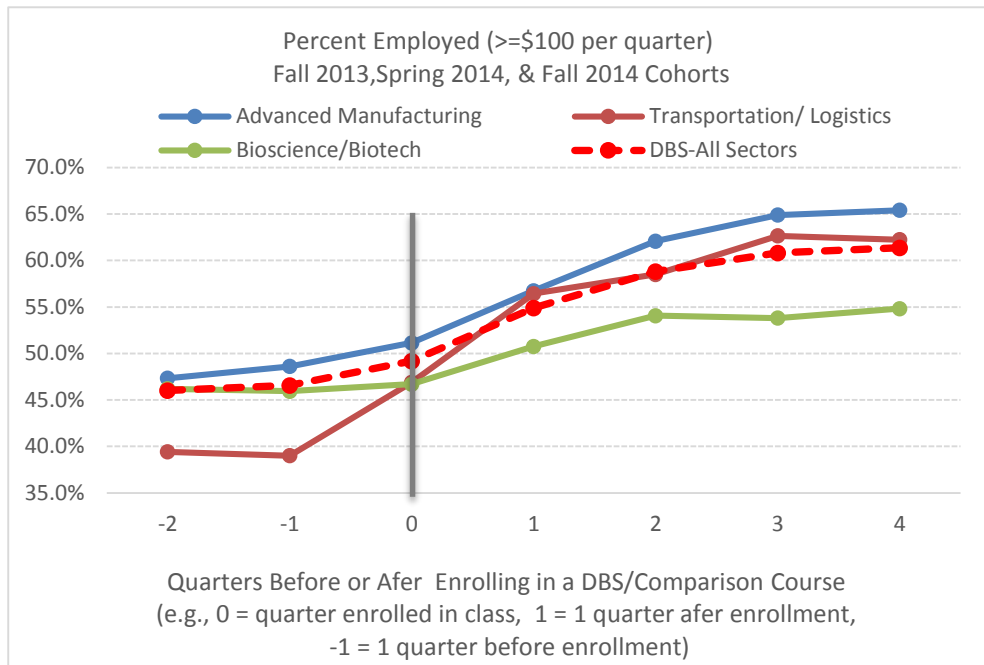
Employment rates among DBS students increased considerably over time after enrolling in the program. This increase was driven by those who took courses in Advanced Manufacturing and Transportation and Logistics.

Both survey and UI data showed that the rates of employment increased over time for participants in DBS-supported training programs. Exhibit 3.2 illustrates how quarterly employment rates, approximated by the percentage of individuals with positive earnings in UI wage records, steadily increased from two quarters before baseline to four quarters after baseline. In this analysis, “being employed” was defined as having received at least \$100 in paid earnings over a quarter (three-month time period). As shown, percent employed among DBS participants steadily increased over time after the enrollment in a DBS course for the first four quarters (i.e., one year) following the initial enrollment in the program. The employment rate among DBS students (all sectors combined) rose from 49.2 percent in the quarter after baseline to 61.4 percent by the fourth quarter after baseline.

Data Sources for Employment Outcome Measures: Participant Surveys and UI Data

The two data sources offer different advantages and limitations. The 3-month and 12-month follow-up surveys included detailed and targeted questions that were designed to explore questions for this study, but the data were self-reports and were available only for participants who responded. Less than half of the original participants in DBS and comparison group courses responded to follow-up surveys. On the other hand, UI data are available for nearly all participants and cover most jobs except for self-employment, federal government jobs, and out-of-state jobs. However, the available UI information was limited to quarterly earnings data. Furthermore, for this study, individual-level data were not available from EDD. The evaluation used these two different sources to check for the consistency of findings and supplement analyses from each source.

Exhibit 3.2 Quarterly Employment Rates for DBS Participants, Based on UI Data



Sources: California UI wage data, 2011–2016

Both the level and trends in employment rates varied greatly by the priority sector of the courses that students had taken, as illustrated by Exhibit 3.2. Post-program employment rates based on the UI wage records were the highest among those in Advanced Manufacturing, and the lowest among those in Biosciences. For example, by the fourth quarter after program enrollment, the employment rate was 65.4 percent for Advanced Manufacturing, compared to 54.8 percent in Biosciences.

The lower employment among students in Biosciences reflects that their rates did not increase over time as fast as those in other two sectors. In contrast, the pre- to post-program gains in employment appear to be the largest for Transportation and Logistics students. They had the lowest pre-program employment as a group, but their rate of employment increased sharply after enrolling in the DBS program.

DBS Program Effects on Employment

There is mixed evidence to suggest that post-program employment was higher among students who took DBS-supported courses than those who took non-DBS courses. According to the UI data, 69.4 percent of DBS students and 60.5 percent of comparison students were employed for at least one quarter during the year following baseline. This difference was statistically significant at the 5 percent level ($p = 0.047$), suggesting that DBS programs may have played a role in improving the likelihood of employment for their participants.

With survey data, we also compared post-program employment rates between DBS and comparison students, controlling for their demographic and other background characteristics,

including the employment status at baseline.²⁴ For survey respondents, we define employment as any self-reported paid work, which can include jobs that were not covered by UI data. In addition, survey data allowed us to examine course-related employment, to assess whether students had a job that was closely related to the course taken at baseline. However, because fewer than half of study participants completed follow-up surveys, the results from survey data analyses should not be used to draw a conclusion for the DBS program as a whole. Nonetheless, they provide additional insights into how the program may have affected participants' post-program employment.

Exhibit 3.3 summarizes the estimated employment rates (or the predicted probability of employment) based on any paid jobs or jobs related to the course work at the 3-month and 12-month follow-ups. As shown, we did not observe statistically significant differences in employment rates among survey respondents between the DBS and comparison groups at the 3-month follow-up. At the 12-month follow-up, the program effects on course-related employment were found positive, but not statistically significant, and there was no difference between the groups for the rate of any paid employment. Overall, we did not find strong evidence for differences between DBS and comparison groups among survey respondents.

Exhibit 3.3 Employment Probabilities (Survey Respondents)

Outcomes	Predicted probability of employment	Predicted probability of employment	Difference (estimated program effects)	Std. Err.	p-value	N
	DBS	Comparison				
3-month follow-up						
Any paid job	0.63	0.61	0.02	0.032	0.576	933
Job closely related to the course taken at baseline	0.28	0.30	-0.02	0.04	0.552	933
12-month follow-up						
Any paid job	0.68	0.69	-0.01	0.036	0.830	1000
Job closely related to the course taken at baseline	0.37	0.32	0.05	0.035	0.144	1000

Source: IMPAQ calculations based on baseline and follow-up surveys.

Note: * indicates statistical significance at 5% level. ** indicates statistical significance at 1%. The difference between the groups were estimated based on a logit model assuming random cohort and fixed college effects and controlling for baseline covariates (including age, gender, race, education, low-income status, veteran status, disability status, previous enrollment history, and employment status).

Post-Program Wages and Earnings

In addition to improving post-program employment among their participants, DBS-supported CTE programs were expected to affect other employment-related outcomes, such as an increase

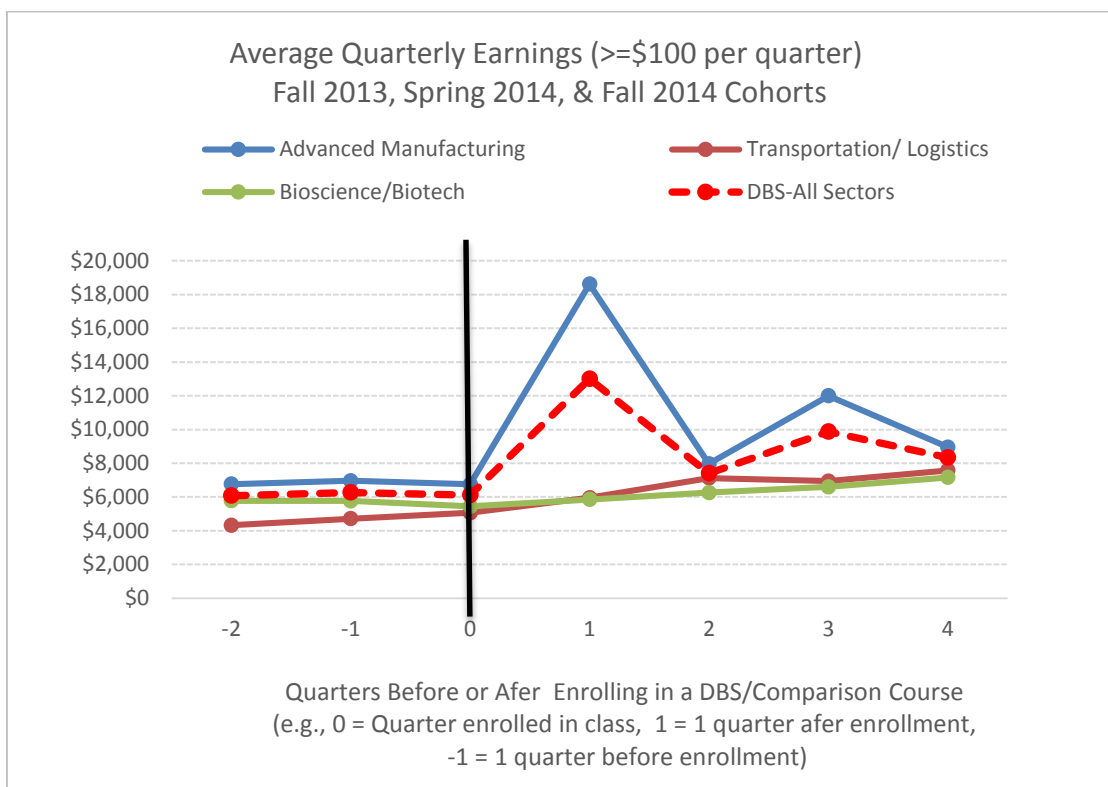
²⁴ In addition, the college and cohort (semester) effects were controlled in the estimation. See Appendix E for additional details.

in earnings/wages and job promotion or advancement. In this section, we investigate the effects of DBS programs on earning and wages, which are key to understanding how participants have progressed toward career advancement goals. As with post-employment analyses, we used both UI data and survey data for analyses.

Wages and Earnings

Wages and earnings of DBS students increased over time after participating in the program. Both the UI data and follow-up surveys showed that the level of earnings (UI data) or wages (surveys) rose for participants in DBS-supported training programs. Exhibit 3.4 illustrates, based on the UI data, how quarterly earnings increased from two quarters prior to baseline to four quarters after baseline.

Exhibit 3.4 Quarterly Earnings for DBS Program Participants, Based on UI Data



The earnings level among DBS students was flat—around \$3,000 per quarter—prior to enrolling in DBS. After enrollment, earnings began increasing, jumping to about \$13,000 in the first quarter (which could be due to outliers), but then quickly returned to the earnings growth trajectory. At baseline, employed DBS students earned an average of \$6,119 per quarter. The average earnings of employed DBS students increased to \$8,337 by the fourth quarter after baseline. Exhibit 3.4 also illustrates that the increases in the earnings were driven by students who took courses in Advanced Manufacturing. Earnings from Transportation and Logistics and Biosciences students increased steadily, but at a lower rate than those in Advanced Manufacturing. DBS students who completed surveys also reported an increase in estimated wages over time. DBS students’

median reported wages increased from \$14 per hour at the 3-month follow-up to \$15 per hour at 12-month follow-up. Taken together, the UI data and follow-up surveys data suggest that DBS students' post-program pay increased over time, and the wage/earnings growth patterns seemed to vary by the sector of the DBS courses taken.

DBS Program Effects on Wages and Earnings

Wages and earnings of students who took DBS-supported courses were higher than those of the comparison group soon after program participation, but these gains did not persist. Additional statistical analyses of the survey data, controlling for demographics and baseline earnings level, found wage growth patterns that were similar to the earnings growth patterns in Exhibit 3.4.

Among survey respondents, wages at 3-month follow-up for those who took DBS courses were higher (by about 7-8 percentage points) than wages for the comparison group, but the estimated differences were not always statistically significant. The wage difference between the DBS and comparison groups was smaller on average, and was not statistically significant at 12-month follow-up. Additional analyses suggested that there was much variation in wages by sector: the estimation results indicate that wages of survey respondents who took DBS courses in Advanced Manufacturing tend to be higher than wages of those who took DBS or comparison courses at both 3- and 12-month follow-ups, but these differences are not consistently significant (see Appendix XX for additional estimation results).

Continued Training and Attainment of Educational and Vocational Credentials

In addition to the immediate employment-related goals, the DBS initiative aimed to support the program participants in attaining academic and vocational credentials in the priority sectors of the region, thereby enhancing their career advancement opportunities. We investigated the extent to which this goal has been met by analyzing outcomes based on participant surveys and CCCCCO student records.

Continued Community College Enrollment

Many DBS students continued with their post-secondary education and training at community colleges. To assess the extent to which the DBS courses supported students' continuing education and training, we first examined the post-program enrollment in community colleges over three semesters following baseline, among DBS students from the Fall 2013, Spring 2014, and Fall 2014 cohorts.²⁵ We found that a substantial proportion of these DBS students continued taking additional courses at California community colleges.²⁶

²⁵The data beyond the three semesters post-program could be observed for only a small fraction of study participants who joined the program prior to Spring 2013. We limited our presentation here to the outcomes from the three semesters following the initial program participation and limited the sample to cohorts who were enrolled in courses in Fall 2013, Spring 2014, or Fall 2014 (the main study cohorts) to keep the sample largely consistent across the follow-up periods. We also examined post-program enrollment including all cohorts for which the data are available; the overall findings remain the same.

²⁶ The enrollment rates are estimated based on the DBS student sample for whom enrollment records were matched on the program participation semester. Students who were not recorded as having officially enrolled were excluded

Overall, 55.0 percent of DBS students continued to enroll in community colleges in the semester immediately following the DBS program, according to the CCCC data. Enrollment in community colleges among this group declined steadily, but 33.0 percent were still enrolled in the third semester post-baseline (about 1.5 years after enrolling in the study). Many of those students were taking occupational training classes, and most of them successfully earned units in the classes taken (see Appendix E for more details).

The extent of post-DBS program enrollment in community colleges varied significantly priority sector. DBS students who took courses in Advanced Manufacturing or Biosciences were more like to continue to enroll in community college after the program. In contrast, few of those who took courses in Transportation and Logistics continued to enroll in college. The enrollment in community colleges dropped sharply after the program enrollment for this group. The differences in post-program enrollment across the priority sectors likely reflect the design and purpose of the courses, as well as the intention of the participants. As noted earlier, students from Transportation and Logistics courses were most likely to report finding a job as their goal, suggesting that their preference to leave school as soon as possible for an immediate work opportunity.

DBS Program Effects on College Enrollment

The potential effects of DBS on enrollment in community colleges (CC) were estimated, controlling for the baseline group differences, including demographics and stated employment and education goals. We found that, overall, DBS students enrolled in community colleges at statistically significantly lower rates than comparison group students over the two semesters after baseline (Exhibit 3.5). DBS students continued to enroll at lower rates beyond the first two semesters, but the gap became smaller and statistically significant during the second year after baseline (i.e., overall, DBS students enrolled in community colleges at the rate comparable to comparison group students after one year). Additional analyses²⁷ found that there were no statistically significant differences between the DBS students in Advanced Manufacturing and other DBS and comparison group students. On the other hand, DBS students in Transportation and Logistics were significantly less likely to be enrolled than other DBS and comparison group students.

from analyses presented here. A small number of DBS classes that were offered did not require participants to formally register to enroll. These classes were concentrated on a couple of campuses and in the Transportation and Logistics sector. In addition, a small number in the participant list did not match the CCCC records for unknown reasons (possibly due to invalid identification numbers).

²⁷ See Appendix E for additional information on model specifications.

Exhibit 3.5 Post-Program CC Enrollment, Credentials, and Transfer: DBS vs. Comparison

Outcome	1st semester post-program participation		2nd semester post-program participation		3rd semester post-program participation		4th semester post-program participation	
	Difference in percentage	p-value	Difference in percentage	p-value	Difference in percentage	p-value	Difference in percentage	p-value
Currently enrolled in community college	-11.4%**	<0.001	-6.7%**	0.006	-5.3%	0.059	-0.6%	0.872
Have received either a degree or certificate since baseline	-1.5%	0.142	-0.7%	0.521	-6.7%**	0.001	-10.0%**	0.001
Have transferred to a 4-year college since baseline	-0.1%	0.712	0.3%	0.477	0.1%	0.770	-2.9%*	0.033

Source: IMPAQ staff calculations based on CCCC student records and program data.

Notes: The difference between the groups were estimated based on a logit model assuming random cohort effects and fixed college effects and controlling for baseline covariates (including age, gender, race, education, low-income status, veteran status, disability status, previous enrollment history, employment status, and goals).

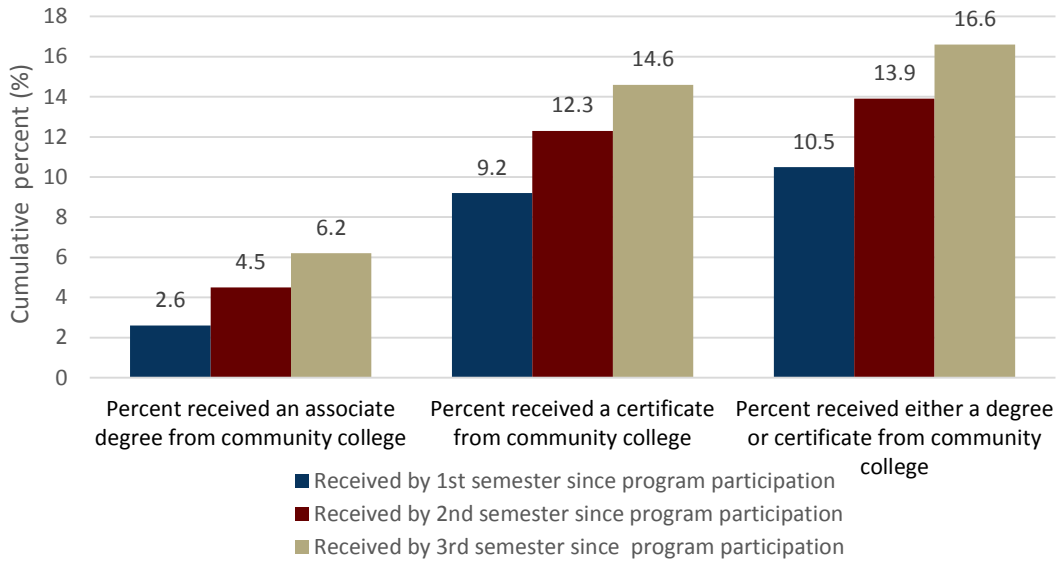
** Significant at 1 percent. * Significant at 5 percent.

Taken together, there was little evidence that the DBS-supported programs were more effective than other similar CTE courses in leading the participants to pursue further education and training, as measured by post-program community college enrollment. This does not necessarily mean that the DBS programs were unsuccessful in advancing these students' career and employment goals, however, as the programs were aiming to help students find job opportunities at the same time, which could affect the continuation of formal training and education.

DBS Program Effects on Certificates and Degrees

Over time, the number of DBS students who attained certificates and academic degrees increased, but the gains were modest and no greater than those among the comparison group. Attainment of certificates and degrees among the participants in DBS-supported CTE programs closely followed the patterns observed for post-program enrollment in community college presented above (i.e., positive changes over time, but not significantly different from the comparison group), providing little evidence that DBS was more effective than other CTE programs. This is not surprising, given that continued enrollment in college is expected to be highly correlated with the completion of degree and certificate programs.

Exhibit 3.6 Degree or Certificate Attainment for DBS Students



Source: IMPAQ calculations based on CCCC student records.

Note: The exhibit presents the unadjusted (raw) percentage of students who had received a degree or certificate by a given semester since and including the semester when they first enrolled in the DBS/comparison program. The student sample includes Spring 2013, Fall 2013, and Spring 2014 cohorts (N=1,209 for DBS and 865 for comparison) for 1st and 2nd semesters after the program and Spring 2013 and Fall 2013 cohorts for 3rd semester (N=806 for DBS and 602 for comparison).

Analyses based on the CCCC student records suggested limited gains in degree awards.²⁸ By the third semester post-program participation (or about 1.5 years after baseline), 6.2 percent of DBS students had been awarded an associate’s degree, whereas 14.6 percent received a certificate.²⁹

However, the attainment of degrees or certificates among DBS students did not appear to be consistently higher than that of comparison students. Further regression analyses confirm that the likelihood of receiving a degree or certificate among DBS students, after controlling for demographics and other background characteristics, was not significantly different from that among comparison students over the first two semesters. By the third semester post-baseline, however, DBS students were found to be less likely than comparison groups to have obtained a degree or certificate. These results suggests that the DBS-supported programs did not make

²⁸ DBS participants who responded to both baseline and 12-month follow-up surveys were, on average, more educated than typical DBS participants. For example, as noted in the previous section, only 23.2 percent of all DBS students reported to have a college or graduate degree (AA/AS and above) at the time of enrollment, compared to 31.4 percent of DBS students who responded to both surveys. The analysis of the education attainment based on the survey sample is not directly comparable to those based on the CCCC data, which covered most DBS students, except for those for whom the records could not be matched.

²⁹ Because not all certificate receipts were consistently reported as part of the CCCC student records, the extent of receipt of certificates may well be understated.

detectable differences in students' pursuits of degrees or certificates, possibly reflecting the stronger emphasis of the program on immediate job placement.

DBS Program Effects on Transfer

Both surveys and CCCCCO records indicate that a small proportion of the DBS students had transferred to four-year colleges following their enrollment in DBS-supported CTE programs. According to the CCCCCO records, less than 1 percent of DBS students had transferred to a four-year college by the first semester following the program, and 3.2 percent by the third semester following the program.

There was no statistical difference in the likelihood of transfer to four-year colleges between the DBS and comparison groups over the first three semesters following baseline (see Exhibit 3.5). By the fourth semester, DBS students were statistically significantly less likely to have transferred to four-year colleges than the comparison group, due to the very low likelihood of transfer among Transportation and Logistics students.

Summary

The outcomes study found mixed results. Post-program employment rates among DBS students increased steadily after they first enrolled in their DBS courses. Employment rates rose from 49 percent in the quarter immediately after their enrollment in DBS courses to 61 percent in the fourth quarter post-baseline. This increase was driven by those who took courses in Advanced Manufacturing and Transportation and Logistics. There was also limited evidence that suggests that post-program employment was higher among DBS students than the comparison group.

Wages of employed DBS students increased after they first enrolled in their DBS courses. Post-program wages tended to be higher for DBS students than for non-DBS students soon after their program participation, but the difference seemed to dissipate over time.

Many DBS students continued with their post-secondary education and training at community colleges. More than half (55.0%) of DBS students continued to enroll in community colleges in the semester immediately following the DBS program, and about one third (33.0%) of them were still enrolled in the third semester after the initial DBS course enrollment. DBS students in Advanced Manufacturing continued to enroll in community colleges at similar rates as students who took non-DBS CTE courses, whereas DBS students in Biosciences and Transportation and Logistics enrolled at lower rates than non-DBS students. Similarly, over time, the number of DBS students who attained certificates and academic degrees increased, but the gains were modest and no greater than those among the comparison group. A small proportion of DBS students had transferred to a four-year college. The transfer rate among DBS students was not significantly different from that of the comparison group.

Overall, findings on the effects of the DBS programs on post-program employment, wages/earnings, and academic outcomes were inconclusive. Failure to observe positive effects across all measures of DBS may be attributable partly to the limitations of the study design. As

described earlier, although the comparison group students were, on average, similar to DBS students, there was a large difference between the groups in a few key background items, including the receipt of public aid, signaling that DBS students represented a more disadvantaged population. Although students' background characteristics were controlled in statistical analyses, there could be unobservable factors—for example, those related to their disadvantaged status—that were not fully accounted for and were affecting outcomes. In particular, factors influencing individual's choice of a enrolling in a course (such as ability, preferences, and personal circumstances) can be systematically different between those who end up choosing a DBS course and those who choose a non-DBS course. These factors cannot be fully accounted for in this non-experimental framework. Furthermore, the study is limited by low response rates of the follow-up survey, which not only affected the sample size but also led to cautions against drawing a conclusion based on an analysis sample that may not be representative.

Despite the limitations of the study, findings provide a few important takeaways. First, DBS participants did make gains in employment and education outcomes over time. Second, there is limited evidence that DBS students gained in employment more than comparison groups. For example, the UI data suggested that DBS students were more likely than comparison students to be employed for at least one quarter during the year following baseline (69.4% vs. 60.5%). Third, post-program outcomes, across measures, varied considerably by priority sector, highlighting the possibility that the overall effect estimates may not fully explain the complexity of the effects arising from the fact that the DBS initiative encompassed such a wide diversity of programs.

4. CONCLUSION AND RECOMMENDATIONS

The DBS project was an ambitious effort involving 11 community colleges and multiple workforce and industry partners, spread geographically across the vast and diverse East Bay region. Over the course of the three-and-a-half-year grant period, the DBS consortium accomplished many of its objectives. The consortium also encountered some challenges that can help inform future efforts dedicated to regional career pathway development. In this section, we discuss the consortium's accomplishments, lessons, promising practices, and considerations for future research.

Implementation Study Highlights Increased Collaboration

The implementation study showed that DBS facilitated and expanded collaboration across the region. DBS supported a significant increase in accelerated, applied training programs in the East Bay that led to employment in high-growth industries or further educational credentials. A large proportion of funding went to colleges in need of resources to modernize and upgrade existing CTE programs, and to develop accelerated, new, and innovative training programs. In addition, colleges used funds to provide a broad array of support services and job search assistance to students. Key implementation study findings include:

- More than 2,500 individual participants were served by college-based training programs that largely fell into the priority industry sectors of Advanced Manufacturing, Transportation and Logistics, and Biosciences. Analysis of participant demographic characteristics confirm that DBS served a population in need.
- DBS made great strides in breaking down silos between institutions and systems. Through the career pathway development activities and creation of industry-led partnerships, colleges and industry partners had more opportunities to learn from one another, deepen their relationships, and become more aware of resources in the region.
- Colleges and workforce development partners began coalescing in their approach to interacting with business. In particular, a demand-driven and industry-driven approach to partnerships took greater hold in the region. Individuals and programs began to see themselves as “one system” and “one region” delivering services to support students and industry who are not concerned with district lines or funding streams.
- DBS promoted a cultural shift in the region. Colleges and faculty members became less “territorial” or competitive with one another, and more willing to share employer contacts and other information to ultimately improve workforce development programs and best serve students.
- Evidence shows that sustainability of grant efforts is highly likely. Most college program components developed through DBS can be supported through student enrollment. Several programs were institutionalized into their colleges, or are in the process of institutionalization. Our SNA shows that the collaborative regional relationships fostered through the grant activities are likely to persist. Furthermore, the region-wide cluster partnerships, a key output of grant activities, continue to operate—for example, the East

Bay Manufacturing Summit³⁰—and have provided a structured forum for industry and partners to respond to future needs as they arise.

Promising Practices

Our evaluation of the DBS initiative highlights several promising practices for regional workforce development and career pathway development that could inform similar efforts locally and nationwide.

Build on Existing Relationships

DBS capitalized on the existing relationships among key partners in the East Bay region. Rather than attempt to build new relationships or collaborations from scratch, DBS brought individuals and organizations together to *strengthen* communities of practice and of learning. For example, some instructors from similar programs at different colleges reported that they already knew each other, but that they did not (prior to DBS) have structured forums for working together, sharing curricula, and aligning their programs. In addition, colleges and WIBs brought employers they already knew into the DBS consortium, and through a snowball effect, those employers attracted new and different industry representatives.

High Quality Technical Assistance Providers

Leadership of the DBS initiative strategically partnered with strong TA providers that brought valuable tools, deep knowledge, and relevant experience to the consortium. For example, the Career Ladders Project (CLP) includes experts that have worked at the DBS community colleges in the past, and are intimately knowledgeable of how colleges operate, and of career pathway development. CLP brought valuable tools to the colleges for career pathway mapping, but also provided high quality professional learning sessions where colleges and other training providers could collaborate. Similarly, the Collaborative Economics model of recruiting employer “champions” to lead industry partnership activities was highly regarded as a positive development in the region.

Common Salesforce Approach to Business

Another TA provider, Business U, continues to work with DBS partners on a common salesforce approach to business and industry. The web portal under development will address the need for streamlining communication with industry. Efficient tools and strategies reduce duplication of efforts. In addition, employers can get overwhelmed with multiple, similar requests from different colleges (e.g., requests for information about job openings or internships). A common salesforce approach can minimize this effect and enhance the flow of collaboration and communication between industry and education systems.

Leverage Existing Resources and Partnerships

One of the key factors contributing to continued collaboration among DBS partners is the strategic partnerships established with the deputy sector navigators (funded by the state) and

³⁰ These types of events were spearheaded by DBS but have been adopted by local industry partners; <http://prismlogistics.com/event/make-move-east-bay-manufacturing-summit-2016/>

East Bay Biomedical Manufacturing Network (EBBMN) (funded by federal grants). These funding streams will continue for a few more years, and can build on the regional infrastructure put in place through the combined efforts of the three initiatives. Also promising is the leveraging of DBS and the region's experience building collaboration to pursue additional grant funding to continue the regional and demand-driven career pathway development.

Outcomes Study Found Mixed Results

DBS supported new and enhanced CTE programs at 11 participating campuses in the target sectors of Advanced Manufacturing, Transportation and Logistics, and Biosciences. We examined post-program employment and education outcomes for students who participated in these programs, relative to those who participated in other similar CTE programs that were not supported by DBS (i.e., the comparison group).

We did not find consistently significant differences in employment and education outcomes between DBS and comparison students overall. Further, we found that differences in outcomes varied based on industry sector. The differences across sectors may reflect the diversity in training strategies or in unobserved characteristics of participants. Findings from the outcomes study include the following:

- Post-program employment rates among DBS students increased steadily following initial enrollment in DBS courses. Employment rates rose from 49 percent in the quarter immediately after enrollment in DBS courses to 61 percent in the fourth quarter post-enrollment. This increase was driven students in the Advanced Manufacturing and Transportation and Logistics areas. Biosciences students saw the smallest increase in employment, one likely explanation being that those students sought to further their educational goals, remaining in school rather than entering the workforce.
- Transportation and Logistics students had the lowest employment rates at baseline, but saw the largest pre/post increase in employment. Individuals in this group were more likely to face multiple barriers to employment *before DBS training* (i.e., more likely to be African American, have low income, have little work experience, and/or have low levels of prior education or a criminal record).
- There was limited evidence that post-program employment was higher among DBS students than among the comparison group. Overall, 69 percent of DBS students and 61 percent of comparison students were employed for at least one quarter during the year following baseline.
- Many DBS students continued their post-secondary education and training at community colleges. More than half (55.0%) of DBS students continued to enroll in community colleges in the semester immediately following the DBS program, and about one third (33.0%) were still enrolled in the third semester after baseline. DBS students in Advanced Manufacturing continued to enroll in community colleges at similar rates as the comparison group, whereas Biosciences and Transportation and Logistics students enrolled at lower rates than non-DBS students. This finding aligns with reports from

Transportation and Logistics students that they were most interested in finding a job (rather than continuing education) directly after their short training program. Biosciences students were much more likely to report intentions to transfer to a four-year college.

Lessons Learned and Recommendations

As with any grant effort, particularly those involving cross-systems collaboration, the TAACCCT-funded DBS initiative experienced some challenges to fully realizing all grant goals and objectives. These include:

The mismatch between the academic calendar and the DOL grant funding cycle and requirements. Colleges reported that it can take one to two years to hire a qualified faculty member. Curriculum development and approval also take one to two years. Although colleges may have had lofty goals for their grant funds, the bureaucracies of the college and district systems made it difficult to spend the grant funds in a timely manner satisfactory to grant guidelines. Similarly, *the slow pace of institutional change at the community college level can make program changes and improvements challenging.* It is difficult to design and implement programmatic changes, review implementation (what works and what does not), and revise strategies within a three-and-a-half-year grant period.

- **Recommendation to funders:** Consider revising the length of the grant cycle to allow for the slow pace of change in academic institutions. A longer period of performance allows more time for planning curriculum approval and multiple student cohorts to move through the program and demonstrate outcomes.

Limited and late industry engagement in the program. Many respondents reported that employer partners did not get involved early enough in the grant activities. Colleges had already begun revising training programs when cluster leadership teams began planning employer-led partnerships. In general, there also could have been more industry engagement (e.g., additional regional business involved).

- **Recommendation to funders:** Encourage grantees to build *new* mechanisms for industry engagement at the start of the grant, then follow these activities with college training program enhancements. This will facilitate the gathering of input from business into the new training programs, which will, in turn, promote the sustainability of the cross-system regional collaboration and higher-quality training for students over the long term.

Limited faculty time to develop curriculum and promote capacity building. Many college instructors work as adjuncts and do not have significant funding, stipends, or time allotted for cross-campus collaboration or professional development. Thus, the work falls to a dedicated few who may have limited power to bring about change within and across their institutions. Although stipends were available through DBS, some instructors did not access them.

- **Recommendation to funders and grantees:** Provide more institutional support for college faculty to collaborate across campuses and districts, and to work with employers. Ensure that instructors are aware of, and have access to, stipends and arrangements for substitute instructors for faculty release time. Consider including collaboration activities in job descriptions and reducing the teaching load for those who participate. Another suggestion is to hold more professional development and collaboration events at the colleges themselves (rotating events among different campuses), making it more convenient for faculty to attend. Ensure that regular cross-campus meetings are convened, so that a culture of ongoing collaboration becomes the norm.

Diffuse goals and objectives. The DBS consortium had many ambitious objectives but was not able to complete all of them during the grant period. For example, they proposed to develop a web portal for housing individual and employer information, links to training programs, employment opportunities, and job search functions for the region, which was a costly and resource-intensive goal. During the grant period, DBS began building this web-based system but it is not yet fully developed.

- **Recommendation to funders and grantees:** Consider focusing the grant program on a narrower set of priorities. This will allow for depth of services and concentrating in on a specific issue or area. A more focused approach would also make the initiative easier to evaluate, as the treatment would be more clearly defined. Although DBS made many inroads to building career pathways and collaboration across the region, if it had focused on fewer objectives, there might have been more dramatic institutional changes in this short time, and possibly stronger outcome effects.

Methodological Limitations

Evaluators were presented with several challenges in measuring implementation and outcomes of the DBS TAACCCT grant. First, DBS represents a systems-change initiative that encompassed many different activities, partners, events, and strategies. In examining implementation, it was sometimes challenging to understand how and whether specific efforts were linked to—or funded by—DBS. For example, college instructors may describe collaboration with instructors from other campuses, but it was not always easy to tease apart when this collaboration started (before or after DBS), and/or whether it was specifically linked to DBS goals (e.g., focused on the three priority sectors). In some cases, key informants would describe workforce development efforts or events in which they participated, but they were not always clear on whether DBS funded or sponsored the event.

Similarly, it is challenging to examine and explain individual outcomes based on a systems-change initiative. Limitations to the outcomes study include the following:

- **Restriction of study sites.** The evaluation was conducted within the bounds of the DBS colleges. Without comparing outcomes with non-DBS colleges, potential impacts of systems-changes brought forth by DBS could not be effectively studied. Instead, the study focused more narrowly on DBS-supported courses to non-DBS courses.

- Inability to claim causality. Because the study compared students who self-selected into DBS to student who self-selected in to comparison course, the difference between the two groups cannot be attributed only to the DBS “intervention.”
- Constrains on the selection of comparison groups. It was not feasible to implement a more systematic selection process that would match participant and comparison samples on key individual characteristics. The study instead relied on selecting comparison courses based on college recommendations. Our selection of comparison groups, albeit carefully conducted, may have resulted in limited comparability.
- Low response rates on surveys, which present threats to external validity of survey findings, as they do not represent the target study sample. Survey data were used to complement UI wage and CCCCCO data, which were much more complete.

Implications for Future Workforce Development Efforts and Research

DBS was part of a larger movement of encouraging regional collaboration toward building career pathways and bolstering workforce development in California and nationwide. WIOA now requires workforce and education systems to intentionally work together. California’s SlingShot initiative provides funding for development of regional career pathways, specifically aimed at accelerating income mobility. And through the Career Pathways Trust program, the California Department of Education has invested \$250 million³¹ since 2014 throughout the state for career pathway programs beginning at the K-12 level. DBS aligns well with the goals of these initiatives and it is highly likely that these programs will build on DBS accomplishments. The promising practices highlighted above can inform these and similar workforce development efforts across the nation.

Ideas for **future research** on career pathways and workforce development include the following:

- Studies that investigate how regional approaches affect different types of individuals; addressing questions such as: What are the differential impacts of various approaches on individual workers or students? Also, are there regional and sub-regional effects, based on where individuals live (urban, suburban, rural areas)?
- Examining long-term outcomes/impacts on participants. For example, it could be beneficial to understand the longer-term trajectories of different types of individuals. Suggestions include following individuals who have been retrained for the workforce over several years to understand how effective that training has been long term, and whether and how these individuals have advanced in their careers and/or educational pathways.
- Focusing research and evaluation on specific types of workforce development strategies (e.g., embedded support services, instructional innovations) to understand how particular strategies (rather than a collection of many strategies) affect outcomes.

³¹ <http://www.cde.ca.gov/ci/ct/pt/>

Overall, the DBS grant efforts were successful in expanding workforce development services to individuals throughout the region, and to increasing collaboration around workforce development throughout the East Bay. DBS brought much-needed job training and education (wrapped in support services) to low-income individuals who often faced multiple barriers to employment. The initiative created structures to bring regional partners together in meaningful ways to improve workforce development and strengthen career pathways in the East Bay. This collaboration built on existing relationships; and DBS provided the catalyst to expand and enhance those relationships. Evidence shows that DBS promoted a real shift in culture, vision, and perception. Instead of individuals' thinking and planning being limited by their college or organization (e.g., WIB, employer), these different stakeholders adopted a model for working together and approaching economic development *regionally*. This is a powerful shift that has implications—and can provide some promising practices and lessons—for similar efforts in the East Bay region, the state of California, and career pathway programs across the nation.

5. REFERENCES

- Borgatti, S.P., Everett, M.G., & Freeman, L.C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Cambridge, MA: Analytic Technologies.
- Borgatti, S.P., Mehra, A., Brass, D.J., & Labianca, G. (2009). Network analysis in the social sciences. *Science*. 323(5916), 892-895. doi: 10.1126/science.1165821
- Burghardt, J. and A. Gordon. (1990). *More Jobs and Higher Pay: How an Integrated Program Compares with Traditional Program*. New York: Rockefeller Foundation.
- Department of Labor (DOL) Career Pathways Toolkit.
https://www.doleta.gov/usworkforce/pdf/career_pathways_toolkit.pdf
- Ebenstein, A., Harrison, A., & McMillan, M. (2014). *Why Are American Workers Getting Poorer? China, Trade and Offshoring*. Washington, DC: National Bureau of Economic Research.
- Farber, H.S. (2015). *Job Loss in the Great Recession and Its Aftermath: U.S. Evidence from the Displaced Workers Survey*. IZA DP No. 9069.
- Freeman, L.C. (1979). Centrality in social networks: Conceptual Clarification. *Social Networks*, 1, 215-239.
- Friedman, S.F., Reynolds, J., Quan, M.A., Call, S., Crusto, C.A., & Kaufman, J.S. (2007). Measuring changes in interagency collaboration: An examination of the Bridgeport Safe Start Initiative. *Evaluation and Program Planning*, 30, 294-306. doi: 10.1016/j.evalprogplan.2007.04.001
- Knoke, D., & Yang, S. (2008). *Social Network Analysis* (Vol. 154). Thousand Oaks, CA: Sage Publications.
- Levine, L. (2012). *Offshoring (or Offshore Outsourcing) and Job Loss among U.S. Workers*. Washington, DC: Congressional Research Service.
- Oakes, J. (1986). Beyond Tracking. *Educational Horizons*, 65 (1), 32-35. Stable URL: <http://www.jstor.org/stable/42926852>
- Oakes, J. (1992). Can Tracking Research Inform Practice? Technical, Normative, and Political Considerations. *Educational Researcher*, 21 (4), 12-21. Stable URL: <http://www.jstor.org/stable/1177206>
- Suarez, C., and E. Melendez. (2001). *Making Connections to Jobs, Education, and Training: The Essential Skills Program of the Community College of Denver*. Washington, DC: U.S. Department of Labor.

Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications. No. 8. In M. Granovetter (Ed.), *Structural Analysis in the Social Sciences* [series]. New York: Cambridge University Press.

Zeidenberg, M., Cho, S., and Jenkins, D. (2010). *Washington State's Integrated Basic Education and Skills Training Program (I-BEST): New Evidence of Effectiveness*. Community College Research Center (Columbia).

Contra Costa Community College District
Design it–Build it–Ship it (DBS) Final Evaluation
Report

APPENDICES

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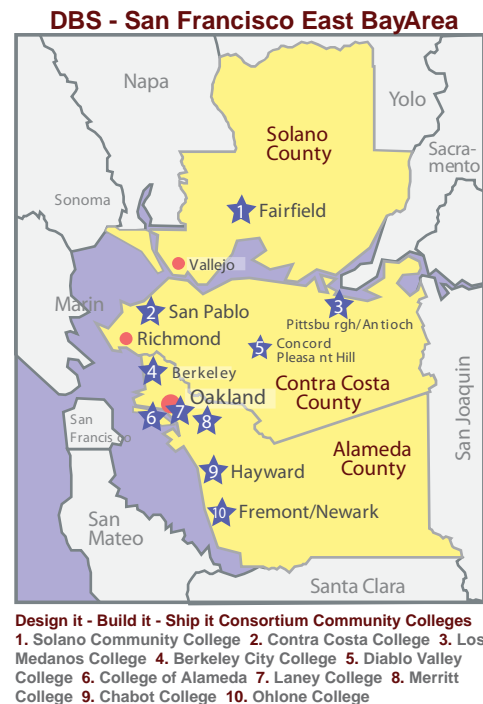
APPENDIX A. DBS GRANT NARRATIVE

Introduction:

Design it – Build it – Ship it (DBS) is a regional workforce initiative that represents an unprecedented opportunity for the San Francisco East Bay Area to build accelerated, intensive, and regionally articulated programs of study so that TAA eligible, dislocated workers or unemployed adults can earn degrees or credentials of value and enable them to enter the workforce in industries with growing occupational demand and opportunities for career and wage advancement. **DBS** will create a regional workforce system that includes:

1. A regional “career path” system with stackable certificates across the 10 DBS community colleges—coordinated through an East Bay Skills Alliance that includes higher education, industry, WIBs, labor, national research labs, and economic development partners,
2. Stronger training, referral and placement systems that integrate the colleges and WIA One Stop Career Center System with jointly supported aptitude and career inventories, digitally mapped career pathways, electronic referral/enrollment, and systems for leveraging WIA, TAA, ETP and other training resources within the community colleges,
3. Development of “career transfer pathways” from the community colleges into the University of California and the California State University systems that articulate between CTE pathways in the community colleges STEM centered pathways in the 4 year systems.

DBS is grounded in established research, industry engagement, and builds off sub-regional work in the East Bay including the Bay Area Manufacturing Renaissance Council, the East Bay Economic Development Alliance, the Bay Area Community College Consortium, and the Alameda Transportation and Logistics Academic Support Initiative. DBS integrates these alliances into a



framework that defines training, industry engagement, and regional partnerships tied to advanced manufacturing, logistics, and engineering industries key to the East Bay Economy.

I. Statement of Need:

A) Education and Training Needs of TAA-Eligible Workers

Impact of Foreign Trade: Despite the Bay Area’s reputation as a significant technology driven regional economy, the East Bay

contradicts the Bay’s generally affluent image. Since 2007, there have been over 250 major plant closures/layoffs in the East Bay resulting in over 31,200 unemployed workers from manufacturing, transportation, and other industries.²

Partial List of East Bay TAA Certifications¹			
TAW	Company	Decision	Workers
70525A	Corsair Memory Inc.	11/30/2007	45
70058E	Pacific Steel Casting Co.	8/31/2009	75
71775	Hewlett Packard	2/18/2009	115
72748	Allied Systems Ltd	4/1/2010	33
62940	Dakota Supply Group	4/1/2010	42
72884D	NUMMI	4/1/2010	4,421
73158	Toyota Logistics	3/31/2010	80
70122	Toyota Tsusho America	3/31/2010	104
72884C	Vascor Ltd	4/1/2010	28
61811J	Wingard Quality Supply	4/1/2010	20
73261	Johnson Control	3/25/2010	321
73545	TTM Technologies, Inc	10/30/2009	84
80410	Solyndra	8/31/2011	900
			6,268

There have been 57 TAA Certified projects in Alameda, Contra Costa, and Solano counties from 2007 to 2011, more than Silicon Valley, San Francisco Peninsula, or Los Angeles during this period.³ This includes closures such as Toyota’s New United Motor Manufacturing, Inc. (NUMMI) in 2010 resulting in layoffs of over 4,400 workers at NUMMI plant and 31,000 additional workers at NUMMI suppliers and other companies in the East Bay, greater Bay Area, and California Central Valley.

TAA Certifications: 2007-11	
East Bay	57
SF Peninsula	48
Silicon Valley	52
Los Angeles	35

Job losses in traditional manufacturing and other industries impacted by foreign trade and competition only increase the challenges face by those on the margins in East Bay communities.

¹ US Department of Labor, TAA National Database; also ACWIB regional WARN data tracking system
² Alameda County Workforce Investment Board, Regional WARN data tracking system.
³ US Department of Labor, National TAA Database

The DBS service area includes communities with statistically significant levels of poverty, unemployment, and populations with

barriers to workforce success. Current estimates are that over 100,000 adults along the corridor do not have a high

DBS Impact Area Regional Demographics ⁴			
City	Unemployed	Poverty	No Diploma
Oakland	16.1%	17.5%	21.2%
Pittsburgh/Bay Point	20.1%	16.2%	24.4%
Hayward	10.2%	20.9%	26.7%
Richmond/San Pablo	17.9%	16.4%	27.5%
California	12.7%	13.2%	19.5%
United States	8.8%	13.5%	15.4%

school diploma or GED. At the 10 colleges in the DBS consortium, from 70 to 80% of entering students, in particular adults returning to education while unemployed, assess from 1 to 3 levels below college readiness in basic skills, requiring remediation to participate in CTE programs.

Partnerships with TAA Agencies: With the NUMMI closure in 2010, there was significant effort to implement a regional strategy to serve and absorb the impact of 34,000 newly unemployed Bay Area and Northern central

California workers. This included a regional employment center in Fremont staffed by the United Auto Workers and a regional Central California consortium, called the NUMMI “Blue Team”, comprised of California EDD, Workforce Boards, Community Colleges, and other stakeholders. The Blue Team has met quarterly since 2009 and now includes service coordination for workers from multiple East Bay TAA projects. As a result, four colleges in the DBS consortium developed programming specifically

NUMMI Blue Team
CA TAA Administrator
California EDD
Workforce Boards
Alameda County WIB
Contra Costa WIB
City of Oakland WIB
Richmond WIB
San Joaquin County WIB
Santa Clara County WIB
Stanislaus County WIB
Community Colleges
Chabot College
Ohlone College
Diablo Valley College
Laney College
College of Alameda
Contra Costa College District
Delta College
Modesto Junior College
Labor/Other
United Auto Workers

ly for TAA workers, including Alameda, Chabot, Diablo Valley, and Laney, who have trained over 250 TAA eligible workers in sectors such as automotive, energy efficiency, warehousing, and machine technology. The DBS Consortium will build upon the Blue Team process and includes California EDD and all five Workforce Boards in the DBS Consortium region.

⁴ US Census, American Factfinder; California Department of Finance.

Education and Training needs of TAA Eligible Workers: As the Bay Area manufacturing economy shifts from traditional to advanced manufacturing, the majority of workers from TAA eligible projects receiving assistance and services are from manufacturing. Few have college degrees, most having a high school diploma (occasionally with some college) with a second significant population of Spanish speaking and Chinese immigrants working in light manufacturing and assembly. Assessments of TAA workers from NUMMI illustrate the significant gaps between the skills possessed by most TAA eligible, dislocated workers, or unemployed adults and the requirements of most 21st century “middle skill” occupations and the challenges faced by adults changing their careers in a new technology driven economy(s).^{5 6 7}

- **Gaps in basic skills** including math, English, and digital literacy required for most new, knowledge driven, manufacturing processes and other emerging industries. Even workers with high school diplomas and some college require at least contextualized refreshers in core skills to adequately participate in training,
- **Family obligations** that make it urgent for workers to quickly identify their pathway and participate in accelerated training leading to employment in the shortest time possible,
- **Difficulty in Access to Services and Education** for individuals who have been earning a sustainable wage. For most displaced workers, educational, public services, pension, and other support systems seem disconnected and alien requiring development of systems to streamline access to these supports and services,
- **Language/Cultural** barriers requiring VESL, and other strategies to ensure access to training in the context of English language education related to workforce success.

The majority of NUMMI and other TAA workers served through the Blue Team process lacked significant basic mathematics and technical skills to complete training pathways, despite decades

⁵ Toward Ensuring America's Workers and Industries the Skills to Compete. National Skills Coalition (2010)

⁶ Haycock, K., Barth, P., Mitchell, R., and Wilkins, A., Eds. *Thinking K-16*. "Ticket to Nowhere: The Gap Between Leaving High School and Entering College and High Performance Jobs," pp 2-33. Washington DC: Education Trust.

⁷ Allison Zippay, Job Training and Relocation Experiences Among Displaced Workers.

of work in their industry of origin. Many faced significant barriers in terms of personal depression and dislocation associated with job loss as well as the need to reframe their expectations since in most cases they were training for jobs making less than half of what they made previously. Many had mortgages or significant financial obligations requiring them to enter and complete training and move into their new career path quickly. Finally, few of these workers had experiences with education beyond high school, leaving them un-prepared for the disconnected and complex educational systems in the regional community colleges—contributing directly to the low successful referral rates of TAA workers into college education and training programs.

B) Evidence of Job Opportunities and Occupations

Target Industries: DBS targets industries related to the East Bay’s advanced manufacturing economy(s). This includes advanced manufacturing subsectors such as petroleum, industrial machinery, computers, semiconductors, medical equipment and pharmaceuticals, *and* related sectors that support the regional manufacturing economy including international trade, transportation and logistics (ITTL) and professional and scientific services, specifically engineering.

Economic data indicates that, despite job losses in manufacturing, manufacturing and advanced manufacturing are central to the regional economy, and the East Bay is poised for a resurgence in advanced manufacturing and other industries central to the regional economy:

- The East Bay has high concentrations of jobs in advanced manufacturing including 2 to 10 times higher concentrations of workers in petroleum (10.15), industrial machinery (4.04), computers & peripherals (2.48), semiconductors (2.78), medical equipment (2.07), and pharmaceutical (1.58) manufacturing compared to other regions in the US.⁸
- That, while manufacturing has been flat during the recession, the overall amount of employment in manufacturing and industries that support the regional manufacturing econ-

⁸ East Bay Economic Development Alliance, *Building on Our Assets: Economic Development and Job Creation in the East Bay*. (2011). P. 26.

omy such as wholesale trade, goods movement, and scientific/technical services still accounts for 238,500 jobs, over 25% of regional East Bay employment of 944,700.⁹

- Advanced manufacturing regionally is driven by research at the Lawrence Berkeley, Sandia, and Lawrence Livermore labs which drive new startups and manufacturing technology. 93.4% of annual job creation is from expansion or startups, 54.2% from startups, including spin-off companies from the national labs.¹⁰
- The presence of the Port of Oakland, the 5th largest international Port in the United States and a large regional logistics and goods movement infrastructure that supports as many as 450,000 jobs in Northern California.¹¹ Regionally, according to the Bay Area Center of Excellence, Logistics employers project from 3-9% expansion in their workforce in the current year.¹² According to state LMI data, regional logistics employment will increase by over 6000 jobs between 2010 and 2015.¹³
- When manufacturing has been flat, advanced manufacturing subsector employers consistently report difficulty finding middle skill workers for jobs that do not require a four year degree, but require 1-2 years of technical training. These jobs account for as much as 47% of all California jobs according to the National Skills Coalition.¹⁴ In a recent community forum, Bayer Pharmaceuticals in Berkeley reported 32 openings for middle skills jobs that they cannot fill due the lack of qualified local candidates.

DBS targets advanced manufacturing as both a regional workforce *and* economic development priority. Multiple events in the East Bay are driving the estimated need for more middle skill workers in advanced manufacturing and logistics. This includes the expansion and relocation of Lawrence Berkeley National Laboratories in Richmond which will create hundreds of new jobs for workers in fabrication, biosciences, and other support industries for the labs. The City and

⁹ California Employment Development Department Labor Market Data – 2011 estimates.

¹⁰ East Bay Economic Development Alliance, *Building on Our Assets: Economic Development and Job Creation in the East Bay* (2011). P. 26.

¹¹ *The Economic Impact Study of Port of Oakland Maritime Operations*, Martin Associates, 2006

¹² Center of Excellence of San Francisco Bay Area (2011), *Environmental Scan: Logistics and Transportation Occupations, San Francisco and Central Valley Regions*.

¹³ Economic Modeling Specialists (EMS); 2010). Complete Employment. Center of Excellence of San Francisco Bay Area (2011), *Environmental Scan: Logistics and Transportation Occupations, San Francisco and Central Valley Regions*.

¹⁴ National Skills Coalition. *Middle Skill Jobs state by state: growing California's Economy by Investing in the Forgotten Middle*. (2011)

Port of Oakland are redeveloping 360 acres of the former Oakland Army Base for a logistics business park and intermodal marine/rail transfer facility which will create an estimated 1,500 new warehousing, shipping, and logistics jobs at the Port within 5 years. Regionally, the Career Ladders Project, California Manufacturing Technology Association, California Federation of Labor and manufacturers have come together to form the Bay Area Manufacturing Renaissance Council focused on new training and expansion of advanced manufacturing. Similarly, the Bay Area Community College Consortium just finished 12 months of engagement with employers in the development of an Industrial Machine Maintenance Mechanics pathway.

C) Gap Analysis

Without substantial intervention, it is doubtful that the regional community college system can adequately reorganize itself to serve the ongoing needs of TAA eligible and dislocated workers. Over the last 8 months, our analysis of these institutional challenges has included a regional workforce conference on career pathway programs led by 7 colleges in the East Bay Career Advancement Academies, a regional study of job growth produced by the East Bay Economic Development Alliance, and local study sessions with each DBS consortium college, workforce boards, industry, labor and other stakeholders. From this process we know:

- While thousands of adults are served by the regional WIBs due to job loss, less than a hundred are served at any one time by the consortium partners in CTE programs as a result of formal referral from the WIA system,
- 70% of unemployed adults entering training are 1-3 levels below college readiness for participation in most Career and Technical Education pathways, requiring referral into development education pathways which most students do not complete,
- That there is no formal alignment between CTE programs and industry or between training programs offered by the colleges. First steps are just underway to identify common credentials the colleges can offer as a region rather than as disconnected colleges.

The fact is few workers were served by the colleges during NUMMI because of the overcomplicated and disconnected systems within the colleges and between the colleges and the workforce system. There is no real alignment of career pathway programs, core certifications, and industry and no efficient process for funneling workers into community college training. While each college works with industry they do so separately, developing disconnected certificates that are not regionally validated by industry or accepted by other educational institutions within the system.

Additionally, the ability of colleges to offer training more responsively is limited by restricted lab space for many programs and inadequate use of block scheduling or dynamically dated programs outside the regular semester framework. This includes inadequate use of online simulation software, gaming platforms, and more efficient use of existing lab space. There is no regional framework for online learning to increase access to instruction or supplement classroom instruction with additional module based instruction. In discussions with individual colleges, it was recognized that colleges do not offer adequate courses and sections of specific training pathways, and there is need for flexibility in how courses are packaged, times when they are offered, and how they can be accelerated to accommodate the restricted availability of unemployed workers.

Programs do not focus on the underlying factors that contribute to educational and workforce failure.¹⁵ This includes inadequate attention to contextualized, applied mathematics, English, and digital literacy directed towards workforce success, inadequate professional development contextualized for the current labor market, inadequate access to student services or other bundled services that address personal barriers to success, limited faculty expertise relevant to the design of cohort-based and accelerated instructional formats the move workers more efficiently back into the workforce, and no ability to integrated educational outcomes and workforce data into share frameworks that increase mutual accountability between the workforce and educational systems.

¹⁵ Legislative Analyst's Office. Improving Academic Success for Economically Disadvantaged Students (2009).

This includes assessment, where colleges have thus far been unable to integrate vocational assessments such as WorkKeys, I-Train, or other regionally accepted vocational inventories and job credentialing platforms into career preparation at the community colleges.

II. Description of the Project: Strategic Approach and Core Elements

The DBS consortium has identified clear and persuasive need for interventions and a better regional system to serve the thousands of TAA eligible, dislocated, and other adult workers in the East Bay. We also know that TAA eligible workers, like other adults returning to the educational system, face multiple barriers to success in accessing and completing retraining programs:

1. Family commitments, time restraints, and imminent economic needs requiring efficient access to training at times and in formats appropriate to their life situations,
2. Basic skills (English, math, and digital literacy) needed for program completion.
3. Complex and disconnected education and training systems that are difficult to navigate and that are not integrated with publically funded workforce programs,

Through roundtable discussions with DBS consortium faculty, administrators, WIA partners, and industry, along with a review of the current research, we believe that there is no “silver bullet” which will improve retention and completion rates. Instead, the DBS consortium has developed a collaborative strategy for systemic change on two fronts: **1) Curriculum and instructional interventions that retool workforce programs at the colleges to make them more responsive to the needs and life situations of adult workers; and 2) Regional change that builds a workforce intermediary system with industry, the colleges, and workforce boards that strengthens labor market alignment and workforce/educational systems integration. We believe a comprehensive approach will increase access to training and increase positive outcomes in completion while reducing the time to degree or certification at the community colleges.**^{16 17 18 19 20}

¹⁶ Workforce Strategy Center. *Promising Practices in Community College-Centered Workforce Development*. (2002).

¹⁷ Jenkins, D. *Redesigning Community Colleges for Completion: Lessons from Research on High Performing Organizations*. Community College Research Center, Columbia. CCRC Working Paper No. 24. (2010).

A) Evidence Based Design

Instructional Innovation that Supports Increased Access and Completion: Sub-

baccalaureate certifications are powerful tools for adults seeking employment. Even one year of college attendance is a “tipping point” for adults to realize sustainable wage employment.²¹ By 2018, between 61% and 68% of California jobs will require post-secondary education²² and 47% of California jobs require some college but less than a 4 year Baccalaureate.²³ Meanwhile, over 60 million Americans in the prime age workforce (25-54) still work in jobs that, similar to the case at NUMMI, only required a high school diploma or less when they were hired.²⁴ As the economy of high school accessible jobs recedes, and the rising middle skill economy takes its place, it is likely that our prime age workforce will be left behind: unemployed or under-employed—stuck in jobs that don’t provide a middle class income.

The innovation economy is driving rapid shifts in the workforce and employment. More than a third of the U.S. labor force changes jobs every year, more than 30 million Americans are working in jobs that did not exist in the previous quarter, and many occupations today did not exist just five years ago.²⁵ In response, the community colleges must craft collective strategies for the design of accessible, efficient, and linked certification, degree, and transfer pathways that respond rapidly to and anticipate changes in industry demand. This includes strategies that deviate from disconnected course sequencing towards holistic student-centered strategies that inte-

¹⁸ National Fund for Workforce Solutions. *The Principles of the National Fund for Workforce Solutions and their Implications for Public Policy*. (2009).

¹⁹ Pusser, B and Levin J. *Re-imagining Community Colleges in the 21st Century: A student centered approach to education*. The Center for American Progress (December, 2009).

²⁰ Alssid, J., et al. *Building a Career Pathways System: Promising Practices in Community College-Centered workforce Development*. Workforce Strategy Center (2002).

²¹ Bosworth, B. *Certificates Count: An analysis of Sub-baccalaureate Certificates*. Complete College America and Futureworks (2010).

²² Carnevale, P., N. Smith and J Strohl. *Help Wanted: Projections of Jobs and Education Requirements Through 2018*. Center on Education and the Workforce (June 2010).

²³ National Skills Coalition. *Middle Skill Jobs state by state: growing California’s Economy by Investing in the Forgotten Middle*. (2011)

²⁴ Carnevale et al.

²⁵ Carnevale, P., N. Smith and J Strohl. *Help Wanted: Postsecondary Education and Training Required*. in *New Directions for community Colleges* no. 146. (2009).

grate academic and technical skills and accelerate time to completion. DBS will use multiple interventions including best and evidence based practices in education & workforce development:

- Cohort-based instruction using linked courses, block scheduling, instructional teams, and a program of study as the foundation for local, sector-based, learning communities,
- Contextualized, applied mathematics, English, and digital literacy skills aligned with the requirements of the industry and with progression on to transfer level courses,
- Expanded student support including more appropriate use of counseling courses, embedded case management services, and supplemental, leveraged, supportive services.

These strategies are aligned with national evidence-based interventions demonstrated to improve student completion leading to increase earnings for non-traditional students. This includes evaluation of the State of Washington I-BEST program, which found **STRONG** statistically substantial gains in outcomes for basic skills students participating in linked CTE and basic skills courses that were team-taught compared to a control/comparison group validated across multiple sites. This included a 10% higher rate of credit completion and 7.4% increase in certificate completion compared to a comparison group of non I-BEST students.²⁶ These findings are mirrored in earlier **STRONG** control group studies of integrated, cohort-based, basic and vocational skills programs 1) The Center for Employment and Training (CET) Minority Female Single Parent Demonstration project; and 2) The Essential Skills Program of the Community College of Denver; both of which found statistical increases in completion, employment, and wage progression compared to control/comparison groups of similar students.^{27 28} Both provided applied basic skills, support services, and professional development, in conjunction with technical skills training so that students did not have to complete a developmental sequence prior to training.

²⁶ Zeidenberg, M., S. Cho, and D. Jenkins. *Washington State's Integrated Basic Education and Skills Training Program (I-BEST): New Evidence of Effectiveness*. Community College Research Center (Columbia; 2010).

²⁷ Burghardt, J. and A. Gordon. *More Jobs and Higher Pay: How an Integrated Program Compares with Traditional Program*. New York: Rockefeller Foundation (1990).

²⁸ Suarez, C., and E. Melendez. *Making Connections to Jobs, Education, and Training: The Essential Skills Program of the Community College of Denver*. U. S. Department of Labor (2001).

A recent study by Chuck Wisely found **STRONG** evidence that students taking a contextualized mathematics course linked to CTE coursework were both 300% more likely to complete the contextualized course and over 400% more likely to complete transfer level mathematics courses later on compared to their peers.²⁹ Nationally, integrated approaches including sector learning communities, linked courses, block scheduling, bundled support strategies, and work based learning are commonly identified as strong, evidenced-based approaches by evaluation and demonstration think tanks such as MDRC³⁰ and the Workforce Strategy Center.³¹

This mirrors preliminary research from the California Career Advancement Academies (CAA) initiative. Since 2007, CAA has funded 29 colleges to implement contextualized bridge and integrated workforce programs to increase CTE completion for low income adults 1-3 levels below college readiness. Led by the State Chancellor and Career Ladders Project,³² CAA has served over 7,000 students, including a longitudinal evaluation led by Public/Private Ventures. **Seven of the 10 DBS consortium colleges are currently funded under this initiative.** The East Bay Career Advancement Academies (EBCAA) offers 21 short term CTE certificates in industries such as manufacturing, energy, health care, transportation, human services, and pre-apprenticeship serving over 1,400 students since 2007. In the first three years of CAA, low income students with limited basic skills exhibited increased course success rates (75%) and course retention rates (90%) compared to their peers.³³ CAA pathway programs have been highlighted as best practices for workforce by Social Policy Research, DOL, and PolicyLink.^{34 35}

²⁹ Wisely, C. *Effective Basic Skills Instruction: The Case for Contextualized Developmental Math*. Policy Brief 11-1.

³⁰ Kazis, R. and M. Liebowitz. *Opening Doors to Earning Credentials: Curricular and Program Format Innovations that Help Low Income Students Succeed in Community College*. Manpower Demonstration Research Corporation (2003).

³¹ Alssid, J. et al., *Building a Career Pathways System: Promising Practices in Community College Centered Workforce Development*. Workforce Strategy Center (2002).

³² *Career and Technical Education Pathways Initiative*. California Community Colleges Chancellor's Office and WestED; Fourth Annual Report December 2010, pages 38-42, [http://www.careerladdersproject.org/docs/CTE2010toPrint\(rev1\).pdf](http://www.careerladdersproject.org/docs/CTE2010toPrint(rev1).pdf)

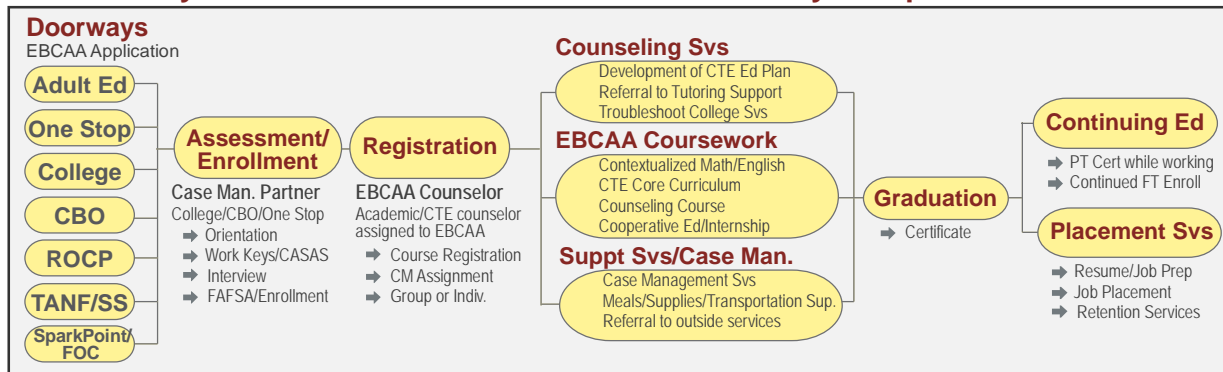
³³ Career Ladders Project; <http://www.careerladdersproject.org/videoa/mainpages/caa.html>; Public/Private Ventures (2010); "California Advancement Academies Evaluation Final Report."

³⁴ Mathematica Policy Research and Social Research Associates (2010); "Career Ladders and Pathways for the Hard to Employ."; Department of Labor/Social Policy Research

EBCAA includes a core framework for workforce and educational success for low income adults with barriers to workforce success:

- An industry/sector focus and program of study with strong connections to employers;
- Career pathways with defined certificate outcomes and transition points to employment and secondary certifications, degrees, and transfer;
- Services for disadvantaged adults and young adults underprepared for college level work;
- Integrated and contextualized basic and occupational skills and linked courses;
- Cohort-based learning communities to improve student support and instruction;
- Expanded community partnerships with WIBs, CBO’s, and adult education.

East Bay Career Advancement Academies: Pathway Components and Roles

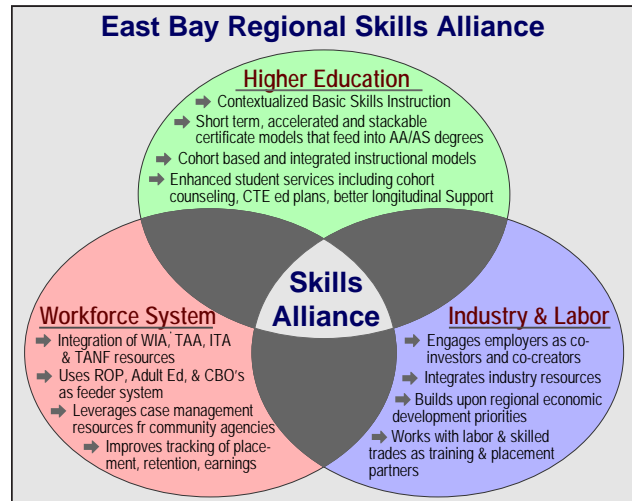


While the CAA’s and EBCAA have been highly successful, and the state continues to invest in their development and expansion, the scope of these strategies has been limited to entry level short term certifications. DBS will expand the East Bay regional learning community of colleges using CAA informed strategies and will expand the use of acceleration strategies to inform re-designed and stackable certificate systems that build ladders for low income and unemployed adults and that are aligned with our industry partners and regional labor market data—taking the work to a larger scale at each college and across the East Bay as a region.

³⁵ Rubin, V. et al. *Pathways Out of Poverty for Vulnerable Californians*. PolicyLink (2010).

Regional Labor Market Alignment: DBS

will implement regional interventions to increase alignment between industry, the community colleges, and public workforce (WIA) systems. This includes organization of the East Bay Skills Alliance (EBSA) to integrate workforce and education resources and labor



market planning, bringing key institutional and community players together as a regional workforce intermediary. Workforce intermediaries are central for organizing workforce systems that funnel job-seekers into quality, career path employment that provides sustaining wages and opportunities for advancement.³⁶ They:

- Serve dual customers, employers and individual workers or job-seekers. WI's measure their effectiveness by outcomes related to employers and job-seekers,
- Provide or broker labor market services for job seekers and employers through job matching, regional skills banks, internships, and customized training strategies for entry level and advanced level jobs, including incumbent worker training,
- Organize multiple partners and funding streams to pursue common goals—acting as as a center of gravity for relationships, accountability, and resource leveraging,
- Project a vision about what workers and communities need to prosper such as ideals about lifelong learning, regional competitiveness, and environmental sustainability.^{37 38}

Intermediaries play a key role in organizing workforce and labor data to identify key industries for training, alignment of training with technical skills, and coordination of regional training sys-

³⁶ Giloth, B. (ed). *Workforce Intermediaries for the 21st Century*. Temple University Press: Philadelphia (2004).

³⁷ Hoops, J. and R. Wilson., *Expanding the Mission: Community Colleges and the Functions of Workforce Intermediaries*. Jobs for the future (2010).

³⁸ Giloth, B. Introduction to *Workforce Intermediaries for the 21st Century*. Temple University Press: Philadelphia (2004). Also see Kazis, R. *Improving the Employment Prospects of Low Income Job Seekers: The Role of Labor market Intermediaries*. Jobs for the Future (1999).

tems in ways that help employers engage with the workforce system. This includes the identification of target industry sectors or clusters, defining roles of colleges and other training institutions, and centralizing how industry and the workforce system work together.

The presence of a high functioning intermediary is indispensable for development of strong and effective sector training programs. In **STRONG** comparison cohort studies of sectoral training programs by the Aspen Institute, workers participating in sector training made over 30% more per hour than workers in traditional job search or “work first” employment programs. They similarly were more than twice as likely to be in jobs that provided health insurance or other benefits and on average realized an additional wage increase during their second year of employment post-training.³⁹ Additional rigorous program research suggests that key elements of successful sectoral strategies includes use of mixed/bundled service strategies, targeting of industries with higher baseline wages, and a focus on skills training over obtaining a GED or improving basic skills alone prior to reentry into the workforce.^{40 41}

B) Stacked or Latticed Credentials

How DBS Will Work with Industry: DBS will bring Advanced Manufacturing, Logistics, and Engineering industry cluster employers together with the colleges and workforce system as part of an East Bay Regional Skills Alliance (EBSA). Designed to function as a regional workforce intermediary, the function of this alliance will be to **1)** Strengthen labor force alignment between the needs of industry and regional community college certificate/degree programs; **2)** Coalesce regional resources dedicated to education, workforce and economic development to braid and leverage funding; and **3)** Build integrated services strategies that improve the ability of the publi-

³⁹ Zandniapour, L. and M. Conway. *Gaining Ground: the Labor Market Progress of Participants of Sectoral Employment Development Programs*. The Aspen Institute SEDLP Research Report No. 3 (2002).

⁴⁰ Hamilton, G., et al. *How Effective Are Different Welfare to Work Approaches? Five year Adult and Child Impacts for Eleven Programs*. U.S. HHS Administration of Children and Families (2001).

⁴¹ Bos, J, et al. *Improving Basic Skills: the Effects of Adult Education in Welfare to Work Programs*. U.S. HHS Administration of Children and Families (2001).

cally funded workforce and community college systems to integrate services, data, and industry engagement.

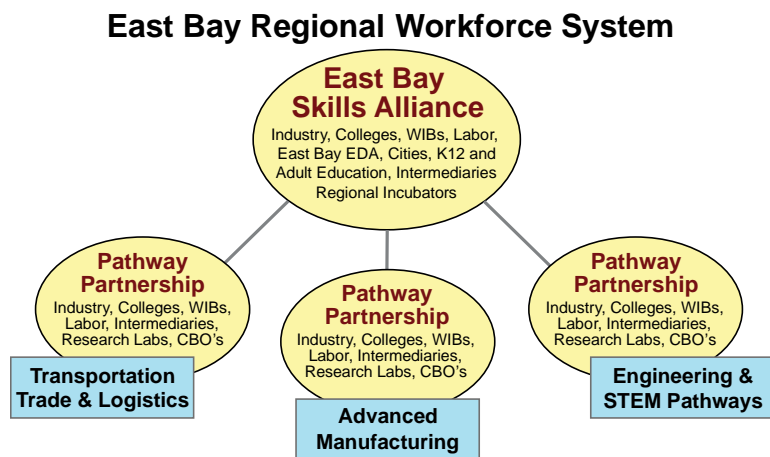
The EBSA will be led by a regional planning body with industry, labor, the DBS consortium partners, regional workforce boards, and economic development intermediaries such as the East Bay Economic Development Alliance, Contra Costa Council, and the Bay Area Community College Consortium. In convening led discretely by these entities over the past several months, industry has repeatedly called for a

more integrated approach to regional workforce development. Currently EDA, the Council, the BACCC, colleges, and workforce boards are engaging many of the same employers independently

around the independent needs of their systems. DBS will create a framework for regional coordination with industry around education and training.

As identified above, the EBSA will oversee multiple Sector Pathway Partnerships. These sector groups will lead work around advanced manufacturing subsectors, transportation/logistics, engineering, and STEM pathways. Their tasks will include:

- Identification and articulation of career pathways, including stackable certifications, degrees, and alignment with industry identified skills and priorities,
- Ensuring inclusion of national, state, and regional recognized industry certifications and accreditations across all training programs within the consortium,
- Establishment of uniform curriculum for on-ramp (CAA), mid-level, and advanced certifications to simplify the ability of industry to recruit and hire from the regional colleges,



- Identification of basic skills, industry readiness, and digital literacy standards for all industry subsectors,
- Identification of training roles among the 10 DBS consortium colleges, including who will provide on-ramp, mid-level, and advanced training certifications.

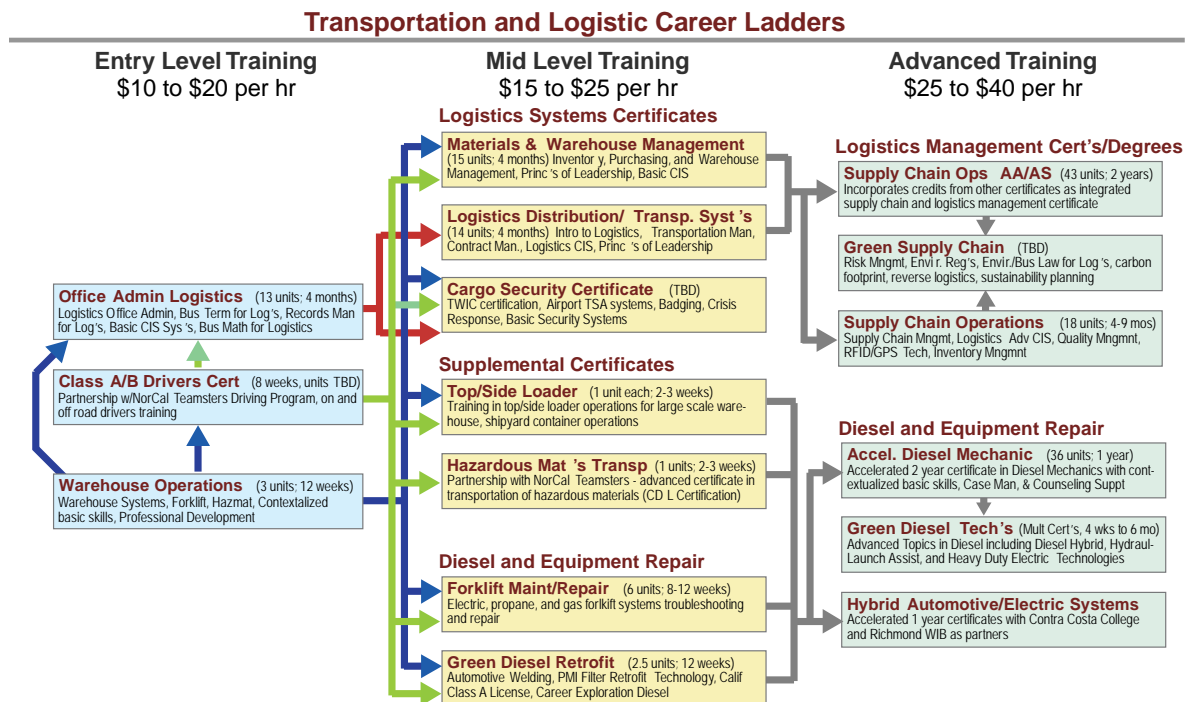
Plans for Stackable Certifications: In year one of TAA funding DBS will deepen work with industry within the EBSA. Goals for this work will be: **1)** Assess the utility and industry alignment of current certifications offered by the DBS consortium colleges; and **2)** Developing plans for retooling, expanding, or articulating certificates into certificate systems, building upon existing capacity where feasible. While this work will be subject to ongoing internal validation with industry and can be expected to change over time, the DBS colleges have identified targets for organizing and expanding credentials. Some of these include:

DBS Consortium Selected/Example Plans for Credentialing and Stackability			
Machine Tech	Biotechnology	Process Technology	Transp./Logistics
Colleges: Laney, Diablo Valley, Solano, Chabot	Colleges: Solano, Ohlone, Laney, Contra Costa	Colleges: Los Medanos	Colleges: Alameda, Contra Costa, Chabot
Existing Certs: Industrial maintenance machine mechanic; AS degree machine technology	Existing Certs: AS in Biotechnology, Certs in Cell Production, Quality Control, Bio-Statistics Bio-ManufacturingStatistics	Existing Certs: AS Degree, 2 year certification Process Technology	Existing Certs: Warehouse Operations, Logistics Office Administration, Green Diesel Tech, Diesel Mechanic AA
Stackability Workplan: <ul style="list-style-type: none"> • Acquire National Institute of Metalworking Skills accreditation • Implement 11 modular NIMS certificates • Implement 1 semester bridge to machine technologies certificate • Implement parallel digital design and fabrication certificate 	Stackability Workplan: <ul style="list-style-type: none"> • Make Bridge to Biotech onramps uniform across the colleges • Develop intermediate lab assistants certification and an advanced biotechnology certificate. 	Stackability Workplan: <ul style="list-style-type: none"> • Develop intermediate PTEC certificate working with refineries • Develop articulation with internal STEM grant and transfer sequence for CSU East Bay.. 	Stackability Workplan: <ul style="list-style-type: none"> • Develop Supply Chain Operations Certificate • Develop Supply Chain Operations AA/AS Degree. • Develop Transportation Distribution Logistics certificate. • Embed Warehouse Education Research Council Certification into certificates

The goal of DBS is to work out fully internally and externally articulated and stackable certificates that allow job seekers the ability to identify opportunities for advancement beyond their immediate training opportunities including opportunities for lateral shifts within an industry. Be-

cause DBS focuses on industries as clusters of related pathways, it creates opportunities for mapping both employment and training in ways that can help job seekers understand their immediate and long term options within their new career focus.

DBS colleges that participate in specific Sector Pathway Partnerships such as machine technologies, logistics, or biotechnology, as examples, will build career pathway maps for their industry similar to that shown below for transportation and logistics. This map was developed by the College of Alameda working with the Port of Oakland and regional logistics industry partners, including the national Warehouse Education Research Council, organized labor (Teamsters and ILWU), and shipping and international logistics companies. These career maps will then be organized by which regional colleges provide specific trainings and how within stack within a specific college as well as across colleges in the region.



This mapping will support implementation of common credentialing standards. Colleges within a pathway area wishing to provide on-ramp training such as Warehouse Operations in logistics or Bridge to Biotech in pharmaceuticals would agree to uniform curriculum for those pro-

grams, recognized and validated by regional industry including any recognized industry credentials and certifications, and accept these as pre-requisites, including for basic skills, for transfer into more advanced trainings at other colleges. The goal for DBS, both for the colleges and our WIA partners, is to build fully navigable career maps which will identify training pathways, alignment with regional employment and demand, and where training is available. These maps will be available digitally for use by case workers at One Stops, Career Counselors at the colleges, and by CBO's as a seamless regional training framework that will make it easier for job-seekers to be referred into and access career path training at the colleges.

Prior Learning Assessments—Making Everything Count: The DBS partners are committed to training frameworks in which individual experiences and prior education are incorporated into their career development portfolio as assets which can be applied towards their education and future employment. DBS will utilize the framework employed by the Council for Adult and Experiential Learning (CAEL)⁴² to incorporate the development of student portfolios as part of the professional development components of our career pathway programs. This will include:

- Use of CAEL technology enabled learning components including online educational advising and access to CAEL's online Prior Learning Assessment courses (CAEL 100),
- Review of learning experiences by faculty experts for college-level equivalency with links to the College Board's CLEP testing options and the American Council on Education (ACE CREDIT) evaluations of workplace and military training,
- Creating an archived electronic record of student's history of prior learning and recording credit recommendations on American Council on Education (ACE CREDIT) transcripts.

Students who complete Prior Learning Assessments (PLA's) demonstrate consistently higher outcomes than those who do not.^{43 44} The development of student portfolios will be integrated

⁴² See the Council for Adult and Experiential Learning, in particular www.learningcounts.org for more information.

⁴³ Klein-Collins, R., *Fueling the Race to Postsecondary Success: A 48 Institution Study of Prior Learning Assessment and Adult Student Outcomes*. The Council for Adult and Experiential Learning (2010).

into pathway programs, in particular for TAA eligible, dislocated workers and recently detached veterans as credit-bearing elements of their career pathway programs. The consortium will dedicate year one to exploring how to apply credit for these portfolios within certificate programs.

C) Online and Technology Enabled Learning

Incorporation of Technology: DBS incorporates online and technology enabled learning in four ways relevant to enhancing and accelerating student learning:

- 1. Regional Mapping and Digital Systems Integration:** DBS will build a regional, online map of career pathways in the community college system aligned with wage and LMI data that can be navigated and used by job-seekers, One Stop case managers, college counselors, and CBO's. It will provide a universal front end for navigation and exploration of career path training in DBS target industries and a set of access tools to facilitate enrollment, FAFSA completion, and basic skills, vocational and career aptitude assessments. It will automate referral and contacts with DBS colleges, outline TAA, WIA, financial aid, and other resources, and including resource calculators to help students estimate their ability to attend. All students will create a unique account which will store information that they gather along the way, including information and PLA's, basic skills assessments, and career exploration that become part of their digital portfolio. Because students can be referred from across the region, it will increase enrollment and thus sustainability of DBS certificate programs and the ability of the colleges to offer them dynamically outside of the regular semester system.

In the development of this application, the DBS colleges and their respective WIBs have already begun exploration of assessment tools and frameworks that may drive this system. This includes incorporation of the tracking and placement capacities of Virtual One Stop (VOS) which will soon be the baseline platform for all of California's workforce programs

⁴⁴ Dagavarian, D. and W. Walters. "Outcomes Assessment fo Prior Learning Assessment Programs. In *In Support of Prior Learning Assessment an doutcomes Assessment of Prior Learning Assessment Programs*. Princeton (1993).

(EDD, ETP, WIA, etc). We will use this platform as a digital staffing system linking graduates of DBS certificate and degree programs and employers in those industries. The pool of graduates will form a regional “skills bank” accessible to employers who identify their need for new workers through this online system. Secondly, we envision the incorporation of core WIA workforce assessments as supplements to the college placement tests including use of ACT’s Work Keys and I-Train career assessment instruments and adoption of the National Career Readiness Certificate.^{45 46} Finally, we will identify and incorporate a common career inventory assessment such as the Jackson Vocational Interest Survey that will be recognized both by our regional WIB’s and the community colleges for referrals from the One Stops.⁴⁷ Embedding these assessments across the systems will increase the flow of job-seekers both from the WIA system into the colleges and vice versa. Colleges will both accept these additional assessments from the One Stops and will offer these assessments in referring students into the WIA system—making the colleges de-facto affiliate One Stop career centers within the regional WIA system envisioned in DBS.

2. Simulations and Gaming Platforms: DBS consortium faculty identified simulation platforms to augment classroom and laboratory instruction. Example products which will be assessed for incorporation into expanded certifications include:

- **CLASS Systems warehouse simulation and design software⁴⁸** that provides simulated warehouse, traffic yard, and regional supply chain systems. The warehouse design functions of this software would be applicable for even entry level warehouse operations students who must design a model warehouse as part of their coursework.

⁴⁵ WorkKeys and I-Train are registered trademarks of ACT. For more information please go to www.act.org.

⁴⁶ The National Career Readiness Certificate integrates measure of cognitive skills and workplace behaviors and has been used locally in other community college CTE workforce programs such as PGE’s Power Pathways program.

⁴⁷ JVIS is a registered trademark of Sigma Assessment Systems, inc. For more information please go to www.jvis.com.

⁴⁸ www.cirruslogistics.com/class

- **Virtual welding, machining, and process technology simulations** such as the VRTEX[®],⁴⁹ Autodesk[®],⁵⁰ and the Materials and Process Simulation Center.⁵¹
- **Online Learning** tools developed by ATeL LLC (Advanced Tools for E-Learning) including virtual laboratory environments for bio-manufacturing, cell culture production, bioreactor control, tangential flow filtration, and environmental monitoring.⁵²

3. Online Supplemental Instructional Resources:

- **Contextualized Math and English** modules adapted to the DBS pathways. These will be either adapted from other colleges or by DBS faculty as they build out new certificates and strengthen existing certificate programs. This regional online learning system will support increased use of CTL in basic math and English, forming a localized “Kahn-Academy” of resources and tools for students in CTE programs.
- **Virtual Enterprise**, a product of the Institute for Virtual Enterprise in New York, a first round TAA funded project. IVE’s Virtual entrepreneurship training platforms and MarketMaker[®] simulated market place will be adapted to develop entrepreneurship and business skills for students where starting their own business is a strong pathway such as welding, machining, electrical, or engineering consulting. IVE is already a partner with Solano who is developing two contextualized entrepreneurship simulations using Market maker targeting CTE pathways at the college.⁵³
- **Online Prior Learning Assessments** (CAEL 100) will be incorporated into vocational pathways for TAA eligible and dislocated workers.

⁴⁹ Cook, J., *Simulators Make Welding Program More Efficient, Eco-Friendly*. www.dothaneagle.com (2011)

⁵⁰ www.autodesk.com/MFG-Simulation

⁵¹ www.wag.caltech.edu

⁵² www.atelearning.com

⁵³ See the Institute for Virtual Enterprise at www.ive.cuny.edu and Marketmaker at www.ivefinancial.com

4. Use of Social Media to support CAA and CTE learning communities: LA Trade and Technical College has developed a special Facebook[®] platform and application for students coming into the college. It links to a portion of Facebook[®] dedicated to use by LATTC students and faculty. On this platform students share information about resources and assignments, reinforcing the interdependence and shared learning among LATTC cohort based programs. Among the interesting findings of LATTC's experience is that students seem much more ready to ask for help and ask questions on social media than they are in the classroom with either their peers or their instructors. Additionally, use of Facebook[®] allows for asynchronous assistance to students by instructors and the ability to spider answers out to groups of students who may have common questions or needs for support.

Impact of Technology: DBS use of technology will impact the ability of the consortium colleges to enroll and increase completion for TAA eligible, dislocated workers and other adults. It will increase the ability of the WIA funded workforce system to help job seekers navigate the regional college training system and provide direct access to assessments (basic skills, vocational inventories, prior-learning assessments) that will help the colleges place students into appropriate training pathways. It will reduce the time to familiarize job seekers with industries with online access to pathway maps, and help students come into the colleges with credible plans to complete a credential and access to appropriate resources (case management, funding, access to financial aid) to help them succeed once enrolled. Given that the largest obstacle in serving TAA eligible workers are the disconnected WIA and community college systems, this step alone will provide a quantum increase in the number of TAA workers served by the colleges.

Secondly, DBS will implement digital simulations of lab environments and online course modules to accelerate and support student learning. On the one hand, digital simulations and gaming environments allow practice of skills without direct participation in a lab. Since lab

space is one of the limiting factors in accommodating additional students in CTE pathways, this will help colleges provide training for dedicated cohorts of TAA and other workforce referrals on a rapid response basis working with the WIA, TANF, and other systems. Online course modules, especially for contextualized basic skills, will provide a plug and play teaching capacity for CTE linked applied math and English courses. Instructors will be able to use formative assessments identifying student skills gaps, and provide them with contextualized content that directly addresses their educational needs. The use of Virtual Enterprise and CAEL 100 build upon nationally recognized and validated tools and will allow pathway programs to build these components and supports into the curriculum without adding time to completion.

Finally, DBS uses of social technology will build upon the cohort support mechanisms identified in CAA as critical for student success. By developing student learning communities through linked courses, contextualized instruction, and team teaching, DBS already incorporates an analog form of social media that uses mutual support as a key strategy to increase completion. Use of social media to augment this will strengthen this component of our workforce programs.

D) Transferability and Articulation

The DBS consortium includes UC Berkeley, California State University East Bay, and Lawrence Berkeley National Laboratories. Their involvement in DBS capitalizes on newly evolving initiatives at these institutions driving linkages to the community college system and their direct local impacts on regional industry and roles in the workforce system.

- **Advanced Manufacturing Partnership:** UC Berkeley is one of 10 national research institutions involved in a national effort by the Federal government to bring together industry, universities, and government to invest in emerging technologies that will create high quality manufacturing jobs and enhance US global competitiveness. In the East Bay this will include ongoing engagement with industry and work with the community colleges to

shorten the feedback loop between the introduction of new manufacturing technologies and the availability of training for middle skill workers in these technologies offered by the community colleges.⁵⁴

- **CSU East Bay Institute for STEM Education:** Bayer and other major regional employers are investing in a new STEM Center at CSU East Bay that is leading regional dialogue around the infusion and strengthening of STEM pathways in K-20 education. This work includes examination of applied (CTE) pathways from high school into the community colleges and the four year systems in the East Bay. Our current dialogue with CSU includes broadening use of contextualized basic skills with STEM education and how STEM centered CTE pathways may be adapted to transfer into the CSU system.⁵⁵
- **LBNL Lab Expansion and Relocation:** Lawrence Berkeley National Laboratories recently announced a major expansion and relocation of its dispersed facilities to a centralized research campus in Richmond, CA. Part of this expansion is exploration of new educational roles for the lab working with high schools and community colleges. Dr. Paul Alivisatos, LBNL Director, was the keynote speaker at the East Bay Career Advancement Academies Fall conference where he spoke directly about the role of the lab's work in driving job creation for entry level and middle skill workers.

The regional dialogue between UC Berkeley, CSU East Bay, LBNL, and the community colleges has centered on three layers of articulation: **1)** The role of these institutions in professional development for DBS faculty that decreases time to introduction of new training technologies in community college classrooms (LBNL is committing paid internships for faculty and students at the lab); **2)** Collaborative work with these systems focused on anticipating job growth in ad-

⁵⁴ In December 2011 UC Berkeley Hosted one of four national meetings on the AMP. For more information on AMP go to www1.eere.energy.gov/manufacturing/pdfs/february_2012_webcase_for_industry.pdf

⁵⁵ *Proposed Charter, CSU East Bay Institute for STEM Education.* www20.csueastbay.edu/faculty/senate/files/cr/11-12-cr-docs/stem-institute-proposal.pdf (2010).

vanced manufacturing sectors—especially those driven by spin-off companies from LBNL; and

3) Increasing articulation between CTE pathways in the community colleges and transfer pathways into the UC and CSU systems, in particular through logistics (business) and advanced manufacturing (engineering) CTE areas.

As part of the DBS work plan, CSU, UC Berkeley, and the DBS colleges will co-host grant funded faculty institutes each year for the first three years of TAA funding as a joint professional development opportunity and to initiate discussion to deepen articulation between our systems. This includes identification of Transfer Model Curriculum for students out of advanced community college CTE training programs such as Process Technology, Machine Technology, Electrical Technology, and Bio-Pharmaceutical manufacturing. These will be direct transfer pathways or modifications of engineering/STEM pathways to allow students in these programs to quickly acquire the transfer courses for transfer. Potential related STEM pathways would be mechanical, chemical, or electrical engineering or bio-chemistry in the case of bio-pharmaceuticals. Additionally, these discussions will include industry sessions to reinforce industry validation of any new credentialing processes related to regional industry and to enforce regional uniform curriculum across the community colleges as well as vertically with our 4 year partners.

We anticipate that by the end of year 2 of TAA funding, DBS will have implemented up to 3 articulation and transfer agreements with UC Berkeley or CSU East Bay. Currently we believe these will be in the following areas:

- **Process Technology/Chemical Engineering** articulation agreement and transfer pathway from Los Medanos College to CSU East Bay. This conversation has already begun as a result of DBS planning and consortium discussions that include both Los Medanos and the Director of the CSUEB Institute for STEM Education,

- **Bio-Technology/Bio-Pharmaceutical** articulation agreement and transfer pathway from Ohlone/Laney/Solano colleges into UC Berkeley and CSU East Bay. The Bay Bio institute will be a part of this discussion, bringing industry as well as higher education partners. This is a revision of previous conversations which have not yet resulted in improved articulation between the systems,
- **Logistics** articulation agreement and transfer pathway from the new AA/AS logistics program at College of Alameda and Cal Maritime, a campus of the CSU system located in Solano County. COA has been pursuing this articulation agreement for some time, and will use TAA funding to revitalize this process.

In the development of these new agreements, we will convene faculty from appropriate disciplinary areas to map both the industry/disciplinary specific curriculum elements of these pathways as well as the inclusion of appropriate A-G (general education) components of the transfer curriculum. We anticipate this will require curriculum/pathway revision on both sides, requiring any new curriculum or transfer programs to go through curriculum review at the colleges and finally at the state level before final approval.

E) Strategic Alignment

Coordination with Employers and Industry: The DBS Consortium will work with industry and our WIA partners to develop the East Bay Skills Alliance (EBSA) and Sector Path Partnerships to define regional workforce and economic development priorities and ensure labor force alignment of training and credential programs. In addition to individual industry commitments, this includes regional industry intermediaries folded into DBS such as the East Bay Economic Development Alliance, the Contra Costa Council, the Warehouse Education Research Council, the Port of Oakland, the Bay Area Community College Consortium, and the State Chancellor.

In preparation for this application, the DBS consortium invited our regional industry partners to meet and provide feedback on the work described in this application. As a result, we have se-

cured letters of commitment from **23 employers** attached to this application. These letters represent both ongoing commitments based on current relationships and new commitments to participate in processes described herein. These include:

- Quarterly meetings of the East Bay Regional Skills Alliance to build a regional system that serves industry with a concise menu of services that strengthen the regional economy,
- Expertise and technical knowledge to build/strengthen training certificates, programs, and curriculum with the community colleges and workforce boards,
- Feedback on work readiness, basic skills, and certification criteria in our industry to help the colleges and workforce boards improve these areas of training,
- Increasing the number of trainees who participate in internships, work experience, or other work based learning in our company and/or industry.
- Material support to training programs through informational events, presentations to students, facility tours, donations of used equipment, or other activities.

Coordination with the Public Workforce System: Eastbay Works is a system of 4 Workforce Investment Boards and 14 One Stop Career Centers serving Alameda and Contra Costa Counties. Multiple DBS consortium colleges operate One Stops funded by Eastbay Works and have partnerships with the WIBs for referral of TAA eligible and dislocated workers into training. Our regional coordination with the WIA system includes:

- Participation of colleges and WIBs in the NUMMI Blue Team which serves to coordinate access and services to TAA eligible workers in the East Bay,
- Joint recent development of the East Bay components of a State of California WIB application for Workforce Innovation Funds that included the first iterations of the Regional Skills Alliance and Sector Pathway Partnership structures described in this application,
- WIA funding for 5 affiliate one stop career centers on DBS campuses including Ohlone, Chabot, Las Positas, College of Alameda, and Merritt College.

DBS will coordinate with regional workforce boards to 1) Assist in the implementation of the EBSA including commitments to braid WIA, EDD, ETP, TANF and other workforce resources; and 2) Implement a digital infrastructure that maps career pathways with systems for online assessment, referral and enrollment, and a regional online staffing system.

Coordination with other Educational Institutions: DBS will coordinate with 2 round one TAA grantees: the West Hills C⁶ Consortium and Kingsborough College in New York. Seven of the 10 DBS colleges are already formal partners with the West Hills Consortium through the Career Advancement Academies. On May 31st a West Hills consortium team is participating in our East Bay CAA faculty retreat to explore issues regarding CTL, the role of instructional teams, and how colleges can sustain career pathway and CTE on-ramp programs. Since the West Hills consortium includes pathway programs in advanced manufacturing and transportation, the groups have been sharing curriculum and strategies related to these industries. DBS will work with Kingsborough by adaptation of the Institute for Virtual Enterprise, a first round funded TAA project. We will bring representatives from Kingsborough to the East Bay for professional development and to build entrepreneurship modules contextualized to DBS target industries.

Finally, 7 California state agencies have jointly endorsed the DBS application including the State Chancellor, Department of Education, Employment Development Department, Employment Training Panel, Governor's Office of Business and Economic Development, California Labor Board, and the California WIB. This selection was based DBS strategies to grow major regional industry sectors including the Skills Alliance to address skills gaps faced by regional industry, increased STEM production industry sectors, addressing gaps in accountability, bringing good practices to scale in the area of open education resources, as well as learning from the West Hills Consortium. DBS complements the State's efforts to create a workforce system responsive to sectors within a region as well as industries that span multiple regions.

III. Work Plan and Project Management

B) Project Work Plan:

Project Work Plan: Design it-Build it-Ship it								
Priority 1	East Bay Skills Alliance: Establish Skills Alliance for regional engagement of DBS industries and creation of regional sector partnerships for regional pathway mapping, resource, and systems integration							
Activities	Implementers	Costs		Time		Deliverables		
Strategy 1.1	Convene East Bay Skills Alliance partners to lay out multi-year workplan	Industry DBS Colleges WIBs East Bay EDA CC Council	Total:	705,099	Start Date:	October 2012	Joint participation MOU and commitment EBSA mission and goals.	
			Equip:	NA	End Date:	Dec 2012		
			Year 1:	175,000	Milestones:	First convening Fall 2012; Ongoing quarterly after that		
			Year 2:	233,300				
Year 3:	236,699							
Strategy 1.2	Establish Sector Path Partnerships for primary logistics and advanced manufacturing sub-sectors	Industry Colleges WIBs	Total:	Same as Above	Start Date:	October 2012	Meeting schedules, partnership goals, partnership MOU's	
			Equip:			End Date:		December 2012, Ongoing
			Year 1:			Milestones:		First meeting of each partnership, establishment of ongoing goals
			Year 2:					
Year 3:								
Strategy 1.3	Define strategies to integrate employer engagement across systems, integrate referral Proc's, placement and funding resources	Industry DBS Colleges WIBs East Bay EDA CC Council	Total:	Same as Above	Start Date:	October 2012	Sector Path Partnerships, regional services portfolio for employers, referral and placement protocols	
			Equip:			End Date:		June 2013
			Year 1:			Milestones:		Protocols for referral Employer engagement process, yrs 2 & 3 resource mapping
			Year 2:					
Year 3:								
Strategy 1.4	Build online Systems including career maps for DBS pathways with online assessments, resource exploration, and staffing skills bank for placement of DBS graduates.	4CD DBS Colleges WIBs CLP	Total:	360,000	Start Date:	Jan. 2013	Digital system and infrastructure for job seekers and placement services	
			Equip:	NA	End Date:	June 2014		
			Year 1:	300,000	Milestones:	Identify IT/Web Res's Mapping & Planning complete, complete web site in place		
			Year 2:	30,000				
Year 3:	30,000							
Priority 2	Workforce Systems Analysis and Mapping: Build out fully mapped regional pathways in primary DBS sectors							
Activities	Implementers	Costs		Time		Deliverables		
Strategy 2.1	Identify potential for layered training systems with regional employers mapped against jobs and wage scales and ar-	Colleges WIBs Industry	Total:	1,205,099	Start Date:	October 2012	Tiered systems identified for each industry and region, validated by employers with	
			Equip:	NA	End Date:	June 2013		
			Year 1:	575,000	Milestones:	Industry focus groups on this topic in Fall 2012;		
			Year 2:	533,300				

	ticulated within AA/AS degree and transfer opportunities		Year 3:	536,699		part of ongoing quarterly convenings w employers	benchmarks for implementation.
Strategy 2.2	Identify/implement new training elements which fill out broader workforce training system. (recruit faculty, validate curriculum, develop protocols, recruit, train, etc)	Colleges	Total:	9,000,000	Start Date:	January 2013	Validated curriculum and training plans; at least on cohort of students in each new training in yr 2 of grant
			Equip:	NA	End Date:	June 2013; ongoing	
			Year 1:	1,000,000	Milestones:	Training Id'd 12/2012 Training developd with faculty & partners 6/2013	
			Year 2:	4,000,000			
Year 3:	4,000,000						
Strategy 2.3	Map certificate progressions from bridge to 2 yr programs, modularize short term certificates and embed within longer career training pathways	Industry DBS Colleges WIBs	Total:	Part of Above	Start Date:	November 2012	Regional career maps additional res's id'd resource integration with CAA/Perkins, other funding.
			Equip:		End Date:	June 2013, ongoing	
			Year 1:		Milestones:	Maps completed 6/13	
			Year 2:				
Year 3:							
Strategy 2.4	Identify opp points for contextualized basic skills development, dynamic cohorts, and bundled services strategies, including service pathways for different pop's	Colleges CLP WIBs Adult Ed	Total:	Part of Above	Start Date:	August 2012	CTL Curriculum components, PD plans for faculty, definition of multi-discipline strategies for each college
			Equip:		End Date:	June 2014	
			Year 1:		Milestones:	Yr 1: 10% of students Yr 2: 15% of students Yr 3: 20% of students	
			Year 2:				
Year 3:							
Strategy 2.5	Student svs/advising strategies for working with students who enter employment to help them maintain connected to education for supplemental skill development	Colleges WIBs Employers CLP	Total:	Part of Above	Start Date:	January 2013	Stud Svs protocols, mktg materials Career path plans marking important transition points for outreach and ed planning.
Strategy 2.6	Define strategies with industry partners to support continued worker development including training at job sites, flex scheduling, or employer funded incentives.	Colleges WIBs Industry EDD	Total:	Part of Above	Start Date:	October 2012	One employer at each college involved in on site training, incumbent worker, work-based learning or other integration strategies.
			Equip:		End Date:	Jan. 2014	
			Year 1:		Milestones:	Industry focus groups on this topic in Spring 2013; part of ongoing quarterly convenings w employers; outreach materials for use with employers to recruit new employers	
			Year 2:				
Year 3:							

Priority 3	Project Governance and Administration: Implement a project governance, program coordination, technical assistance and development of a regional community of practice.						
Activities		Implementers	Costs		Time		Deliverables
Strategy 3.1	Establish project management system including steering committee, project director, administrative, fiscal, and data management systems	CCCCD DBS Coll's WIBs Evaluator State WIB & Chancellor	Total:	1,300,000	Start Date:	July 2012	Project Staff including- Coordinators, Fiscal and IR staffing
			Equip:	10,000	End Date:	June 2014	
			Year 1:	433,000	Milestones:	Pos's adv – 10/2012 Hiring comp-12/2012 Comm Mtgs – 10/2012; monthly thereafter	
			Year 2:	433,000			
			Year 3:	433,000			
Strategy 3.2	Establish implementation workplans and local workplans for each college. Includes identification of local coordinator at each college for oversight of local implementation, regional convening, and reporting	CCCCD DBS Coll's	Total:	Part of Above	Start Date:	Started	Direct funding for or in-kind commitment of .5fte from each college for local coordination; formal workplans with each consortium college
			Equip:		End Date:	December 2012	
			Year 1:		Milestones:	MOU dev-October 2012; Local staffing-12/2011 Partnership agreements between individual colleges, WIBs, & CBO's	
			Year 2:				
			Year 3:				
Strategy 3.3	Establish regional convenings of DBS consortium including all colleges and major implementation partners	CCCCD BPA CCCCO DBS Coll's CLP	Total:	450,000	Start Date:	July 2011	Dev of regional community of practice related to core DBS strategies
			Equip:	N/A	End Date:	June 2014	
			Year 1:	150,000	Milestones:	1 regional convening each year	
			Year 2:	150,000			
			Year 3:	150,000			
Strategy 3.4	In-depth and ongoing technical assistance to consortium colleges related to implementation of primary DBS pathway and workforce system strategies	CCCCO CLP BPA	Total:	600,000	Start Date:	Started	Fidelity of implementation to outlined project strategies; institutionalization of project at college sites
			Equip:	NA	End Date:	June 2013	
			Year 1:	200,000	Milestones:	Technical Assistance goals set for each coll 12/2012;	
			Year 2:	200,000			
			Year 3:	200,000			
Strategy 3.5	Build web site and online learning community to organize resources, share learning across project, and make products available to broader college/workforce community.	CLP Colleges	Total:	260,000	Start Date:	Jan 2013	Publicly available online resources from the project available to partners and to broader select colleges/workforce communities
			Equip:	100,000	End Date:	June 2014	
			Year 1:	230,000	Milestones:	Identification of plan for web tools 12/2012 Implementation of web strategies 1/2012	
			Year 2:	20,000			
			Year 3:	10,000			
Priority 4	Implement digital learning and technology enabled strategies: Implement digital/technology enabled strategies that strengthen teaching & learning, make online learning available to students, and foster collaboration and efficient service delivery.						
Activities		Implementers	Costs		Time		Deliverables
Strategy 4.1	Implement on-line short term supplemental certificates and	Colleges CLP	Total:	150,000	Start Date:	Jan 2012	Online modules, certificates and supplemental
			Equip:		End Date:	Ongoing	

	hybrid face to face/online learning courses	CCCCO	Year 1:	75,000	Milestones:	Id strategies 2/2013 Implementation 6/2012; ongoing	material aligned to career pathway programs	
			Year 2:	37,500				
			Year 3:	37,500				
Strategy 4.2	Implement specialized digital simulation and specialized learning software in appropriate courses and career trainings	DBS Coll's CCCCO	Total:	300,000	Start Date:	January 2012	Implement simulation (trucking, warehouse, Health IT) software and other digital learning aides across sites	
			Equip:	300,000				End Date:
			Year 1:	300,000	Milestones:	Id strategies 10/2011 Implementation 1/2012; ongoing		
			Year 2:					
Year 3:								
Priority 5	Implement a project-wide infrastructure for data-driven decision making and program improvement: Create integrated data structure for tracking educational and workforce data for student progress, implementation and outcomes							
	Activities	Implementers	Costs		Time		Deliverables	
Strategy 5.1	Create process to upload college and workforce data into central database for tracking of outcome measures	CCCCD CLP P/PV CCCCO WIBs/EDD	Total:	1,348,000	Start Date:	July 2011	Unified database defining project-wide and local progress measures	
			Equip:		End Date:	June 2014		
			Year 1:	335,750	Milestones:	Establish local/global measures 10/2011 Imp Database 1/2012		
			Year 2:	335,750				
Year 3:	335,750							
Strategy 5.2	Establish process to report quarterly and yearly formative and summative data elements to inform local and project decision-making	CCCCD CLP P/PV CCCCO	Total:	Above	Start Date:	July 2011	Customized quarterly and yearly reporting processes contextualized to needs of project and individual sites	
			Equip:			End Date:		June 2014
			Year 1:			Milestones:		Report formats 10/2011 Form repts-quarterly Summ repts-yearly
			Year 2:					
Year 3:								
Strategy 5.3	Implement learning sessions by region as state consortium to guide use of quarterly/annual data for program improvement and decision-making	CLP P/PV CCCCD CCCCO Colleges	Total:	Above	Start Date:	July 2011	Institutionalized use of data by faculty, administrators and workforce prof's in program design and improvement	
			Equip:			End Date:		June 2014
			Year 1:			Milestones:		1 state convening each yr 1 ea regional convening (CV, Bay Area, LA) per yr
			Year 2:					
Year 3:								

C) Project Management

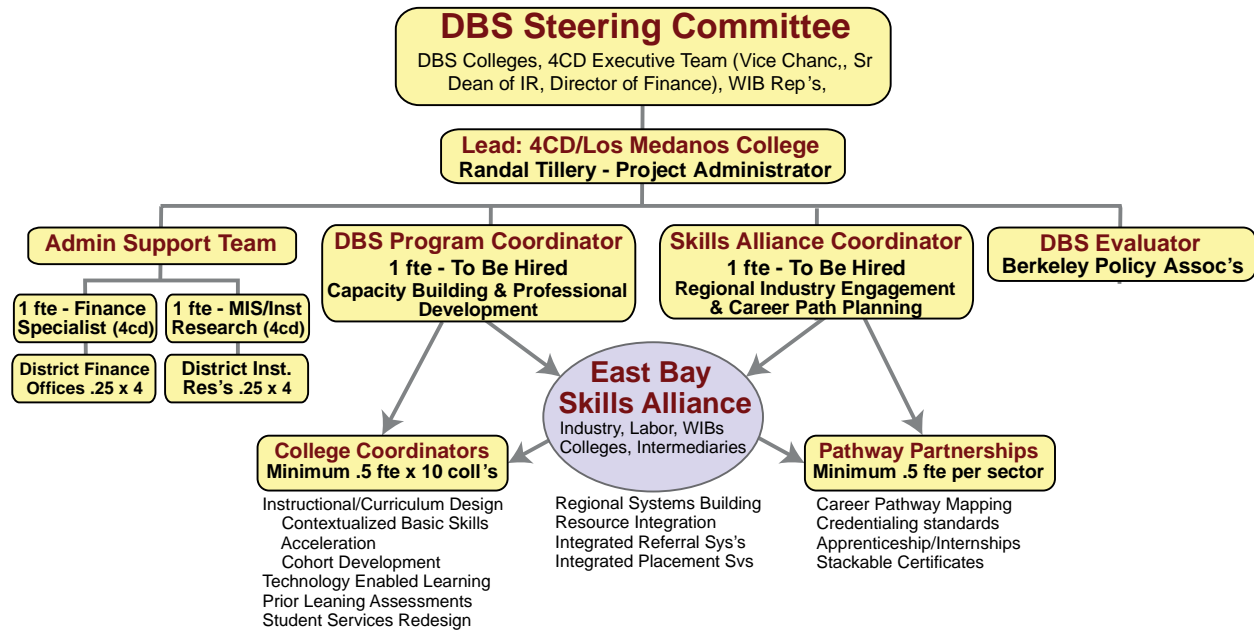
Los Medanos College (LMC), one of three colleges in the Contra Costa Community College District (4CD), is the lead applicant for TAACCCT funds under this application, however, as the fiduciary and governing agency for the three CCC colleges, the Contra Costa Community College District (4CD) will manage the formal systems for finance, consortium governance, MIS, and reporting to the Department of Labor in partnership with LMC.

Effective Project Management and Staff: Randal Tillery, Contra Costa District Dean of Workforce and Economic Development, will be the full time project administrator for DBS. With 15 years of direct experience in the development of large, multi-system workforce initiatives, Randal's expertise includes the ability to build consortium driven initiatives that braid and integrate multiple sources of funding. As former Director of Workforce at the Unity Council, Director of Neighborhood Economic Development at the East Bay Asian Local Development Corporation, Workforce project specialist at Gibson and Associates, and principle of Red Letter Consulting, Randal has developed dozens of Federally funded workforce projects, designed and implemented WIA funded One Stop Career Centers, and has been directly involved in developing dozens of DOLETA funded projects in the San Francisco Bay Area. The Senior administrative team at the District office will also include Dr. Tim Clow, Senior Dean of Research and Planning, Jonah Nicholas, Director of District Finance, and Mojdeh Mehdizadeh, Vice Chancellor of Academic Affairs and former Associate Vice Chancellor of Instructional Technology. This team brings over 50 years of collective workforce and administrative experience to DBS.

Effective Management Structures: DBS will use a consortium governance model that includes all 10 DBS consortium colleges and other regional stakeholders. The DBS organizational structure wraps around and supports the East Bay Regional Skills Alliance—an alliance of industry, labor, colleges, WIBs, economic development partners and in turn drives the mapping and design

of career pathways, regional business services strategies, and individual college capacity building activities. DBS funds regional processes for working with the 10 colleges to coordinate capacity building, professional development, career pathway mapping, industry engagement, and regional systems integration across the region.

DBS Administrative Structure



DBS distributes capacity across the 10 colleges and builds an infrastructure to supervise and manage grant activities. The major funded partners all participate in Steering Committee which also includes many members of the EBSA. To ensure consistent support for financial management and data integrity, each participating district will dedicate .25 fte of a finance specialist and .25 fte from institutional research and each college will dedicate at least .5 fte to local coordination of capacity building. DBS will fund a dedicated coordinator to work with the regional colleges around their capacity building activities, including regional coordination of professional development, and will fund a dedicated EBSA Coordinator who will convene the alliance and take the lead for industry engagement and career path mapping.

Effective Systems and Processes: Contra Costa Community College District is a 158 million dollar community college district serving the 1 million plus residents of Contra Costa County.

The district maintains strict accounting standards with assignment of project codes for all grant funded projects and an internal auditor for monitoring expenditures and contracts. Staffing assignments are allocated by individual grant codes within the district's financial management software system as are subcontracts, supplies, travel, and other expenses. 4CD will require all CCLI consortium partners and colleges to submit budgets to the district broken out by DOL budget codes as well as detailed work plans with benchmarks for every year of capacity building and program implementation prior to execution of MOUs. All vendor contracts over \$1,000 require three bids and all MOU's are subject to review by purchasing, finance and the 4CD Board of Trustees. An A-133 Audit is conducted yearly at 4CD by the California State Controller's Office which historically has not identified any compliance issues. Financial statements are prepared in compliance with generally accepted accounting principles as prescribed the Governmental Accounting Standards Board and Audits of State, Local Units issued by the American Institute of Certified Public Accountants and Federal rules and regulations. DBS funds a dedicated finance specialist and research specialist to ensure compliance by 4CD and the 10 DBS colleges with Federal procurement, fiscal management, reporting, and evaluation requirements.

In the 4th quarter of 2010, Los Medanos College and 4CD filed the final report for a DOLETA Community Based Job Training Initiative grant for the LMC Process Technology program which itemized successful completion of all required grant activities (CB15983-07-60-A-6). This included successful compliance with all Federal finance guidelines, timely grant expenditures, matching funds, and program implementation which exceeded grant baselines for nearly all deliverables and outcomes. As of this year, 4CD has chosen to centralize its major workforce projects in a district division of workforce and economic development led by Dean Tillery. Because of his extensive experience with Federal workforce projects, we anticipate we will only improve upon our already successful grant management record. As an example, under our cur-

rent Career Advancement Academies initiative funded by the State Chancellor’s Office, 4CD was able to execute all MOU’s within 60 days of grant notification, completed staffing within 60 days, and has exceeded every benchmark for implementation, enrollment, or completion.

Consortium Members Roles and Responsibilities: Seven of the ten DBS consortium colleges have worked closely for over a year on the implementation of the Career Advancement Academies, which is a central element to the capacity building work that DBS will fund to include new stackable certificate systems and broader regional systems integration with industry and public workforce system. This current consortium is led by 4CD who will lead the DBS consortium and includes clearly defined roles by our consortium partners. These include:

Partner	Roles and Responsibilities	#’s Served
Los Medanos (Lead Applicant)	<ul style="list-style-type: none"> • Lead Applicant and Fiscal Agent • Regional lead for Process Technology, Electronic Technology, and Welding related to petroleum and chemical man. • Certificates <ul style="list-style-type: none"> Electrical Technology Process Technology Welding Certificate: Networking/Security for Manufacturing 	25 30 25 25 Total: 105
Alameda	<ul style="list-style-type: none"> • Regional Lead for Transportation and Logistics Partnership • Certificates <ul style="list-style-type: none"> Warehousing Operations Green Diesel Retrofit Supply Chain Operations Certificate Supply Chain Operations AA/AS Degree. Transportation Distribution Logistics certificate. 	75 50 25 25 25 Total: 200
Berkeley	<ul style="list-style-type: none"> • Member of Biotechnology Sector Partnership • Certificates <ul style="list-style-type: none"> Biotechnology Associates Degree Biotechnology Certificate of Achievement Bridge to Biotechnology Certificate Bio-informatics 	20 40 20 20 Total: 100
Chabot College	<ul style="list-style-type: none"> • Regional lead for admissions, records and integrated case management for TAA and dislocated workers • Member of Industrial Maintenance/Machine Tech Partnership • Certificates <ul style="list-style-type: none"> Clean Diesel/Alt Fuels Manufacturing Project Management/Entrepreneurship Basic and CNC Machining Automated Production Systems Welding 	50 100 25 25 50

		Total: 250
Contra Costa College	<ul style="list-style-type: none"> • Member of Transportation and Logistics Partnership • Regional Lead for Advanced Automotive Technologies <ul style="list-style-type: none"> Green Automotive Hybrid 50 Advanced Hybrid Automotive 25 Warehousing 75 Logistics Office Administration 25 Freight Forwarding/Customs Brokering 25 Engineering Technician 25 	Total: 175
Diablo Valley	<ul style="list-style-type: none"> • Member of Ind. Maintenance/Mach. Tech partnership • Certificates <ul style="list-style-type: none"> Industrial Maintenance Machine Mechanic 56 Electronics/Electricity 56 Engineering Technology 60 Engineering Transfer 30 	Total: 202
Laney	<ul style="list-style-type: none"> • Regional Lead for Ind. Maintenance/Mach. Tech partnership • Member of Biotechnology partnership • Certificates <ul style="list-style-type: none"> Industrial Maintenance 75 Advanced Industrial Maintenance 60 Machine Technology 200 Bio-Medical Device Manufacturing I 75 Bio-Medical Device Manufacturing II 40 Bio-Manufacturing I 75 Bio-Manufacturing II 40 	Total: 565
Merritt	<ul style="list-style-type: none"> • Member of Transportation and Logistics Partnership • Member of Biotechnology Partnership • Certificates <ul style="list-style-type: none"> Homeland Security/TSA 40 Histo-Technology 20 	Total: 60
Ohlone	<ul style="list-style-type: none"> • Member of Biotechnology Partnership • Certificates <ul style="list-style-type: none"> Bio-manufacturing 40 Biostatistics 20 Quality Control/Assurance 20 Cell production 20 AS Degree Biotechnology 20 	Total: 120
Solano	<ul style="list-style-type: none"> • Regional Lead Biotechnology Partnership • Member of Ind. Maintenance/Mach. Tech partnership • Certificates <ul style="list-style-type: none"> Mechatronics Technician 20 Welding Industrial Technician 20 Drafting Technician 20 Water/Wastewater Technology 20 Water/Wastewater Employability Skills 40 Water/Wastewater Math On Ramp 40 Bio Manufacturing Boot Camp 40 Biotech Lab Assistant 40 	Total: 240

Sustainability Plan: Design it-Build it-Ship it will sustain effective practices learned during grant funding through the institutionalization of new systems and processes for serving TAA eligible and dislocated workers in the East Bay Skills Alliance. EBSA will align and map regional certificates into career pathways and will use accelerated cohort based and contextualized instructional strategies demonstrated through the Career Advancement Academies, I-BEST, and other models to increase completion and success for dislocated and low wage workers. This re-tooling of educational and workforce systems in the East Bay will increase access to short term certificate training for unemployed workers referred from the WIA One Stop centers, CBO's, TANF agencies, probation and other elements of the public workforce system. This will increase the ability of these disparate systems to braid and leverage funding through access to TAA training funds, Individual Training Accounts, ETP, and employer training resources.

The DBS consortium plans are to leverage state apportionment (FTES), WIA training resources, TAA training resources where available and other aligned resources within the community colleges to sustain successful elements of DBS. This includes the \$782,000 in annual funding from the State Chancellor's office for the Career Advancement Academies, Perkins, CTE collaborative funding, and other local resources. Collectively, the DBS consortium partners identified \$4,600,000 in leveraged resources for this initiative. Equipment, facilities improvements, simulation software, and other digital infrastructure will be maintained through existing resources pending the outcomes of the DBS evaluation. Secondly, it is worth noting that many of the core interventions of DBS including contextualized basic skills, linked courses, and use of instructional teams are relatively cost effective to maintain once established, and a profound amount of our year one activities will be focused on the professional development and work with faculty to build a dedicated core of full time and adjunct faculty dedicated to these program structures. Finally, the maintenance of the regional career mapping, skills bank, digital student

assessments and PLA's, and other elements are relatively inexpensive to sustain, and it will be a primary task of the Skills Alliance to use the evaluation to determine the usefulness of this new capacity and find the funding across the systems to sustain them once grant funding has ceased.

IV. Outcomes

A) Analysis of Outcome Projections

DBS will use outcome and progress measures, local evaluation elements, and local implementation and financial reports to inform ongoing project evaluation and program improvement over and beyond the life of the initiative. The goal for implementation of evaluation and program improvement systems in DBS is to build a local learning system whereby student outcomes are measured against program interventions to inform ongoing program improvement or development of new program elements or interventions.

Design it-Build it-Ship it Outcome Measures for TAACCCT Program						
Outcome Measure		Year 1	Year 2	Year 3	Year 4	Total
1	Total Unique Participants to be Served	400	700	917		2,017
2	Participants Completing a TAACCCT-Funded Program of Study	320	560	734		1,614
3	Participants Still Retained in Their program of Study or Other TAACCCT-Funded Program	340	595	779		1,714
4	Total Participants Completing Credit Hours	360	630	825		1,815
5	Total Number of Participants Earning Credentials	320	560	734		1,614
6	Total Participants in Further Education After TAACCCT-funded Program of Study Completion	80	140	183		403
7	Total Number of Participants Employed After TAACCCT-Funded program of Study Completion		224	392	514	1,130
8	Total Number of Participants Retained in Employment After Program of Study Completion		168	294	385	847
9	Total Number of Those Participants Employed Who Received a Wage Increase Post-Enrollment		134	235	308	678

The DBS consortium will enroll 2017 students over the first three years of TAACCCT funding, the majority of those in years 2 and 3 of grant funding when new certificates, local capacity, and regional systems begin to come on line. DBS capacity building activities will result in both new certificate programs, aligned to industry validated career pathways, and improve TAA and dislo-

cated worker access and success rate in existing certificate and degree programs. Because it builds upon existing capacity and creates new regional systems that will drive increased completion and workforce success, DBS will be able to leverage TAACCCT funding to impact a much broader array of certificate and degree programs than would otherwise be possible, allowing us to maximize the impact of grant funding and layer it with existing apportionment, FTES, CAA, and other funding sources. The goal for implementation of evaluation and program improvement systems in DBS is to build a local learning system whereby student outcomes are measured against program interventions to inform ongoing program improvement and development of new program elements or interventions.

Balance of Objectives and Outcomes: DBS seeks to balance its expenditures on capacity and regional systems building with actual training activities that will allow us to test and validate systems and instructional improvements against participant outcomes. Given the scope of DBS capacity building activities, the number of estimated enrollees (2017) will provide an adequate basis for evaluating the impact of DBS on enrollment, credit and certificate completion, and workforce success. DBS objectives for the grant period include:

- **Establishment of 25 new certificate pathways at DBS colleges** including industrial technician, industrial maintenance, logistics, alternative fuels, biotech, and other career pathway certificates,
- **Embedded Acceleration Strategies at all 10 Colleges** including contextualized teaching and learning strategies, dynamic/block scheduling, use of instructional teams, technology enabled learning, and wraparound counseling/case management services,
- **Development of the East Bay Skills Alliance** will build a regional infrastructure for working with industry, aligning regional training priorities, and strengthen integration of WIB/community college systems, and promote stackable certificates across the region,

- **Creation of digital infrastructure** supporting shared assessment, including prior learning assessments, career mapping and exploration, digital simulations, curriculum resource modules, and a digital staffing/placement system for DBS participants/graduates.

This summary list of objectives illustrates the powerful way DBS will use TAACCCT funding to drive quantum increases in the ability of the regional colleges to enroll and successfully serve TAA eligible, dislocated, and other adult workers. The proposed mix of objectives and outcomes will realize this capacity building while still enrolling and serving a significant number of participants in grant-funded training that will support the DBS comprehensive evaluation.

B) Process or System for Tracking and Reporting Outcome Measures

DBS will use outcome measures, progress measures, qualitative analysis of program & systems development to inform ongoing project evaluation and program improvement over and beyond the life TAACCCT funding. DBS will build a shared culture of learning among the consortium colleges and the East Bay Skills Alliance partners to institutionalize data and outcome driven decision making in the regional education and workforce system. The DBS consortium has selected Berkeley Policy Associates (BPA) as our 3rd party evaluator through a national RFQ selection process. BPA will work with our local evaluation team which includes the five DBS college districts, the State Community College Chancellor's Office, California WIB, regional workforce boards, and the Career Ladders Project (CLP). This partnership has agreed to build a model process that can merge workforce and college data into a single data system for program improvement and identify successful strategies that can be brought to scale in the State system.

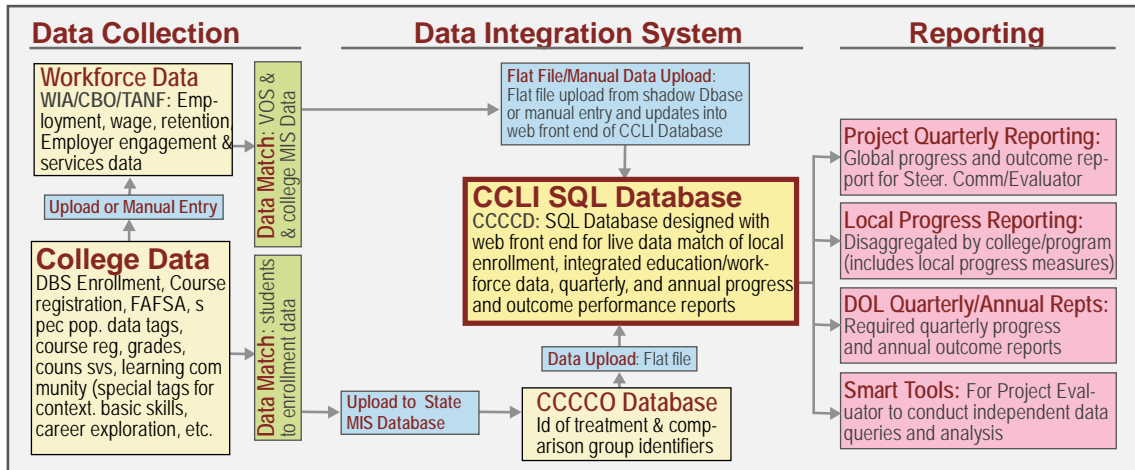
Existing Data Systems and Procedures: DBS will use a unique project data flag within the California Community Colleges MIS system for capturing information about DBS enrollees in the treatment groups and for control/comparison cohorts. California is unique in that it operates a statewide MIS system which captures all student identifiers, enrollment, completion and performance for all 112 community colleges in California. While individual districts may use unique

MIS programs such as Banner, Datatel, or PeopleSoft, all student data is uploaded to the state system in a common data format 3 times each year, creating a unified process for capturing college, program, special populations, and special projects data. The seven CAA colleges all currently use special populations flags as a part of the CAA statewide evaluation and have processes in place for flagging CAA students in their systems. This includes dedicated staffing in each Institutional Research division to support flagging and student tracking activity.

In addition to core educational MIS capacity, the State workforce systems are in the process of integrating all statewide workforce data including WIA, EDD, CalJOBS, ETP and other systems into a new system called Virtual One Stop (VOS). VOS will create a unified and more flexible platform for tracking workforce participants, monitoring statewide and local workforce outcomes, and for matching of workforce participants with EDD wage and employment data. VOS is more flexible than the previous Job Training Automation (JTA) system and allows for special program flags, flexible field creation, and the ability to import external data sources (such as educational data).

Addressing Gaps in Tracking Systems: For DBS, the California WIB, State Chancellor's Office, and the local DBS partners have agreed to implement a shared database for merging workforce and educational data for analysis of DBS outcome measures. This will automate tracking of many DOL outcome measures including entered employment, retention, and wage increases and allow better longitudinal measurement of participant outcomes well beyond the end of grant funding. While many details about this system remain to be defined, it will at the very least involve creation of unique DBS project flags in VOS and State college MIS and merging that data either in VOS or a unique separate SQL database designed for this project, but which can be used for future integrated educational and workforce projects in the region.

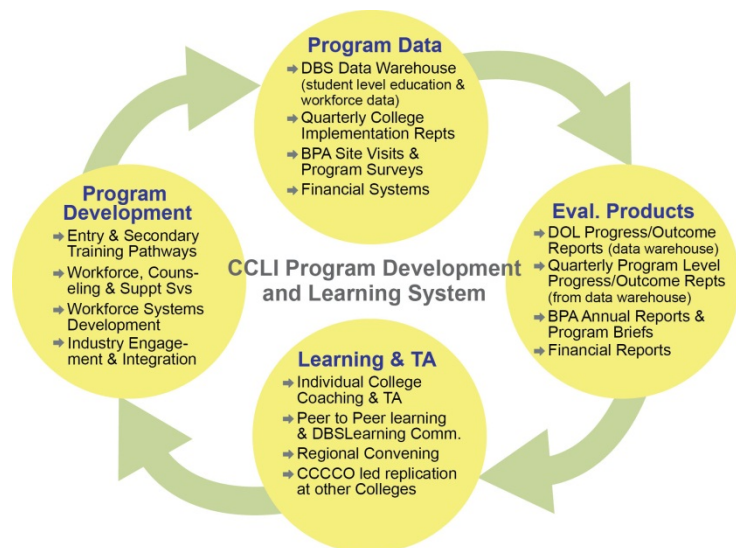
DBS Draft Data Management and Reporting System



As the above draft data integration plan illustrates, DBS will include project identifiers in both VOS and State MIS systems and the close cooperation of the State WIB, State Chancellor's Office, and the regional WIBs and DBS consortium colleges, who have all identified this as a priority activity they will support for this project. To support this work DBS provides direct support for MIS operations at the State and local levels, including for IR divisions at each of the five districts, MIS at the five DBS WIB partners. Contra Costa, which has robust IR and MIS divisions will take the lead in convening the partners and building this system.

C) Using Data for Continuous Improvement

The DBS consortium partners have made the adaptation of college data systems and integration of workforce data for program improvement a strategic priority for this initiative. In addition to ensuring that progress and outcome data disaggregated by program and campus is available to colleges on a regular basis, we will convene the consortium in for the review of qualitative and



quantitative evaluation data at least once a year. This will reinforce the consortium as a Community of Practice through guided discussions of program performance and techniques for interpreting program performance data and using it to drive program improvement. Berkeley Policy Associates has committed to this as a part of their scope of work and will collaborate with the Career Ladders Project to determine frequency and objectives for training topics on data analysis, establishment of shared learning goal for the colleges, and guided discussions on program improvement and development using the outcome data. Community of Practice sessions led by CLP will be supplemented with shared strategies from the field, evidence-based practices from current research, and guided working sessions where colleges help resolve issues common to their programs. Learning sessions will also focus on sector specific issues working with industry, WIBs, and other partners in program design and implementation.

APPENDIX B. IMPLEMENTATION RESEARCH METHODS

The implementation study component of the DBS TAACCCT grant evaluation used a mixed-methods approach that included qualitative, quantitative, and social network analyses. In this section, we describe the data collection activities, followed by an explanation of the qualitative and social network data analysis procedures.

Data Collection Activities

Observations of DBS Events/Activities

From Fall 2012 through Spring 2016, IMPAQ evaluators observed 41 DBS-related meetings, activities, and events. Examples of the types of events observed include DBS coordinator meetings, Cluster Leadership Team and Cluster Partnership meetings, cross-system business services meet-ups, and High Impact Pathway (HIP) Institutes. Using a semi-structured observation protocol (see Appendix B.1), the IMPAQ observer on site took notes on the meeting content, structure, and level of participant engagement. Notes were reviewed and edited by team leaders and revised and finalized by the on-site observer.

Document Review

In Winter 2013, evaluators began collecting and reviewing documents on a continual basis that included (but were not limited to) program descriptions, website information, marketing materials from each partner agency, training curricula, program completion requirements, recruitment materials, consortium meeting agendas and notes, and other documents that provided information about DBS programs and contexts. Documents collected during meeting observations and site visits were described in the field notes with file locations referenced therein. One hundred nine documents have informed the implementation study analysis.

Site Visits

The evaluation team conducted two rounds of site visits in Spring 2014 and 2015 to the original ten participating colleges. The site visits included focus groups with participating students and interviews with faculty, coordinators, administrators, counselors, and other college staff. These site visits allowed evaluators to understand program components and the status of implementation from a variety of perspectives. Site visits also allowed evaluators to learn about changes and/or improvements to programming and to collect relevant program documents.

The site visit protocols (Appendices B.2 and B.4) were developed in Summer 2013 and reviewed by the DBS grant leadership team. These protocols included instructions to site visitors on the scheduling and proper conduct of site visits, interview topic guides tailored to the role of the respondent (e.g., instructor/faculty, college administrator, DBS counselor, and grant coordinator), a topic guide for student focus groups, and data handling and follow-up procedures.

The demographic characteristics of the student focus groups were compiled through the use of an anonymous background questionnaire administered at the start of each focus group session. These demographic characteristics are displayed by year in Exhibits B1 and B2.

Exhibit B1. Characteristics of 2014 Focus Group Students, by Sector

	Advanced Manufacturing	Biosciences	Transportation & Logistics	Total
# of Focus Groups Completed	5	5	4	14
Gender				
Female	8	17	13	38
Male	37	14	11	62
Total	45	31	24	100
Ethnicity				
American Indian/Alaskan Native	3	1	1	5
Asian	6	12	1	19
African American	9	4	15	28
Latino/Hispanic	11	7	2	20
Not Provided	1	0	0	1
Other	2	2	3	7
White	13	5	2	20
Total	45	31	24	100

Exhibit B2. Characteristics of 2015 Focus Group Students, by Sector

	Advanced Manufacturing	Biosciences	Transportation & Logistics	Total
# of Focus Groups Completed	5	4	3	12
Gender				
Female	4	9	10	23
Male	28	12	28	68
Total	32	21	38	91
Ethnicity				
American Indian/Alaskan Native	0	0	3	3
Asian	6	8	3	17
African American	5	2	26	33
Latino/Hispanic	8	6	4	18
Native Hawaiian/Pacific Islander	2	1	0	3
Other	1	1	0	2
White	10	3	2	15
Total	32	21	38	91

Partner Interviews

During Summer and Fall 2014 and 2015, telephone interviews were conducted with a purposeful sample of 12 to 14 consortium partners each year. These interviews provided information on the development of the DBS consortium itself, and the roles of key stakeholders. The interview samples included individuals representing workforce boards, technical assistance providers, DBS consultants, and business/industry representatives. Topics covered (see Appendix B.3) included

grant accomplishments, the effectiveness of training programs to respond to industry needs, strengths of partnerships, sustainability, and lessons learned.

The number of respondents from the site visits and telephone interviews are presented by year and type of respondent in Exhibit B3.

Exhibit B3. Interview Responses by Year and Respondent Type

Year	College Faculty/Staff	DBS Partner
2014	63	12
2015	49	14

Social Network Survey (Collaboration Questionnaire)

The primary source of data for the social network analysis (SNA) was a collaboration questionnaire. To develop the draft questionnaire, IMPAQ evaluators reviewed published research across disciplines that used SNA or surveys to examine collaboration between organizations. The initial draft, completed in Year 2, included items adapted from published surveys and interview protocols, as well as original items created specifically for the study.

The draft questionnaire was piloted with eight individuals who had been involved in grant-funded activities as of the first part of Year 2. Four respondents participated in 20-minute debriefing calls to discuss the length, format, directions, comprehensiveness, and relevance of the questionnaire and one provided feedback via email. Based on the feedback from the pilot respondents, evaluators revised the directions, changed some terminology, and added new questions.

The questionnaire, administered in Year 2, asked respondents to identify their organization(s), their job title(s), and which industry cluster was most relevant to their work, and to name up to 10 individuals with whom they collaborated on DBS-related activities or programs. For each partner named, respondents were asked about their frequency of communication, topics on which they collaborated, and whether they collaborated with this partner prior to the DBS initiative.

Information collected from site visits, interviews with partners, and observations were used to identify individuals in the region involved with the DBS initiative. We also consulted with the 4CD and reviewed attendance and sign-in sheets from grant-sponsored meetings and events. Ultimately, 191 people were invited to take the Year 2 survey and 162 responded (85% response rate).

Before administering the questionnaire in Year 4, we revised the questionnaire based on feedback from respondents and 4CD (see Appendix B6: Year 4 Questionnaire). Evaluators invited individuals who had been invited to complete the questionnaire in Year 2 and were still involved with DBS, along with individuals who had become involved in DBS since Year 2, to take the Year 4 questionnaire. In total, 160 individuals were invited to complete the Year 4 questionnaire and 115 responded (72%).

Data Analysis Procedures

Qualitative Analysis Procedures

Observation, interview, and focus group notes were uploaded to NVivo 10, a software package designed for coding and analyzing qualitative data. Interview and focus group audio files were transcribed by an external transcription service. Transcripts and observation notes were coded based on analytic categories drawn from the implementation study research questions and the evaluators developing knowledge of the DBS program, such as:

- Grant goals
- Program components
- Technical assistance to colleges
- Employer engagement
- Career pathway development
- Industry cluster
- Data use
- Sustainability
- Successes
- Challenges

The first round of qualitative data coding began in June 2014 with the site visit data, and focused on describing key elements of the DBS program, early implementation challenges, and the career pathway development process. Each set of site visit notes was coded independently by two IMPAQ team members. Coders conferred weekly to develop a shared understanding of code definitions and resolve discrepancies through discussions and reaching consensus. Through this collaborative process, initial code definitions were refined and new codes generated as needed to capture key concepts emerging from the data. This iterative team coding process was repeated until a stable set of codes emerged. All the 2014 and 2015 interview and focus group transcripts were double-coded following the same team process.

After the coding was completed, the analysis team met to discuss topics for systematic inquiry. Each member of the analysis team was responsible for conducting specific queries using the NVivo 10 tools and compiling an analytic memo summarizing the results of each query. Each memo was discussed by the analysis team and reviewed by the implementation study lead. The content of these analytic memos were synthesized into thematic memos that informed the findings reported in Section 2 of this report.

Social Network Analysis Procedures

As a preliminary step in the analysis, evaluators tabulated questionnaire responses to identify participants' (respondents and partners) organizations, industry cluster, whether relationships with named partners had existed prior to the DBS initiative, and whether relationships were expected to continue. We then imported the network data into UCINET 6 (Borgatti, Everett, & Freeman, 2002), a software package designed for social network analysis. UCINET allows

researchers to analyze a network of interacting individuals and relationships among them, and to display those relationships graphically in a map. In social network maps, *nodes* depict actors in a network and lines between them depict relationships, called *ties*, between nodes. For this study, the actors were the organizations participating in the DBS consortium and ties represent the existence of relationships between one or more individuals from the two organizations.

We collapsed individual-level data by organization and examined the three industry clusters within the consortium (Advanced Manufacturing, Biosciences, and Transportation and Logistics) in Year 2 and Year 4. We considered each cluster in each year its own network, for a total of six networks (three in Year 2 and three in Year 4). The industry clusters were not mutually exclusive, so organizations could be included in more than one network in the same year.

For each network, we calculated degree centrality and betweenness centrality scores for each *actor* or organization to investigate the roles of various partners in the consortium. SNA assumes that an actor's position in a network partially shapes opportunities and constraints within the network (Borgatti, Mehra, Brass, & Labianca, 2009) and therefore measures of position, such as *degree centrality* and *betweenness centrality*, help evaluators identify if and why an actor is considered important within the network. Degree centrality measures the extent to which an actor is directly connected to other nodes in the network, with high centrality indicating that an actor has many ties and is relatively visible or prominent within the network (Wasserman & Faust, 1994). Betweenness centrality measures the extent to which an actor is directly connected to nodes that are not directly connected to each other. Actors with high betweenness centrality potentially control information and can serve as gatekeepers or brokers within the network (Freeman, 1979).

In addition, we calculated the *betweenness centralization* of each of the six networks. Centralization is a measure of the entire network, as opposed to an individual actor's, and indicates the extent to which betweenness varies across actors or how heterogeneous betweenness is within the network (Knoke & Yang, 2008; Wasserman & Faust, 1994). In highly centralized networks, centrality is concentrated with a few actors; in decentralized networks, centrality is more dispersed.

Last, we used the number of individual relationships between two organizations as a measure of tie strength. For example, if two individuals at Organization X had a relationship with one individual at Organization Y, the strength of the tie between X and Y would be two. If only one individual at Organization X had a relationship with an individual at Organization Y, the tie strength would be one.

The Year 4 network maps and summary tables that resulted from the social network analysis are presented in Section 2 of this report.¹

¹ Evaluators shared an APPAM Spring Research Conference paper with 4CD in 2016 that reported results from the analysis of Year 2.

APPENDIX B.1 OBSERVATION TOOL

Instructions: Use this guide when you are taking running notes in the field. You will also use this guide to write up and summarize your notes for submission to the Task Leader.

Observer Name:

Observation Date, Start and End Time:

Meeting/Event Name:

Location:

(Estimated) Number of Total Attendees:

1. Provide information on key personnel involved in the meeting or event. Specify if these key personnel are involved in the planning/hosting of the event or a speaker/presenter. Include names and position/title when possible.
2. Describe the objective of the meeting or event. Include information about the targeted attendees (e.g. program participants and employers for a job fair).
3. What industry sector was targeted?
4. Discuss your observations of the following:
 - a. The usefulness of the meeting or event. Was the meeting or event successful in achieving its goal or purpose? Was it relevant? Are there areas where the meeting or event could be improved to enhance the usefulness or relevancy of similar events in the future?
 - b. The interaction among attendees. Was discussion open, was there active participation or engagement, communication friendly, visible comfort level, etc?
 - c. Did attendees express any frustrations, concerns, or challenges during the event?
 - d. Did attendees express any excitement or positive remarks during the event?
5. [For workshops, professional development activities, or similar events) Were participants asked to evaluate the event? What were the results? (If results are not immediately available, will we be able to obtain them later?)
6. Provide details on any additional pertinent information not already discussed above.
7. List any future meetings or events or any announcements made.

Attach a clean version of your notes, organized in the order of the meeting agenda or event schedule.

Be sure to collect any useful documents from the meeting or event that could potentially be included in the documentation review, e.g. flyers, agenda, sign-in sheet, etc.

APPENDIX B.2 INTERVIEW PROTOCOL

Instructions to site visitors: These interview guides are intended to serve as semi-structured agendas for your conversations with key respondents. You do not need to read the questions or probes word for word, and should adapt the wording to match the phrasing used by the respondent. Take notes on key terms or phrases used by the respondents that may be helpful in coding the interview data. Ask for clarification, spelling and definitions as needed. Familiarize yourself with the interview protocol in advance of your meeting with each participant. Skip questions that are not relevant given the current phase of implementation. Highlight the questions you will prioritize if the respondent's time is limited. Be respectful of the respondent's time and keep the interview to the agreed length of time. We can follow up by phone or email for more information as needed.

College Administrators and DBS Program Coordinators

(Program coordinators, college deans, and/or other administrators involved in DBS-related programming at participating colleges)

[Introduce yourselves]. We are meeting with you today to talk about your experiences with the TAACCCT Design It-Build It-Ship It program. Thank you for taking the time to speak with us.

Before we begin, we just want to reassure you that:

All of the information you share with us today will be kept confidential; your name will never be included in any reports and what you tell us will not be discussed with anyone outside of this interview or our research team. [Name/ "I"] will be taking some notes during the discussion. To ensure we accurately report what you have to say, we would like to record this session as well. No one except the research team will have access to this recording. We will keep the discussion under forty-five minutes.

May we audio-record our conversation? Only the research team will hear the recording.

[Turn on the audio recorder if the respondent has agreed to be recorded.]

Questions

We may have asked you some of these same questions last year. Today I'd like to discuss the DBS program at your college as it is being implemented now; and also discuss any changes that have taken place in the last year.

Note: ask questions about "changes" if relevant to the respondent. If they are new this year, ask in the present tense.

Introduction:

1. What is your role here at X college? What is your role with the DBS program? How long have you been involved with DBS?

2. [To your knowledge] have there been any significant changes to staffing or to the DBS program(s) since last year?

Goals:

3. What would you say are the goals of the Design it-Build it-Ship it initiative?
4. What is the main focus of your college at this stage of implementation of the DBS program?
5. Has this focus changed over the course of the grant?

Grant Management:

6. We understand that colleges have used the grant funds in different ways. What specifically has your college done with the grant funding?
7. Describe any budgetary issues that may be of concern as you approach the end of the grant period?
8. How will you use the no-cost extension period, if at all? [Will you serve more students, purchase equipment, etc.?)
9. What kind of guidance or communication do you receive from CCCCD about grant management? Is there additional guidance or technical assistance you could use from CCCCD?
10. What kind of other technical assistance or guidance do you receive around DBS?
11. Have you participated in activities led by: Career Ladders Project. Business U, others?
How have those been helpful? [Probe for the pathway maps and mapping activities. How have they used the maps? How have they been helpful?]
Any ways that PD or TA could be improved or more targeted to your needs?

Program Development:

12. Looking back on your college program(s) prior to the TAACCCT grant, how are the training programs at your campus different under DBS compared to what was in place before? [This may be repetitive but try to probe for any details not mentioned above]

Probes:

How did your college develop new or adapt previously existing curriculum?

Are there new certificates, new pathways, stackable credentials, more supports for students, etc?

New equipment?

Students:

13. How are students recruited into your programs? How are they targeted? Can you describe the enrollment process?
14. Do you have challenges with recruitment? What types of challenges?

15. What kind of follow up are you doing with students after they complete training, or leave the college?
 How is this follow up conducted, and how often?
 What type of information is collected?
 Is this follow up new to DBS or something you have been doing for some time? Have these methods changed since last year?
16. From your point of view, how prepared are graduates of the DBS program for the technical and professional expectations of the workplace (or to further their education to the next level)? Please explain.

Collaboration:

17. Who do you collaborate with outside your college? [Ask about other colleges, workforce organizations, employers, community organizations, universities, etc.]

What is the nature of these collaborations? How do you work together?
 Are any of these partnerships new? (started within the past year)?
 Have they been facilitated or initiated by the DBS grant? If so, how?

Successes:

18. What areas of the DBS program do you feel have been most successful?

Probes:

recruitment

assessment and placement of participants

curriculum

job placement

engaging employers

follow-up

Alignment/articulation with other colleges and universities

Data use and management capabilities

19. Can you cite any examples of system changes or other changes to service delivery that have resulted from the program?

Probes: Has there been greater collaboration between community college, workforce development and economic development systems, better articulating between departments, certificate programs and career pathways? Have there been improvements in serving the needs of industry or employers? Have there been changes in the utilization of new technologies or curriculum delivery methods?

Challenges:

20. Are there any other challenges we haven't discussed that you'd like to mention? [These are challenges the college is having. The next question is about areas of improvement for the DBS initiative].

21. Are there particular ways that you think the DBS initiative, overall, could be improved to better accomplish its goals? If so, how?

Sustainability:

22. How does your college plan to sustain grant-related efforts beyond the life of the grant?
What elements will remain and how will they be funded?
How will the relationships that have developed through the grant funded activities be maintained?

Suggestions/Other:

23. Is there anything else about your experience with the DBS program you would like to share?

Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Give business card].

College Staff (Instructors, Counselors, etc.)

[Introduce yourselves]. “We are meeting with you today to talk about your experiences with the TAACCCT Design It-Build It-Ship It program. Thank you for taking the time to speak with us.”

Before we begin, we just want to reassure you that: All of the information you share with us today will be kept confidential; your name will never be included in any reports and what you tell us will not be discussed with anyone outside of this interview or our research team. [Name/ “I”] will be taking some notes during the discussion. To ensure we accurately report what you have to say, we would like to record this session as well. No one except the research team will have access to this recording. We will keep the discussion under forty-five minutes.

May we audio-record our conversation? Only the research team will hear the recording.

[Turn on the audio recorder if the respondent has agreed to be recorded.]

Questions

We may have asked you some of these same questions last year. Today I’d like to discuss the DBS program at your college as it is being implemented now; and also discuss any changes that have taken place in the last year.

Note: ask questions about “changes” if relevant to the respondent. If they are new this year, ask in the present tense.

Introduction:

1. What is your role here at X college? What is your role with the DBS program? How long have you been involved with DBS?
2. [To your knowledge] have there been any significant changes to staffing or to the DBS program(s) since last year?

Goals:

3. What would you say are the goals of the Design it-Build it-Ship it initiative?
4. What is the main focus of your college at this stage of implementation of the DBS program?
Has this focus changed over the course of the grant?

Technical Assistance:

5. What kind of technical assistance, professional development or guidance have you received related to the DBS grant? Who has provided this TA or guidance?
Pathway and pathway map development [ask how they use the maps]
Sector-based strategies
Curriculum development support
Collaboration
Equipment/ materials

Probes: How satisfied are you with the technical assistance or guidance you've received?
What could be improved or addressed in better ways?

Program Development:

6. Looking back on your college program prior to the DBS grant, how are the training programs at your campus different under DBS compared to what was in place before?

Probe: How did your college develop new or adapt previously existing curriculum? Are there new certificates, stackable credentials, more supports for students etc?

Probe about pathways here, particularly when asking about stackable certificate.

Students:

7. What kind of follow up are you doing with students after they complete training, or leave the college?
How is this follow up conducted, and how often?
What type of information is collected?
8. From your perspective, how has the DBS grant program helped address the needs of students, compared with what was in place prior to the grant?
9. From your point of view, how prepared are graduates of the DBS program for the technical and professional expectations of the workplace (or to further their education to the next level)? Please explain.

Collaboration:

10. What kinds of opportunities has the grant provided you with to collaborate with staff in other departments, community colleges or partner organizations that you would not otherwise have had?

Has the nature of your collaboration with any of the above partners changed since last year?

Probe: How has the DBS grant influenced this collaboration?

11. From your perspective, how has the program addressed the needs of the workforce system and employers, compared with what was in place prior to the grant?

Successes:

12. What parts of the DBS program do you feel are most successful so far?

Possible areas of success might include: assessment and placement of participants, the curriculum, other services offered, job placement, engaging employers, follow-up, etc.

13. Can you cite any examples of system changes or other changes to service delivery that have resulted from the program?

Probes: Has there been greater collaboration between community college, workforce development and economic development systems, better articulating between departments, certificate programs and career pathways? Have there been improvements in serving the needs of industry or employers? Have there been changes in the utilization of new technologies or curriculum delivery methods?

Challenges:

14. Are there any other challenges we haven't discussed that you'd like to mention? [These are challenges the respondent or college is having. The next question is about areas of improvement for the DBS initiative].

15. Are there particular ways that you think the DBS initiative, overall, could be improved to better accomplish its goals? If so, how?

Sustainability:

16. To your knowledge, how does your college plan to sustain grant-related efforts beyond the life of the grant?
What elements will remain and how will they be funded?
How will the relationships that have developed through the grant funded activities be maintained?

Suggestions/Other:

17. Is there anything else about your experience with the DBS program you would like us to document?

Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Give business card].

APPENDIX B.3 PARTNER INTERVIEW PROTOCOL

Industry Partners, Employers, WIB Staff, One-Stop Staff etc.

[Introduce yourselves.] We are meeting with you today to talk about your experiences with the TAACCCT DBS program. Thank you for taking the time to speak with us.

Before we begin, we just want to reassure you that: All of the information you share with us today will be kept strictly *confidential*; your name will never be included in any reports and what you tell us will not be discussed with anyone, including with the administration or other program staff. *[Name]* will be taking notes during the discussion. To ensure we accurately report what is discussed during this focus group, we would like to record this session as well. No one except the research team will have access to this recording. We will keep the discussion under forty-five minutes.

May we audio-record our conversation?

[Turn on the audio recorder if the respondent has agreed to be recorded.]

Questions

1. Could you please describe your organization and your role within it?
2. How did you first hear about the TAACCCT grant/DBS program and how did you get involved?
3. *[If the respondent knows about DBS]* What do you see as the goals of the DBS initiative?
4. Please describe your involvement in the DBS program/consortium?
5. How do you work with CCs?
Do you participate in the East Bay Advanced Manufacturing Partnership/East Bay Transportation and Logistics Partnership/ Biotech marketplace? Do you participate in the East Bay Business Engagement Network?
6. What DBS-related events/ meetings have you attended this past year?
Are there other ways you share resources/ funding/ expertise?
7. From your perspective, has DBS improved the ability of community colleges in the East Bay to respond to employer and industry needs? How or why?

Probes:

[If yes], do you think community colleges will be able to respond well to employer and industry needs after the grant ends?

[If no], what could DBS leaders or partners have done differently to help community colleges be more responsive to employers and industry?

8. Has DBS improved collaboration among community colleges, public workforce agencies, economic development agencies or employers in the East Bay? How or why?

Probes:

[If yes], do you think these organizations will continue to collaborate after the grant ends. In what ways will they continue to collaborate?

[If no], what could DBS leaders or partners have done differently to help improve collaboration?

9. What would you say are the biggest accomplishments of the DBS grant since you've been involved?

Probes:

Preparing students for employment

Preparing students for transfer to four-year colleges

Increased collaboration across consortium members

Better communication/ information sharing

10. Based on your knowledge, is there work related to the grant that will continue after the grant is over? How? Who will carry the work forward?

11. Has DBS helped your organization or other stakeholders in the East Bay take advantage of other funding or initiatives related to job training or career pathways?

Probe: [If Yes,] How?

12. If you were to give the DBS leadership advice on how to improve the DBS program, what would you recommend? Are there any goals or barriers that you think could be better addressed by the program?

13. Is there anything else about your experience as a partner in the DBS consortium you would like us to document?

Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly.

APPENDIX B.4 FOCUS GROUP PROTOCOL

Instructions to site visitors: This focus group protocol is intended to serve as a semi-structured guide for your conversations with program participants. You do not need to read the questions or probes word for word, and may adapt the wording to match the phrasing used by the respondents. Take notes on key terms or phrases used by the respondents that may be helpful in coding the interview data. Ask for clarification and definitions as needed. Familiarize yourself with the protocol in advance of your meeting with each focus group. Skip questions that are not relevant given the current phase of implementation. Highlight the questions you will prioritize if time is limited. Be respectful of the participants' time and keep the session to the agreed length of time.

Program Participants

[Pass out and collect hard copies of student questionnaires. Store them in an envelope]

[Introduce yourself]. We are (I am) from a research group called IMPAQ in Oakland, and we are working with your college and 9 other colleges in the East Bay to evaluate some of the region's training programs. We are meeting with you today to talk about your experiences with the course or training program you're enrolled in, that is a part of a program called Design It-Build It-Ship It (DBS). Thank you all for taking the time to speak with us. [Ensure that they are familiar with DBS; confirm the course/program they are a part of]

Before we begin, we (or I) just want to reassure you that: All of the information you share with us today will be kept strictly confidential; your name will never be included in any reports and what you tell us will not be discussed with anyone, including instructors, administrators or any other college staff. Your participation in this focus group is completely voluntary. You don't have to participate and you don't have to answer any questions that you don't want to answer. There are no right or wrong answers; we are interested your experiences, and your experiences may be different from others in the group. [Name] will be taking notes during the discussion. To ensure we accurately report what is discussed during this focus group, we would like to record this session as well. No one except the research team will have access to this recording. We will keep the discussion to under an hour. In the interest of time, we may not ask each participant to answer a question or we may need to move onto the next question to ensure we cover all important topics.

May we audio-record our conversation?

[Turn on the audio recorder if all participants have agreed to be recorded.]

Questions

First, let's go around the room and have each of you tell us your first name and tell us what training program your are enrolled in.

1. How did you hear about the [DBS program²] and what was the enrollment process like?
2. How or why did you choose this program/class?
Was there another course/program you preferred?
What factors influenced your decision (time, space, wait-list, etc.)
3. Did you have to take any tests or complete any assessments before you started?
Were there any pre-requisites?
4. Describe your class/training program?
What are you learning?
How is the content delivered? (e.g., lecture, lab, hands-on, etc.)
Are there any online components?
How is technology used in your training?
5. What were your goals in enrolling in the [DBS program], and has the program helped you achieve those goals?
[Take note of these goals for reference under question #10.]
6. What kind of additional support or services have you received from the college?

Probes:

Counseling

Math skills improvement

English skills improvement

Job placement

Follow-up

Other

7. Tell me about the staff and faculty for the [DBS program] (e.g. instructors, counselors, and administrative staff). How have they helped you get the services you need? Please explain.
8. What you believe was the most helpful aspects of the [DBS program]?
9. What kinds of challenges have you or others you know faced in participating in or completing the program?
Problems with the scheduling of courses?
Any financial or personal issues that have made it hard to attend/finish your program?
If so, how has the college staff helped you overcome these challenges?

² Use the name for the DBS program that the respondents are most familiar with. Tailor all your questions to fit the terminology the participants use to refer to the program and their area of study.

10. Were there any aspects of the [DBS program] that were not useful or helpful to you? Or could be more helpful?
11. Are there any services that you needed but are not currently offered through the [DBS program]?
12. How well do you feel this program is preparing you for your goal?
Probes:
[Refer back to the goals mentioned in response to question #4]
13. What is your employment situation now?

(For those that obtained employment)
How long did the job search take?
Is your job related to your course of study in the DBS program?
Is the job is full/part-time or permanent/temporary or seasonal?
Are you satisfied with the pay?
14. (For those that have not obtained employment) Where do you hope to work and what do you hope to do there? Tell us about your (planned) job search.
Has the [DBS program] staff helped you find a job in your field of study?
Have you met with potential employers as part of the program?
What do you see as the major barriers to employment for you at this time?
15. What advice would you give someone like you who is considering enrolling in the [DBS program]?
16. What advice would you give other colleges that are developing programs similar to the [DBS program]?

What should other programs do similarly?
What should they do differently?
17. Is there anything else about your experience in the [DBS program] that you would like us to document?

Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Offer business cards to participants]

APPENDIX B.5 BASIC SKILLS SURVEY

We would like to collect information about courses offered at your college as part of the Design it-Build it-Ship it (DBS) program. Please see the pre-populated list of courses below. For each course, please provide information about how your college addressed students' needs for contextualized basic math and/or English courses. If students had a need for remedial or basic English or math before (or during) enrollment in a DBS course, how did you address this? Please choose from the options below and provide a brief explanation.

- 1) [DBS Course #1] How were basic/remedial/contextualized math and/or English skills addressed?

[Response codes 1 – 6]:

1. Not addressed or not applicable. [include open ended text box asking respondent to explain, e.g. "Explain:" Example of explanation "All students had the requisite math knowledge and skills before enrolling in the Biotech 50A course."]
2. Referred students to existing basic English and/or math course at college [include open ended text box asking respondent to "Describe. How did you refer students? Who got referred and why?"]
3. Basic math/English skills were integrated into the course
4. Added a module, bootcamp, or another supplemental "course" for students to take before or during the course. This is not necessarily a registered course taken for credit, but just for supplemental education [insert open ended text box asking respondent to "Describe. Is it required? How are students referred or placed?"]
5. As a result of DBS, the college created a contextualized basic math/ English course to address this specific need [insert text box "Describe the course created, how many units, etc."]
6. As a result of DBS, the college is in the process of creating a contextualized basic math/ English course. [insert text box "Describe. What type of course is being created? What is the current status?"]
7. Other [Please describe]

Example of output:

College	DBS Course	Response Code	Brief Explanation
XYZ College	Biotech 35B	4	1 week/ 8 hour basic math refresher course offered to students who enrolled by choice, before Biotech course began. No credits earned.

APPENDIX B.6 COLLABORATION (SNA) QUESTIONNAIRE

IMPAQ International, a research firm in Oakland, California, is evaluating the implementation of Design It-Build It-Ship It (DBS), a regional workforce initiative funded by a Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant. The goal of DBS is to improve the career pathway system in the East Bay. DBS targets three prominent East Bay industries:

- Advanced Manufacturing
- Biosciences
- Transportation and Logistics

Because regional collaboration is an important part of DBS, we are asking individuals across the region to complete this Collaboration Questionnaire. Your responses are very important to helping us understand how DBS is implemented.

The questionnaire should take about 15-20 minutes to complete. In the first part, we ask about your current job. Next, we ask you to name up to 10 people outside of your organization with whom you collaborate on DBS-related activities. Lastly, we ask specific questions about your collaboration with these individuals.

Your responses will be kept confidential and will not be shared with your colleagues, supervisors, or people you name in the questionnaire. People you name may be contacted and asked to complete a questionnaire, but they will not know that you named them or what you reported about them. If you would like to discuss the evaluation, this questionnaire, or your rights as a participant in this evaluation, please contact the Project Director, Nada Rayyes, at 510.597.2422 or NRayyes@impaqint.com.

Completing the questionnaire is voluntary. You may stop taking the questionnaire at any time. However, to accurately understand DBS, it is important that we hear from as many people as possible.

Thank you for your contribution to this important study!

Section I: Your Information

1. What is your name?
2. What organization do you work for? (If you work for more than one organization, please list the one most relevant to the DBS/TAACCCT grant).
3. What is your title/position at your organization?

Section II: Frequent Contacts

Please name up to 10 individuals outside your organization or agency with whom you collaborate most frequently about DBS. If you collaborate with more than 10 individuals, please list the people with whom you have the most frequent contact. If you collaborate with fewer than 10 individuals, please list everyone with whom you collaborate, even if your contact with them is infrequent.

4. Frequent Contacts

	First Name	Last Name
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

I do not collaborate with anyone outside my organization about DBS

Section III: Person 1-10 Information

Please answer the following questions for up to 10 contacts.

5. What is [Person 1] 's Organization
6. How often do you collaborate with [Person 1]?

	Number of times per...
Day	
Week	
Month	
Year	

7. Is your collaboration with [Person 1] related to any of the following industry clusters?

Please choose **all** that apply:

- Advanced Manufacturing
- Biosciences
- Transportation and Logistics
- Not sure
- None of these

8. In which of the following areas do you collaborate with [Person 1]?

Please choose **all** that apply:

- Recruitment, referral or placement of job-seekers/students into community college training programs
- Implementing training/career pathway programs at community colleges (e.g., develop curriculum, teach students, participate in course & program approval process)
- Facilitating collaboration among organizations and partners to support workforce and economic development in the East Bay (e.g., convene meetings or work groups)
- Business engagement (e.g., industry cluster partnerships)
- Job placement or hiring of DBS participants (college students)
- Improving data capacity or use of data
- Planning and implementing technical assistance or professional development
- Other (please specify):

9. Did you collaborate with [Person 1] before your involvement in the DBS Consortium?

Please choose only one of the following:

- Yes
- No
- Not Sure

10. Do you expect to continue collaborating with [Person 1] after the DBS grant ends?

Please choose the appropriate response for each item:

	Extremely Unlikely	Unlikely	Neutral	Likely	Very Likely
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX C. OUTCOMES STUDY DATA SOURCES

The outcomes study analyzed data from the following sources:

- Official student lists provided by colleges
- Survey data (baseline, 3-month follow-up, and 12-month follow-up surveys)
- Administrative data from the California Community Colleges Chancellor's Office (CCCCO)
- EDD UI wage data

The official student lists were provided by colleges and included information about students' intended pathway pursued (i.e., major), DBS status, and course cluster. This is an exhaustive list sorted by preference of program pathways students are pursuing. If a student decided not to pursue a program, the list was not updated, but if a student decided to pursue an additional program, that program was added to the list. The main criteria for inclusion on the official list were (1) enrollment in a DBS or comparison course verified either by college coordinators or by contact information sheets filled by students at time of baseline survey completion and (2) availability of the baseline survey. The official list was different from the list of students the team followed up with because the official list had to be verified by colleges and the Contra Costa Community College District. There were 3,837 students (2,516 DBS, 1,321 comparison) in the evaluation study sample.

The survey data included variables such as students' educational background, employment status and income, benefits received, and current goals. Three-month and 12-month follow-up surveys asked students about their education status, employment status, and income. Community college staff collected baseline surveys, and Scantron forms were scanned in by the district. At some survey administrations, a team member was present during baseline survey collection to ensure that the forms were filled in correctly. Three-month and 12-month follow-up surveys were conducted via online survey for students for whom we had email addresses and phone numbers. The team followed up with students through email reminders and phone calls to encourage responses. Local college student ID was the identifying key for these surveys. It is important to note that there were more baseline surveys than what is analyzed in the analytic sample. Although the criterion to be included on the official student list was the availability of a baseline survey, 76 students did not have baseline surveys. It is likely that errors from either bubbling the Scantron form or scanning caused some baseline surveys to end up having blank IDs.

Additional baseline surveys were collected from students who ended up dropping the course or for other reasons did not complete the course. In addition, because the verification of the baseline surveys occurred later than at follow-up, the team collected more outcomes surveys than in the analytic sample. In total, the team collected 1,128 surveys at the 3-month follow-up survey and 1,189 at the 12-month follow-up survey. For the analytic sample, the team analyzed 928 surveys at the 3-month follow-up surveys and 986 at the 12-month follow-up surveys

(response rates of 28.9% and 30.7% respectively). Response rates ranged from 20.1% to 49.0% except for the pilot administration of Follow-up Survey 1 for the Fall 2013 cohort. Survey invitations were only sent to a select number of schools, and the response rate was only 3.5%. See Appendices F.1-F.3 for the baseline and two follow-up student surveys.

California Community College Chancellor's Office administrative data included three different types of data: student demographics, student enrollment, and awards (degrees/certificates). The CCCCO MIS Database returned elements the team was looking for in multiple tables with different unique keys, and the RP Group helped produce three intermediate files for easier processing. Student demographics include variables such as age, race, receipt of financial aid, and transfer date and institution (if applicable). Student enrollment data tracked student course history and grades received for each student from Fall 2009 to Fall 2015. The data could be reshaped to the total number of completed courses and total units earned for each term the student was enrolled. The data also provided information on whether the course taken was classified as basic skills or occupational. Taxonomy of Program (TOP) codes and program codes provided information on the types of courses that the students took in each term.³ From these data, we could determine whether the degree or certificate received by the student matched the pathway they were intending to pursue (i.e., their major). Last, for program award data, we have information about the types of awards received by the student, such as degrees and certificates, in any term from Fall 2009 to Fall 2015. TOP codes and program codes were provided for each type of award. Although we submitted the official student list to the Chancellor's Office, not all students matched to enrollment records within the CCCCO MIS Database. Of the 3,837 students in the evaluation study sample, only 3,268 records (2,059 DBS; 1,209 comparison) were returned from CCCCO.

The team requested **employment and wage indicators data** from the California Employment Development Department (EDD). EDD collects earnings data on UI-covered employees from employers on a quarterly basis, in compliance with the Federal Unemployment Tax Act. Even though the UI data do not cover all working individuals (e.g., self-employment and certain agricultural and domestic work are not covered), the majority of employed individuals are included in the database. There is an lag of more than six months in the release of quarterly data. The EDD currently does not release individual-level UI data for research purposes, but provides aggregated data for a study sample for a qualified research purpose.

The evaluation team, through the DBS consortium of community colleges led by the Contra Costa Community College District (4CD), requested and obtained EDD-derived aggregated indicators (mean quarterly earnings and numbers/percent employed). The team obtained quarterly data aggregated by treatment status, cluster corresponding to DBS course taken, and college. The data

³ A list of TOP codes can be found at http://extranet.cccco.edu/Portals/1/AA/Credit/2013Files/TOPmanual6_2009_09corrected_12.5.13.pdf. The codes provide a taxonomy of programs that is standardized across all colleges. Program codes are local to each college.

returned included percentage of students employed, gainful employment (flagging students with quarterly wages from employers being at least \$5,000 and at least \$15,000), average quarterly earnings out of all students, and average quarterly earnings out of employed students (where employment is defined as having quarterly earnings of at least \$100). The team requested an additional set of employment based on select four-quarter periods, including the number of quarters employed over four quarters following students' enrollment in the program. These indicators are also aggregated by cohort and treatment status

The evaluation team asked EDD to match its data from 2013 Q2 to 2015 Q4 for a list of students who were on the study sample and had Social Security numbers on record. This allowed for at least three cohorts (Fall 2013, Spring 2014, and Fall 2014) of students to be matched from two quarters before the enrollment quarter through four quarters after the enrollment quarter; for two cohorts (Fall 2013 and Spring 2014) of students to be matched through six quarters after the enrollment quarter; and for one cohort (Fall 2013) of students matched through eight quarters after the enrollment quarter.

Duplicates—Scenarios in Which Students Take More Than One DBS and/or Comparison Course

It is possible that students took more than one course that was DBS or comparison during the course of the study, but each student was classified under only one treatment status for the study. To de-duplicate records, the team analyzed the sample and decided to use these decision rules:

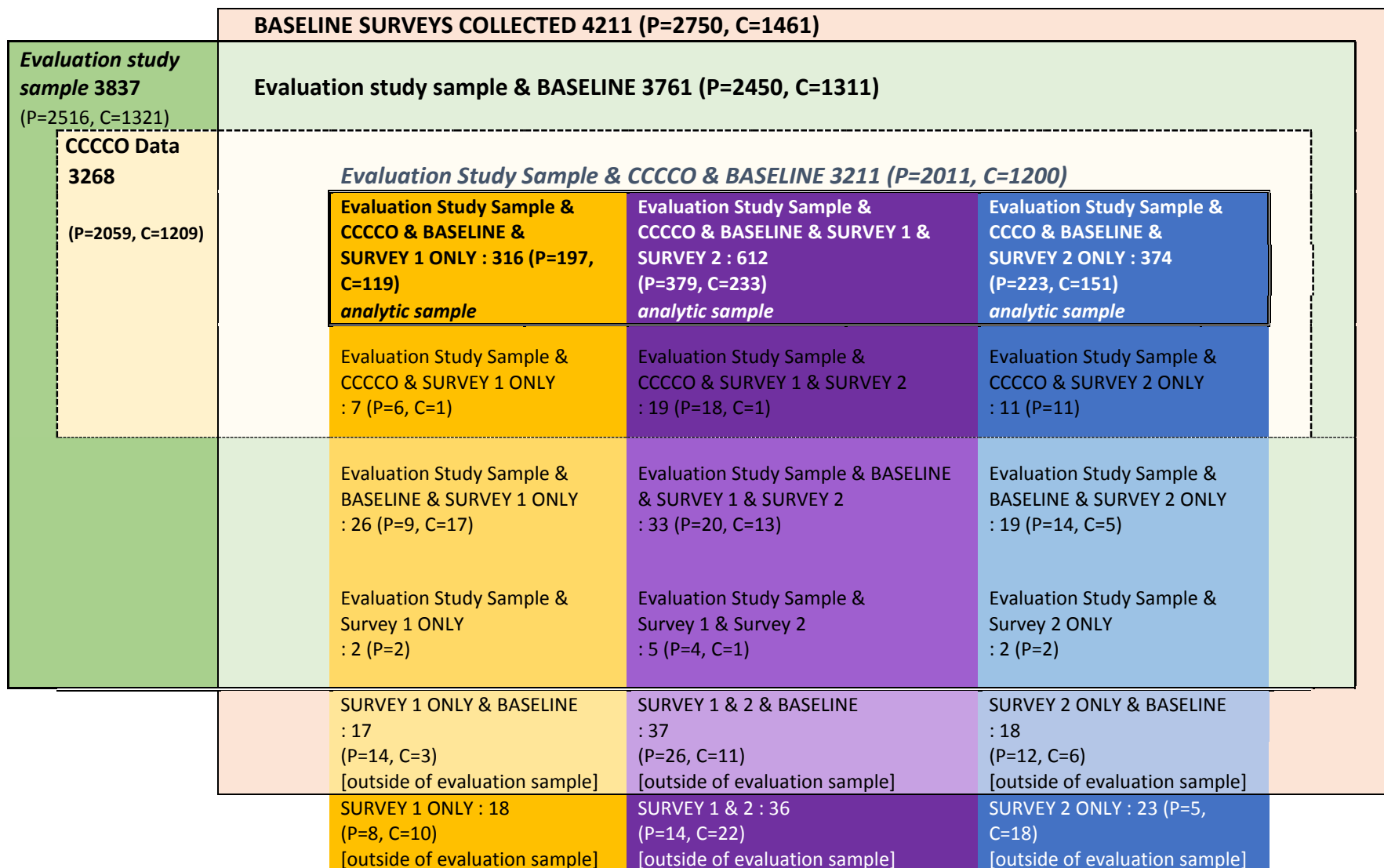
- More than one DBS course: student classified under the first DBS course taken
- More than one comparison course: student classified under first comparison course taken
- One DBS and one comparison course: student classified under DBS course
- Multiple DBS courses and comparison courses: student classified under first DBS course taken

However, there are certain exceptions to these rules. If the student already turned in a follow-up survey for an earlier course taken but did not complete a follow-up survey based on a later course, the student remained classified under the course for which data was received. For example, if a student took a comparison course in Fall 2013 and completed a second follow-up survey by Spring 2015, but later took a DBS course in Spring 2015 and did not complete any follow-up surveys, the student was still classified as comparison.

Data Sample Attrition and Sample Overlaps

Because of the number of datasets merged together, not all students were found in all datasets. Below is a diagram that shows numbers of surveys and data received, and numbers in the analytic sample. As shown in Exhibit C.1, there are 1,302 observations (799 DBS, 503 comparison) that have data from baseline and at least one outcomes survey and CCCCCO data, and are in the evaluation study sample.

Exhibit C.1 Venn Diagram of Overlap Between Data Sources



APPENDIX D. DBS AND COMPARISON PROGRAMS

Exhibit D.1 DBS Programs by College and Term

College	Program	Sector	F13	SP14	SU14	F14	SP15	SU15	F15
Berkeley City College	Computer Information Systems	Other		X		X	X		
	Biotechnology	Bio		X		X	X	X ⁶	
	Analytic Chemistry	Bio		X		X	X		
Contra Costa College	FLOW ¹	Transport	X	X		X	X	X	X ⁶
	Bridge to Biotechnology	Bio		X		X	X		X ⁶
Chabot College	Electrical Technology	Man	X						
	Welding	Man	X	X		X	X ⁴		
	Automotive Technology	Man	X	X			X ⁵		X ⁶
	Project Management	Man	X			X	X ⁶		X ⁶
	Machine Technology	Man		X					
	Engineering	Man		X		X	X		X ⁶
College of Alameda	Green Diesel	Transport	X	X		X	X ⁷		
	Transportation Distribution Logistics	Transport	X	X		X			
	Warehouse Operations & Forklift	Transport	X	X		X	X		
Diablo Valley College	Mechanical Technology	Man	X	X		X	X		X ⁶
	Architectural Design	Man	X						
	Pre-apprenticeship	Man	X	X		X ³	X		
Laney College	Biomanufacturing	Bio	X	X		X	X		X
	Machine Technology	Man	X	X		X	X		X
	Industrial Maintenance Machining	Man	X			X			X ⁶
Las Positas College	Engineering Technology	Man					X		X ⁶
Los Medanos College	Electrical Technology	Man	X	X		X	X		X ⁶
	Process Technology	Man	X	X		X	X		X ⁶
	Welding Technology	Man	X	X		X	X		X ⁶
Merritt College	Histotech	Bio	X				X		
	Homeland Security	Transport	X ²			X	X		
Ohlone College	Biotechnology	Bio	X	X		X	X		X
Solano Community College	Biotechnology	Bio		X	X		X	X	
	Water & Wastewater Treatment	Bio		X			X		X ⁶

Notes:

1 FLOW- Forklift, Logistics, Operations, and Warehousing

2 F13 Homeland Security surveys were lost

3 College provided information that this course was offered in Fall 2014, but we only received data from one student.

4 Only have data from one student in this course in S15; this course is not listed in college information sent from 4CD for S15

5 Only have data from one student in this course in S15

6 Course listed in information provided by college, but we have no data from students in this semester

7 IMPAQ has contact information from Green Diesel students this semester, but 4CD records and data do not show occurrence of this program

Exhibit D.2 Comparison Courses by College and Term

College	Program	Sector	S13	F13	S14	SU14	F14	S15	SU15	F15
Berkeley City College	Multimedia Arts	Other			X		X	X		
Contra Costa College	Automotive Hybrid Technician	Man	X	X	X ¹		X	X		
	Nursing	Bio	X					X		
Chabot College	Electrical Technology	Man		X						
	Welding	Man		X	X		X			
	Automotive Technology	Man		X	X			X ¹		X ³
	Project Management	Man		X			X	X ²		X ³
	Machine Technology	Man			X					
	Engineering	Man			X		X	X		X ³
College of Alameda	Automotive Technology	Transport		X				X		
	Diesel Mechanics	Transport		X						
	Aviation Maintenance Tech	Transport			X					
	Dental Assisting	Bio			X			X		
Diablo Valley College	Computer Science	Other		X		X				
	Architecture Technology	Other		X			X	X		
Laney College	Environmental Control Technician (ECT)	Man		X	X		X	X		
	Welding Technology	Man		X	X		X	X		
Las Positas College	Welding Technology	Man						X		
Los Medanos College	Automotive Technology			X	X		X	X		
Merritt College	Biology	Bio		X			X			
	Administration of Justice	Other		X			X	X		
Ohlone College	Respiratory Therapy	Bio		X			X			
Solano Community College	Water & Wastewater	Bio			X			X		
	Biotechnology	Bio						X		

Notes:

1 Course listed in information provided by college, but we have no data or contact information from students in this semester

2 Course in IMPAQ's and 4CD's records, but not in data.

3 Course listed in information provided by college, but we have no data from students in this semester

APPENDIX E. OUTCOMES STUDY METHODS AND RESULTS

Guided by the outcomes focused research questions presented in the report, we investigated the potential effects of the DBS programs on post-program employment and academic outcomes by comparing their outcomes to those who were enrolled in similar CTE courses. This appendix provides a summary of the analytic approaches used in analyses discussed in this report and provides a summary of selected findings from our analyses.

Estimation Models

The evaluation team employed regression analysis to examine effects of the DBS program on student educational and employment outcomes constructed from student surveys and CCCC MIS data. Outcomes based on study surveys were estimated at 3 months and 12 months after the initial participation in the program (“baseline”). Outcomes based on the CCCC MIS data were estimated at the first to fourth semesters (2 years) after the baseline. The treatment effects were estimated by comparing the outcomes between the DBS program participants and the comparison group for a given follow-up period, controlling for a set of baseline covariates.

On the calendar time, the baseline for students ranged from Spring 2013 to Fall 2015. The evaluation team collected follow-up survey data from students with the baselines of Fall 2013, Spring 2014, Fall 2014, and Spring 2015, and the 3-month and 12-month follow-up analyses included mainly survey respondents from these four periods. The evaluation team obtained the CCCC MIS data covering the study period through Spring 2016, which allowed the investigation of outcomes over a longer follow-up period than surveys. The outcome analysis sample using CCCC MIS data was restricted to those who took the DBS or comparison courses in Fall 2013, Spring 2014, or Fall 2014, to keep the sample largely consistent across the longer follow-up periods up to four semesters (2 years) after the baseline.

For each follow-up period (3 months and 12 months after the baseline for surveys, or 1 to 4 semesters after the baseline for the CCCC MIS data), the regression model is specified as follows:

$$y_{ict} = \alpha + \gamma T_i + X_i \beta + \delta_c + \theta_t + \varepsilon_{ict} \quad (\text{Eq. 1})$$

where y_{ict} is the outcome for student i in college c of cohort t , α is a constant intercept, T_i is the treatment indicator equal to 1 for DBS program participants and 0 for the comparison group, X_i is the vector of student baseline covariates (or a parsimonious subset), δ_c captures the college fixed effects, θ_t captures the cohort effects, and ε_{ict} is the error term (which captures unobservable individual characteristics of student i). We controlled for the college and cohort effects in all models to control for the variation between colleges and the time periods. The effect of the DBS program is measured by γ , which is the estimated difference in the values of outcome measure between the DBS and comparison groups, holding all baseline covariates (X_i) equal.

The DBS program might have different impacts for different priority sectors. In addition, we estimated an alternative model with a set of sector-specific treatment indicators to explore potential differential effects across the priority sectors (Advanced Manufacturing, Transportation and Logistics, or Biosciences). This alternative model is specified as follows:

$$y_{ict} = \alpha + \gamma_1 T_{1i} + \gamma_2 T_{2i} + \gamma_3 T_{3i} + X_i \beta + \delta_c + \theta_t + \varepsilon_{ict} \quad (\text{Eq. 2})$$

where T_{1i} is the treatment indicator for sector 1 (Advanced Manufacturing) equal to 1 for DBS students in sector 1, and 0 for all other DBS and comparison students; T_{2i} is the treatment indicator for sector 2 (Transportation and Logistics); and T_{3i} is for sector 3 (Biosciences/Biotechnology). The coefficient of each of the three indicators ($\gamma_1, \gamma_2, \gamma_3$) indicates the difference in the outcome measures between DBS students in the relevant priority sector and students in the comparison group.

To check for the robustness of the estimation results, we estimated the model under a variety of alternative model specifications, including alternative assumptions about θ_t (treating it as either fixed or random), alternative sets of baseline covariates, and alternative treatment of missing covariates (applying either the casewise deletion or dummy variable adjustment method).

For numeric (continuous values) outcomes (e.g., wages), we used linear regression. For binary outcomes (e.g., having a paid job), we employed logit regression: the estimates of DBS program effects for binary outcomes were reported in terms of the marginal probability of obtaining the relevant outcome (i.e., the differences in the predicted probability of obtaining the outcome between the DBS and comparison groups constitute the estimates of the program effects).

Outcome Measures

For outcome measures constructed from the follow-up surveys, we included employment and education indicators at both the 3-month and 12-month follow-ups. The two primary employment measures are indicators for having a paid job and holding a job closely related to the DBS coursework. In addition, we examined additional employment outcome measures, including holding a permanent job, working at least 30 hours per week, having a promotion, having a wage increase, and finding a new job. All the employment measures are binary (0 = no; 1 = yes). The first four measures are available for both the 3-month evaluation and 12-month evaluation, and rest are available only for the 12-month evaluation. We also included the logarithm of the hourly wage as outcome measure for those who reported earnings. The educational outcomes from the follow-up surveys include survey responses of transferring to a 4-year college, obtaining/renewing certificates, and obtaining an AA degree or any degree above AA. The first two measures are available for both the 3-month evaluation and 12-month evaluations, and the last one is available only at the 12-month follow-up.

For outcome measures constructed from the CCCC MIS data, we included education indicators from the first to fourth semester after the baseline. They included binary indicators for being enrolled in community colleges, having transferred since the baseline, and having received a certificate or degree. A summary of outcome measures (unadjusted means and standard deviations) are provided in Exhibit E.1

Covariates

For covariates (X_i), we included baseline outcome measures (or their proxies)⁴ and considered a variety of student characteristics, including age, gender, race, education level, number of dependents, veteran status, disability status, receipt of public aid, income level, previous enrollment history (number of enrollments before the program), total units earned before the program, and employment status.. We tested different model specifications with different sets of covariates, and the results are largely similar across the choices of covariates. We report here results based on two covariate specifications: the basic model controlling for only the college and cohort effects, and the model controlling for additional baseline covariates as well as the baseline value of the relevant outcome measures (when available). Exhibits E.2–E.4 provide baseline comparisons of covariates for analytic samples.⁵

Estimated Effects

The results from the regression estimation of DBS effects are summarized in Exhibits E.5–E.8.

⁴ Baseline outcome measures include: employment status for the employment outcome estimation; wage levels for the wage estimation; and education levels and previous college enrollment/unit indicators for the education outcome estimator. Some baseline outcome measures were also used as covariates in other estimation models (e.g., the baseline employment status was included as a covariate in the estimation of post-program enrollment).

⁵ The exact estimation sample varied slightly by the outcome. We instead provide comparisons for the 3-month survey respondents (for outcome measures from the 3-month survey), 12-month survey respondents (for outcome measures from the 12-month survey), and students with non-missing CCCC MIS data (for outcome measures from the CCCC data).

Exhibit E.1 Summary of Outcome Measures

	# of months/ semesters after baseline	DBS			Comparison		
		Mean	SD	N	Mean	SD	N
Based on Follow-Up Surveys							
Primary employment outcome indicators							
Have a paid job (1=yes, 0=no)	3 months	0.63	0.48	617	0.60	0.49	380
	12 months	0.70	0.46	659	0.66	0.47	399
Have a job closely related to the course taken (1=yes, 0=no)	3 months	0.29	0.45	617	0.30	0.46	380
	12 months	0.38	0.49	659	0.31	0.46	399
Secondary outcome indicators							
Have a permanent job (1=yes, 0=no)	3 months	0.67	0.47	319	0.66	0.48	188
	12 months	0.68	0.47	425	0.62	0.49	253
Working at least 30 hours per week (1=yes, 0=no)	3 months	0.30	0.46	599	0.33	0.47	371
	12 months	0.33	0.47	651	0.35	0.48	395
Estimated hourly wage (in dollars)	3 months	26.63	39.22	330	24.56	42.96	191
	12 months	35.48	58.63	144	30.12	43.15	106
Received wage increase since baseline (1=yes, 0=no)	3 months	0.07	0.26	589	0.11	0.31	359
	12 months	0.29	0.45	463	0.28	0.45	294
Got promoted since baseline (1=yes, 0=no)	3 months	0.04	0.19	589	0.04	0.21	359
	12 months	0.12	0.32	463	0.10	0.30	294
Have received or renewed a certificate since baseline (1=yes, 0=no)	3 months	0.18	0.38	611	0.14	0.35	373
Have AA or higher degree (1=yes, 0=no)	12 months	0.38	0.49	663	0.37	0.48	401
Based on CCCCO MIS data							
Primary education outcome indicators							
Enrolled in community college (CC) (1=yes, 0=no)	1 semester	0.55	0.50	1419	0.68	0.47	910
	2 semesters	0.42	0.49	1419	0.50	0.50	910
	3 semesters	0.33	0.47	965	0.40	0.49	628
	4 semesters	0.20	0.40	506	0.22	0.42	326
Have attained any certificate or 2-year college degree since baseline (1=yes, 0=no)	1 semester	0.09	0.29	1419	0.14	0.35	910
	2 semesters	0.12	0.33	1419	0.17	0.37	910
	3 semesters	0.14	0.35	965	0.25	0.43	628
	4 semesters	0.15	0.36	506	0.29	0.46	326

	# of months/ semesters after baseline	DBS			Comparison		
		Mean	SD	N	Mean	SD	N
Secondary outcome indicators							
Have transferred to a 4-year college since baseline (1=yes, 0=no)	1 semester	0.01	0.10	1419	0.03	0.18	910
	2 semesters	0.03	0.18	1419	0.07	0.25	910
	3 semesters	0.03	0.17	965	0.11	0.31	628
	4 semesters	0.02	0.15	506	0.12	0.33	326
Have earned CC units since baseline (1=yes, 0=no)	1 semester	0.54	0.50	1419	0.66	0.47	910
	2 semesters	0.58	0.49	1419	0.71	0.46	910
	3 semesters	0.59	0.49	965	0.73	0.45	628
	4 semesters	0.61	0.49	506	0.78	0.42	326
Have taken occupational class since baseline (1=yes, 0=no)	1 semester	0.43	0.50	1419	0.60	0.49	910
	2 semesters	0.48	0.50	1419	0.66	0.47	910
	3 semesters	0.52	0.50	965	0.70	0.46	628
	4 semesters	0.56	0.50	506	0.77	0.42	326
Have taken basic education class since baseline (1=yes, 0=no)	1 semester	0.03	0.18	1419	0.03	0.18	910
	2 semesters	0.05	0.21	1419	0.04	0.21	910
	3 semesters	0.07	0.25	965	0.06	0.24	628
	4 semesters	0.09	0.28	506	0.08	0.27	326
Have completed a course in engineering/industrial technology since baseline (1=yes, 0=no)	1 semester	0.28	0.45	1419	0.32	0.47	910
	2 semesters	0.31	0.46	1419	0.35	0.48	910
	3 semesters	0.35	0.48	965	0.36	0.48	628
	4 semesters	0.39	0.49	506	0.47	0.50	326
Have completed a course in bioscience since baseline (1=yes, 0=no)	1 semester	0.12	0.32	1419	0.02	0.14	910
	2 semesters	0.14	0.35	1419	0.04	0.20	910
	3 semesters	0.16	0.36	965	0.05	0.22	628
	4 semesters	0.15	0.36	506	0.06	0.25	326
Have completed a course in IT since baseline (1=yes, 0=no)	1 semester	0.04	0.20	1419	0.08	0.28	910
	2 semesters	0.06	0.23	1419	0.11	0.31	910
	3 semesters	0.04	0.20	965	0.15	0.36	628
	4 semesters	0.05	0.21	506	0.14	0.35	326

Sources: IMPAQ calculations based on 3-month and 12-month follow-up surveys and CCCCO MIS data.

Exhibit E.2: Baseline Equivalence for Analytic Sample for 3-Month Follow-Up Outcomes

Outcome	DBS			Comparison			Adjusted Difference	p-value	Adjusted effect size	Included in Reported Model
	Unadjusted Mean	SD	N	Unadjusted Mean	SD	N				
Employed	0.53	0.50	578	0.53	0.50	359	-0.01	0.87	-0.01	X
Hourly wages of \$25 or higher	0.12	0.33	519	0.15	0.36	279	-0.03	0.23	-0.15	X ^(a)
Hourly wages of \$15-\$25	0.25	0.43	519	0.23	0.42	279	0.02	0.51	0.07	X ^(a)
Hourly wages of \$10-\$15	0.39	0.49	519	0.35	0.48	279	0.04	0.32	0.09	
Hourly wage of \$10 or less	0.24	0.43	519	0.27	0.44	279	-0.03	0.43	-0.08	
Annual household income ≤ 25K	0.45	0.50	574	0.48	0.50	360	-0.03	0.39	-0.07	
Annual household income ≤ 10K	0.22	0.42	574	0.23	0.42	360	-0.01	0.79	-0.03	
Receipt of public aid	0.11	0.31	635	0.08	0.27	385	0.03	0.13	0.21	X
Disabled	0.06	0.23	600	0.08	0.28	354	-0.03	0.10	-0.26	X
Veteran	0.11	0.32	628	0.10	0.30	382	0.01	0.49	0.09	X
Married	0.23	0.42	581	0.15	0.36	370	0.08	0.00	0.31	X
White	0.33	0.47	600	0.35	0.48	354	-0.02	0.60	-0.05	
Hispanic	0.22	0.41	600	0.24	0.43	354	-0.02	0.41	-0.08	X
Asian	0.27	0.44	600	0.18	0.39	354	0.09	0.00	0.30	X
African American	0.10	0.30	600	0.08	0.27	354	0.03	0.17	0.20	X
Female	0.36	0.48	586	0.37	0.48	342	-0.01	0.84	-0.02	X
Have college degree (AA/AS or higher)	0.30	0.46	601	0.27	0.44	378	0.03	0.37	0.08	X
Current Goal: Transfer to 4-Yr College	0.36	0.48	635	0.41	0.49	385	-0.05	0.11	-0.13	X
Current Goal: Find a Better Job	0.50	0.50	635	0.35	0.48	385	0.14	0.00	0.36	X
Current Goal: Get a certificate/degree	0.54	0.50	635	0.46	0.50	385	0.07	0.03	0.17	X
# units earned prior to baseline	21.2	19.2	600	25.5	20.6	354	-4.69	0.00	-0.24	X
# semesters enrolled prior to baseline	2.7	2.1	600	3.3	2.3	354	-0.66	0.00	-0.30	
# of dependents	0.6	1.1	579	0.5	1.1	360	0.07	0.38	0.06	X
Age	29.3	11.6	600	29.7	12.4	354	-0.26	0.74	-0.02	X

(a) Included in wage estimation models only.

Source: IMPAQ calculations based on the 3-month follow-up survey.

Notes: Adjusted mean differences are based on regression models used in the outcome estimation, controlling only for random cohort effects. P-values are for regression adjusted mean differences. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables.

Exhibit E.3 Baseline Equivalence for Analytic Sample for 12-Month Follow-Up Outcomes

Outcome	DBS			Comparison			Adjusted Difference	p-value	Adjusted effect size	Included in Reported Model
	Unadjusted Mean	SD	N	Unadjusted Mean	SD	N				
Employed	0.54	0.50	597	0.52	0.50	383	0.03	0.431	0.06	X
Hourly wages of \$25 or higher	0.14	0.34	546	0.12	0.33	305	0.01	0.705	0.05	X ^(a)
Hourly wages of \$15-\$25	0.26	0.44	546	0.24	0.43	305	0.02	0.615	0.05	X ^(a)
Hourly wages of \$10-\$15	0.38	0.49	546	0.38	0.49	305	0.00	0.958	0.00	
Hourly wage of \$10 or less	0.22	0.42	546	0.25	0.43	305	-0.02	0.552	-0.06	
Annual household income ≤ 25K	0.46	0.50	607	0.45	0.50	379	0.01	0.743	0.03	
Annual household income ≤ 10K	0.22	0.42	607	0.22	0.42	379	0.00	0.945	-0.01	
Receipt of public aid	0.11	0.31	671	0.07	0.25	404	0.04	0.032	0.30	X
Disabled	0.06	0.25	631	0.08	0.28	385	-0.02	0.292	-0.16	X
Veteran	0.12	0.32	664	0.08	0.28	401	0.03	0.077	0.23	X
Married	0.22	0.42	597	0.16	0.36	390	0.06	0.013	0.26	X
White	0.33	0.47	631	0.35	0.48	385	-0.01	0.631	-0.04	
Hispanic	0.21	0.40	631	0.25	0.43	385	-0.05	0.077	-0.16	X
Asian	0.26	0.44	631	0.19	0.39	385	0.07	0.014	0.24	X
African American	0.10	0.30	631	0.07	0.26	385	0.03	0.115	0.23	X
Female	0.32	0.47	613	0.35	0.48	368	-0.03	0.366	-0.08	X
Have college degree (AA/AS or higher)	0.31	0.46	628	0.29	0.46	398	0.02	0.531	0.05	X
Current Goal: Transfer to 4-Yr College	0.34	0.47	671	0.42	0.49	404	-0.08	0.011	-0.20	X
Current Goal: Find a Better Job	0.48	0.50	671	0.33	0.47	404	0.15	0.000	0.39	X
Current Goal: Get a certificate/degree	0.54	0.50	671	0.50	0.50	404	0.04	0.185	0.10	X
# units earned prior to baseline	21.9	20.0	631	27.7	21.5	385	-5.86	0.000	-0.28	X
# semesters enrolled prior to baseline	2.8	2.2	631	3.6	2.4	385	-0.80	0.000	-0.35	
# of dependents	0.6	1.1	607	0.5	1.1	376	0.09	0.212	0.08	X
Age	29.7	11.8	631	29.4	12.2	385	0.37	0.637	0.03	X

(a) Included in wage estimation models only.

Source: IMPAQ calculations based on the 12-month follow-up survey. Notes:

Adjusted mean differences are based on regression models used in the outcome estimation, controlling only for random cohort effects. P-values are for regression adjusted mean differences. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables.

Exhibit E.4 Baseline Equivalence for the Analytic Sample for CCCC Outcomes

Outcome	DBS			Comparison			Adjusted Difference	p-value	Adjusted effect size	Included in Reported Model
	Unadjusted Mean	SD	N	Unadjusted Mean	SD	N				
Employed	0.52	0.50	1304	0.54	0.50	856	-0.02	0.36	-0.05	X
Hourly wages of \$25 or higher	0.11	0.31	1160	0.13	0.34	670	-0.03	0.10	-0.15	
Hourly wages of \$15-\$25	0.25	0.43	1160	0.23	0.42	670	0.02	0.31	0.07	
Hourly wages of \$10-\$15	0.37	0.48	1160	0.34	0.47	670	0.03	0.17	0.08	
Hourly wage of \$10 or less	0.27	0.45	1160	0.30	0.46	670	-0.03	0.24	-0.08	
Annual household income ≤ 25K	0.56	0.50	1295	0.45	0.50	848	0.11	0.00	0.27	
Annual household income ≤ 10K	0.31	0.46	1295	0.23	0.42	848	0.08	0.00	0.24	
Receipt of public aid	0.14	0.35	1419	0.09	0.28	910	0.05	0.00	0.32	X
Disabled	0.07	0.25	1419	0.08	0.28	910	-0.02	0.10	-0.16	X
Veteran	0.12	0.32	1419	0.06	0.23	910	0.06	0.00	0.48	X
Married	0.19	0.39	1252	0.16	0.36	872	0.04	0.03	0.15	X
White	0.31	0.46	1419	0.34	0.47	910	-0.03	0.19	-0.07	
Hispanic	0.24	0.43	1419	0.25	0.43	910	-0.01	0.70	-0.02	X
Asian	0.18	0.39	1419	0.18	0.38	910	0.00	0.85	0.01	X
African American	0.17	0.38	1419	0.09	0.29	910	0.07	0.00	0.41	X
Female	0.24	0.43	1365	0.24	0.43	875	0.00	0.89	0.01	X
Have college degree (AA/AS or higher)	0.22	0.41	1378	0.23	0.42	885	-0.01	0.58	-0.04	X
Current Goal: Transfer to 4-Yr College	0.28	0.45	1419	0.35	0.48	910	-0.07	0.00	-0.19	X
Current Goal: Find a Better Job	0.53	0.50	1419	0.32	0.47	910	0.21	0.00	0.54	X
Current Goal: Get a certificate/degree	0.61	0.49	1419	0.52	0.50	910	0.10	0.00	0.26	X
# units earned prior to baseline	17.6	18.1	1419	25.6	22.3	910	-7.93	0.00	-0.40	X
# semesters enrolled prior to baseline	2.5	2.0	1419	3.3	2.4	910	-0.88	0.00	-0.40	
# of dependents	0.6	1.2	1293	0.6	1.2	842	-0.01	0.91	-0.01	X
Age	29.7	11.3	1419	28.5	11.6	910	1.28	0.01	0.11	X

Source: IMPAQ calculations based on the CCCC MIS data.

Notes: Adjusted mean differences are based on regression models used in the outcome estimation, controlling only for random cohort effects. P-values are for regression adjusted mean differences. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables.

Exhibit E.5 Estimated Effects of DBS program on Employment and Education Outcomes at 3-Months after Baseline, Follow-up Survey

Outcome	Estimation model	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
Have a paid job (1=yes, 0=no)	Basic model	0.62	0.61	0.01	0.04	0.72	0.03	997
	Casewise model	0.63	0.62	0.01	0.05	0.89	0.02	826
	Dummy variable model	0.63	0.61	0.02	0.04	0.58	0.06	933
Have a job closely related to the course taken (1=yes, 0=no)	Basic model	0.28	0.30	-0.02	0.03	0.53	-0.06	997
	Casewise model	0.28	0.29	-0.01	0.04	0.83	-0.02	826
	Dummy variable model	0.28	0.30	-0.02	0.04	0.55	-0.06	933
Have a permanent job (1=yes, 0=no)	Basic model	0.67	0.65	0.02	0.05	0.69	0.05	507
	Casewise model	0.67	0.65	0.02	0.06	0.67	0.07	422
	Dummy variable model	0.67	0.64	0.03	0.05	0.52	0.09	478
Working at least 30 hours per week (1=yes, 0=no)	Basic model	0.29	0.35	-0.06	0.03	0.07	-0.17	970
	Casewise model	0.29	0.36	-0.07	0.04	0.07	-0.21	803
	Dummy variable model	0.30	0.34	-0.05	0.04	0.22	-0.14	906
Log hourly wages	Basic model	2.85	2.73	0.12	0.08	0.13	0.15	521
	Casewise model	2.84	2.77	0.07	0.07	0.33	0.09	387
	Dummy variable model	2.83	2.70	0.13	0.07	0.05	0.17	492
Received wage increase since baseline (1=yes, 0=no)	Basic model	0.07	0.12	-0.05	0.02	0.01	-0.41	948
	Casewise model	0.07	0.11	-0.03	0.02	0.05	-0.37	782
	Dummy variable model	0.07	0.12	-0.04	0.02	0.02	-0.39	884
Got promoted since baseline (1=yes, 0=no)	Basic model	0.04	0.05	-0.01	0.01	0.39	-0.19	948
	Casewise model	0.04	0.05	-0.01	0.01	0.55	-0.16	769
	Dummy variable model	0.04	0.05	-0.01	0.01	0.28	-0.25	869
Have received or renewed a certificate since baseline (1=yes, 0=no)	Basic model	0.18	0.14	0.04	0.02	0.08	0.22	964
	Casewise model	0.19	0.12	0.06	0.02	0.02	0.40	796
	Dummy variable model	0.18	0.13	0.05	0.02	0.05	0.28	901

Source: IMPAQ calculations based on the 3-Month Follow-Up Survey.

Notes: Basic model included cohort and college effects only. The casewise model included select covariates in addition to cohort and college effects and used casewise deletion for missing covariates. The dummy variable model included select covariates in addition to cohort and college effects and used the dummy variable method for missing covariates. Each model assumed random cohort effects and fixed site (college) effects. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status disability status, public aid receipt, units earned prior to the program participation, education level. For the wage estimation, the baseline wage levels were also included.

Exhibit E.6 Estimated Effects of DBS Program on Employment and Education Outcomes at 12-Months after Baseline, Follow-up Survey

Outcome	Model Specification	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
Have a paid job (1=yes, 0=no)	Basic model	0.68	0.68	0.01	0.03	0.86	0.02	1058
	Casewise model	0.69	0.69	0.00	0.04	0.90	-0.01	859
	Dummy variable model	0.68	0.69	-0.01	0.04	0.83	-0.02	1000
Have a job closely related to the course taken (1=yes, 0=no)	Basic model	0.37	0.32	0.06	0.03	0.09	0.15	1058
	Casewise model	0.37	0.34	0.04	0.04	0.30	0.11	859
	Dummy variable model	0.37	0.32	0.05	0.04	0.14	0.14	1000
Have a permanent job (1=yes, 0=no)	Basic model	0.66	0.64	0.03	0.04	0.49	0.08	671
	Casewise model	0.65	0.61	0.05	0.05	0.33	0.13	533
	Dummy variable model	0.67	0.62	0.06	0.05	0.21	0.15	637
Working at least 30 hours per week (1=yes, 0=no)	Basic model	0.30	0.34	-0.04	0.03	0.27	-0.10	1046
	Casewise model	0.31	0.37	-0.06	0.04	0.11	-0.16	849
	Dummy variable model	0.31	0.36	-0.05	0.04	0.15	-0.14	988
Log hourly wages	Basic model	2.99	2.97	0.02	0.12	0.86	0.02	250
	Casewise model	3.03	2.96	0.08	0.12	0.52	0.09	181
	Dummy variable model	2.96	2.96	0.00	0.11	0.99	0.00	244
Received wage increase since baseline (1=yes, 0=no)	Basic model	0.28	0.28	-0.01	0.04	0.87	-0.02	757
	Casewise model	0.29	0.28	0.01	0.04	0.85	0.02	609
	Dummy variable model	0.28	0.28	0.00	0.04	0.96	0.01	719
Got promoted since baseline (1=yes, 0=no)	Basic model	0.12	0.11	0.01	0.02	0.73	0.05	749
	Casewise model	0.12	0.12	0.00	0.03	0.89	0.02	603
	Dummy variable model	0.12	0.10	0.02	0.02	0.51	0.11	712
Had a 2-year college degree or higher (1=yes, 0=no)	Basic model	0.39	0.35	0.04	0.03	0.23	0.11	1064
	Casewise model	0.38	0.35	0.07	0.06	0.24	0.20	867
	Dummy variable model	0.38	0.34	0.08	0.06	0.146	0.23	1006

Source: IMPAQ calculations based on the 12-Month Follow-Up Survey.

Notes: Basic model included cohort and college effects only. The casewise model included select covariates in addition to cohort and college effects and used casewise deletion for missing covariates. The dummy variable model included select covariates in addition to cohort and college effects and used the dummy variable method for missing covariates. Each model assumed random cohort effects and fixed site (college) effects. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status disability status, public aid receipt, units earned prior to the program participation, education level. For the wage estimation, the baseline wage levels were also included.

Exhibit E.7 Estimated Effects of the DBS program on Education Outcomes for Post-Program Periods, CCCCO MIS Data

Outcome	Model Specification	Follow-Up Period: Num. of semesters after baseline	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
Primary Outcomes									
Enrolled in CC (1=yes, 0=no)	Basic model	1	0.55	0.68	-0.14	0.02	0.00	-0.37	2329
		2	0.41	0.50	-0.09	0.02	0.00	-0.23	2329
		3	0.33	0.41	-0.08	0.03	0.00	-0.22	1593
		4	0.21	0.24	-0.03	0.03	0.38	-0.10	768
	Casewise model	1	0.57	0.68	-0.11	0.03	0.00	-0.30	1959
		2	0.44	0.49	-0.05	0.03	0.05	-0.12	1959
		3	0.35	0.40	-0.05	0.03	0.10	-0.13	1316
		4	0.24	0.21	0.02	0.04	0.52	0.09	658
	Dummy variable model	1	0.56	0.66	-0.11	0.02	0.00	-0.30	2329
		2	0.42	0.48	-0.07	0.02	0.01	-0.16	2329
		3	0.34	0.39	-0.05	0.03	0.06	-0.14	1593
		4	0.22	0.23	-0.01	0.03	0.87	-0.02	768
Have attained any certificate or 2-year college degree since baseline (1=yes, 0=no)	Basic model	1	0.09	0.13	-0.04	0.01	0.01	-0.24	2329
		2	0.12	0.16	-0.03	0.02	0.02	-0.19	2329
		3	0.14	0.25	-0.11	0.02	0.00	-0.49	1593
		4	0.16	0.28	-0.13	0.03	0.00	-0.52	831
	Casewise model	1	0.11	0.11	0.00	0.01	0.77	-0.03	1959
		2	0.14	0.13	0.01	0.01	0.57	0.06	1959
		3	0.16	0.22	-0.06	0.02	0.01	-0.32	1316
		4	0.18	0.27	-0.09	0.03	0.00	-0.47	670
	Dummy variable model	1	0.10	0.12	-0.01	0.01	0.14	-0.15	2329
		2	0.13	0.14	-0.01	0.01	0.52	-0.06	2329
		3	0.15	0.22	-0.07	0.02	0.00	-0.38	1593
		4	0.17	0.27	-0.10	0.03	0.00	-0.49	831
Other Outcomes									
Have transferred to a 4-year college since baseline (1=yes, 0=no)	Basic model	1	0.01	0.02	-0.01	0.00	0.14	-0.31	2053
		2	0.05	0.05	0.00	0.01	0.44	-0.10	2109
		3	0.05	0.08	-0.02	0.01	0.01	-0.39	1412
		4	0.04	0.11	-0.05	0.02	0.00	-0.82	710

Outcome	Model Specification	Follow-Up Period: Num. of semesters after baseline	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
	Casewise model	1	0.02	0.03	0.00	0.00	0.37	-0.26	1433
		2	0.06	0.05	0.00	0.00	0.63	0.09	1717
		3	0.09	0.07	0.00	0.01	0.50	0.14	1135
		4	0.05	0.11	-0.03	0.02	0.04	-0.65	557
	Dummy variable model	1	0.02	0.02	0.00	0.00	0.71	-0.09	1972
		2	0.05	0.05	0.00	0.00	0.48	0.12	2109
		3	0.07	0.07	0.00	0.01	0.77	0.06	1350
		4	0.05	0.11	-0.03	0.02	0.03	-0.65	630
Have earned CC units since baseline (1=yes, 0=no)	Basic model	1	0.54	0.66	-0.13	0.02	0.00	-0.34	2329
		2	0.59	0.70	-0.13	0.02	0.00	-0.35	2329
		3	0.59	0.71	-0.14	0.03	0.00	-0.38	1593
		4	0.62	0.77	-0.17	0.04	0.00	-0.51	831
	Casewise model	1	0.56	0.65	-0.10	0.03	0.00	-0.26	1959
		2	0.61	0.69	-0.10	0.03	0.00	-0.26	1959
		3	0.62	0.71	-0.10	0.03	0.00	-0.29	1316
		4	0.66	0.76	-0.11	0.04	0.01	-0.38	670
	Dummy variable model	1	0.55	0.64	-0.10	0.02	0.00	-0.26	2329
		2	0.60	0.68	-0.10	0.02	0.00	-0.27	2329
		3	0.61	0.69	-0.10	0.03	0.00	-0.28	1593
		4	0.64	0.74	-0.12	0.04	0.01	-0.36	831
Have taken occupational class since baseline (1=yes, 0=no)	Basic model	1	0.43	0.61	-0.19	0.02	0.00	-0.48	2329
		2	0.48	0.66	-0.20	0.02	0.00	-0.51	2329
		3	0.52	0.70	-0.21	0.03	0.00	-0.54	1593
		4	0.57	0.76	-0.21	0.04	0.00	-0.62	831
	Casewise model	1	0.45	0.61	-0.17	0.03	0.00	-0.42	1959
		2	0.50	0.66	-0.18	0.03	0.00	-0.46	1959
		3	0.55	0.70	-0.17	0.03	0.00	-0.45	1316
		4	0.64	0.74	-0.12	0.04	0.01	-0.39	670
	Dummy variable model	1	0.44	0.59	-0.18	0.02	0.00	-0.44	2329
		2	0.48	0.65	-0.19	0.02	0.00	-0.47	2329
		3	0.53	0.68	-0.17	0.03	0.00	-0.45	1593
		4	0.60	0.71	-0.14	0.04	0.00	-0.41	831

Outcome	Model Specification	Follow-Up Period: Num. of semesters after baseline	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
Have taken basic education class since baseline (1=yes, 0=no)	Basic model	1	0.03	0.04	-0.01	0.01	0.29	-0.17	2213
		2	0.04	0.05	-0.01	0.01	0.40	-0.11	2213
		3	0.06	0.07	-0.01	0.01	0.60	-0.07	1537
		4	0.08	0.09	-0.01	0.02	0.67	-0.07	831
	Casewise model	1	0.03	0.04	0.00	0.01	0.47	-0.13	1800
		2	0.05	0.05	0.00	0.01	0.86	-0.03	1850
		3	0.07	0.07	0.00	0.01	0.96	-0.01	1264
		4	0.10	0.07	0.02	0.02	0.40	0.18	670
	Dummy variable model	1	0.03	0.04	-0.01	0.01	0.31	-0.17	2213
		2	0.05	0.05	-0.01	0.01	0.39	-0.12	2213
		3	0.06	0.07	-0.01	0.01	0.64	-0.07	1537
		4	0.09	0.08	0.01	0.02	0.60	0.10	831
Have completed a course in engineering/industrial technology since baseline (1=yes, 0=no)	Basic model	1	0.28	0.40	-0.12	0.02	0.00	-0.41	2119
		2	0.31	0.43	-0.13	0.02	0.00	-0.42	2119
		3	0.39	0.48	-0.11	0.03	0.00	-0.27	1314
		4	0.43	0.54	-0.13	0.04	0.00	-0.32	731
	Casewise model	1	0.30	0.39	-0.09	0.03	0.00	-0.33	1763
		2	0.33	0.42	-0.10	0.03	0.00	-0.33	1763
		3	0.42	0.47	-0.05	0.04	0.17	-0.13	1061
		4	0.53	0.53	-0.01	0.06	0.92	-0.01	563
	Dummy variable model	1	0.29	0.39	-0.10	0.02	0.00	-0.35	2119
		2	0.32	0.41	-0.10	0.02	0.00	-0.36	2119
		3	0.40	0.46	-0.07	0.04	0.03	-0.19	1314
		4	0.46	0.49	-0.03	0.05	0.54	-0.08	731
Have completed a course in bioscience since baseline (1=yes, 0=no)	Basic model	1	0.13	0.02	0.07	0.01	0.00	1.44	2204
		2	0.16	0.04	0.10	0.01	0.00	1.10	2204
		3	0.17	0.06	0.09	0.01	0.00	0.88	1503
		4	0.17	0.08	0.07	0.02	0.00	0.69	768
	Casewise model	1	0.13	0.02	0.07	0.01	0.00	1.61	1909
		2	0.16	0.04	0.09	0.01	0.00	1.22	1909
		3	0.17	0.06	0.08	0.01	0.00	1.01	1292
		4	0.18	0.09	0.08	0.03	0.00	0.82	583

Outcome	Model Specification	Follow-Up Period: Num. of semesters after baseline	DBS Probability/ Mean	Comparison Probability/ Mean	Difference	SE of Difference	p-value	Effect Size	Sample size
	Dummy variable model	1	0.13	0.02	0.07	0.01	0.00	1.54	2204
		2	0.16	0.04	0.09	0.01	0.00	1.17	2204
		3	0.17	0.06	0.09	0.01	0.00	0.95	1503
		4	0.16	0.08	0.06	0.02	0.00	0.69	768
Have completed a course in IT since baseline (1=yes, 0=no)	Basic model	1	0.06	0.07	0.00	0.01	0.45	-0.09	2204
		2	0.07	0.08	0.00	0.01	0.53	-0.07	2329
		3	0.06	0.11	-0.04	0.01	0.00	-0.55	1593
		4	0.06	0.12	-0.04	0.02	0.00	-0.56	831
	Casewise model	1	0.06	0.07	0.00	0.01	0.57	-0.08	1909
		2	0.08	0.09	0.00	0.01	0.62	-0.06	1909
		3	0.06	0.12	-0.03	0.01	0.00	-0.55	1292
		4	0.07	0.12	-0.02	0.01	0.08	-0.42	658
	Dummy variable model	1	0.06	0.06	0.00	0.01	0.72	-0.05	2204
		2	0.07	0.08	0.00	0.01	0.68	-0.05	2329
		3	0.06	0.11	-0.03	0.01	0.00	-0.54	1551
		4	0.06	0.11	-0.03	0.01	0.03	-0.48	807

Source: IMPAQ calculations based on the CCCCO MIS data.

Notes: Basic model included cohort and college effects only. The casewise model included select covariates in addition to cohort and college effects and used casewise deletion for missing covariates. The dummy variable model included select covariates in addition to cohort and college effects and used the dummy variable method for missing covariates. Each model assumed random cohort effects and fixed site (college) effects. For the effect sizes calculation, Hedges' g is computed for continuous variables and Cox index (weighted log odds ratio) for binary variables. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status disability status, public aid receipt, units earned prior to the program participation, education level.

Exhibit E.8-1 Estimated Effects of DBS Programs in Advanced Manufacturing on Student Outcomes

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Advanced Manufacturing Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
3-Month Follow-Up Survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	3 Months	0.71	0.65	0.07	0.06	0.28	826
	Dummy variable method	3 Months	0.73	0.64	0.09	0.05	0.10	933
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	3 Months	0.46	0.45	0.01	0.07	0.94	512
	Dummy variable method	3 Months	0.46	0.47	-0.01	0.07	0.86	580
Have a permanent job (1=yes, 0=no)	Casewise deletion	3 Months	0.79	0.63	0.16	0.07	0.03	422
	Dummy variable method	3 Months	0.80	0.63	0.17	0.06	0.02	478
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	3 Months	0.23	0.30	-0.07	0.05	0.20	803
	Dummy variable method	3 Months	0.27	0.29	-0.02	0.05	0.72	906
Received wage increase since baseline (1=yes, 0=no)	Casewise deletion	3 Months	0.03	0.06	-0.03	0.02	0.07	782
	Dummy variable method	3 Months	0.03	0.06	-0.03	0.02	0.06	884
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	3 Months	0.01	0.02	-0.01	0.01	0.12	735
	Dummy variable method	3 Months	0.01	0.02	-0.01	0.01	0.14	832
Have received or reviewed a certificate (1=yes, 0=no)	Casewise deletion	3 Months	0.11	0.11	0.00	0.03	1.00	796
	Dummy variable method	3 Months	0.11	0.12	-0.01	0.03	0.74	901
Log hourly wage	Casewise deletion	3 Months	2.87	2.75	0.13	0.10	0.23	439
	Dummy variable method	3 Months	2.89	2.74	0.15	0.10	0.11	492
12-Month Follow-Up survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	12 Months	0.69	0.74	-0.05	0.05	0.31	859
	Dummy variable method	12 Months	0.68	0.73	-0.05	0.05	0.33	1000
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	12 Months	0.59	0.52	0.07	0.06	0.27	579
	Dummy variable method	12 Months	0.58	0.51	0.07	0.06	0.24	670
Have a permanent job (1=yes, 0=no)	Casewise deletion	12 Months	0.68	0.63	0.05	0.06	0.44	533
	Dummy variable method	12 Months	0.72	0.66	0.05	0.06	0.37	637
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	12 Months	0.31	0.33	-0.01	0.05	0.84	849
	Dummy variable method	12 Months	0.32	0.32	0.00	0.05	0.95	988

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Advanced Manufacturing Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
Received wage increase since baseline (1=yes, 0=no)	Casewise deletion	12 Months	0.23	0.26	-0.03	0.05	0.58	609
	Dummy variable method	12 Months	0.23	0.26	-0.03	0.05	0.49	719
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	12 Months	0.06	0.06	-0.01	0.02	0.74	603
	Dummy variable method	12 Months	0.06	0.05	0.00	0.02	0.93	712
Have a AA or higher degree (1=yes, 0=no)	Casewise deletion	12 Months	0.34	0.30	0.04	0.08	0.61	867
	Dummy variable method	12 Months	0.32	0.31	0.01	0.08	0.85	1006
Log hourly wage	Casewise deletion	12 Months	3.11	2.87	0.24	0.14	0.10	203
	Dummy variable method	12 Months	3.10	2.89	0.20	0.14	0.14	244
CCCCO MIS Data								
Enrolled in community college (1=yes, 0=no)	Casewise deletion	1 Semester	0.60	0.63	-0.03	0.03	0.42	1959
		2 Semesters	0.45	0.44	0.01	0.03	0.86	1959
		3 Semesters	0.33	0.34	0.00	0.04	0.89	1316
		4 Semesters	0.24	0.23	0.02	0.05	0.69	603
	Dummy variable method	1 Semester	0.58	0.62	-0.04	0.03	0.21	2329
		2 Semesters	0.42	0.43	-0.02	0.03	0.56	2329
		3 Semesters	0.30	0.32	-0.01	0.03	0.69	1593
		4 Semesters	0.23	0.23	0.00	0.04	0.93	698
Have attained any certificate or 2-year college degree since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.05	0.06	-0.01	0.01	0.31	1959
		2 Semesters	0.07	0.08	-0.01	0.01	0.71	1959
		3 Semesters	0.03	0.05	-0.02	7.02	0.04	1309
		4 Semesters	0.02	0.03	-0.01	0.01	0.13	670 (a)
	Dummy variable method	1 Semester	0.05	0.07	-0.02	0.01	0.12	2329
		2 Semesters	0.07	0.08	-0.01	0.01	0.37	2329
		3 Semesters	0.03	0.05	-0.02	0.01	0.02	1586(a)
		4 Semesters	0.02	0.04	-0.01	4.72	0.09	831
Have transferred to a 4-year college since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.00	0.01	-0.01	0.00	0.09	1406
		2 Semesters	0.01	0.02	-0.01	0.01	0.13	1707
		3 Semesters	0.01	0.02	-0.01	0.01	0.08	1126

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Advanced Manufacturing Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
		4 Semesters	0.01	0.04	-0.03	0.01	0.03	555
	Dummy variable method	1 Semester	0.00	0.01	0.00	0.00	0.06	1949
		2 Semesters	0.01	0.02	-0.01	0.00	0.10	2109
		3 Semesters	0.01	0.02	-0.01	0.01	0.03	1343(a)
		4 Semesters	0.01	0.04	-0.03	0.01	0.02	630(a)
Have taken occupational class since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.48	0.52	-0.04	0.03	0.28	1959
		2 Semesters	0.53	0.59	-0.06	0.04	0.10	1959
		3 Semesters	0.58	0.62	-0.05	0.04	0.27	1316
		4 Semesters	0.70	0.72	-0.02	0.05	0.76	670
	Dummy variable method	1 Semester	0.45	0.49	-0.04	0.03	0.20	2329
		2 Semesters	0.50	0.56	-0.06	0.03	0.05	2329
		3 Semesters	0.55	0.60	-0.05	0.04	0.21	1593
		4 Semesters	0.66	0.66	0.00	0.05	0.97	831
Have earned community college units since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.61	0.61	0.00	0.03	0.98	1959
		2 Semesters	0.65	0.66	-0.01	0.03	0.79	1959
		3 Semesters	0.65	0.67	-0.02	0.04	0.62	1316
		4 Semesters	0.73	0.76	-0.03	0.05	0.60	670
	Dummy variable method	1 Semester	0.58	0.59	-0.02	0.03	0.58	2329
		2 Semesters	0.62	0.65	-0.03	0.03	0.32	2329
		3 Semesters	0.63	0.66	-0.03	0.04	0.43	1593
		4 Semesters	0.69	0.72	-0.03	0.05	0.58	831

Source: IMPAQ staff calculations based on the student surveys and CCCC MIS data.

Notes: Each model assumed random cohort effects and fixed site (college) effects. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status, and disability. The effect estimates measure differences between Advanced Manufacturing students and other DBS and non-DBS students. The sector-specific effects were estimated including a set of priority sector indicators in estimation models.

Provisional estimates based on 100 iterations of the Newton-Raphson method.

Exhibit E.8-2 Estimated Effects of DBS Programs in Transportation & Logistics on Student Outcomes

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Transportation & Logistics Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
3-Month Follow-Up Survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	3 Months	0.74	0.66	0.08	0.12	0.53	826
	Dummy variable method	3 Months	0.75	0.66	0.09	0.10	0.43	933
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	3 Months	0.43	0.46	-0.03	0.17	0.85	512
	Dummy variable method	3 Months	0.40	0.47	-0.07	0.15	0.66	580
Have a permanent job (1=yes, 0=no)	Casewise deletion	3 Months	0.67	0.68	-0.02	0.19	0.93	422
	Dummy variable method	3 Months	0.63	0.69	-0.05	0.18	0.76	478
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	3 Months	0.20	0.28	-0.08	0.10	0.46	803
	Dummy variable method	3 Months	0.17	0.29	-0.12	0.08	0.20	906
Received wage increase since baseline (1=yes, 0=no)	Casewise deletion	3 Months	0.07	0.05	0.02	0.06	0.77	782
	Dummy variable method	3 Months	0.05	0.05	0.00	0.04	0.97	884
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	3 Months	1.00	0.01	0.99	0.00	0.00	735
	Dummy variable method	3 Months	1.00	0.00	1.00	0.00	0.00	832
Have received or reviewed a certificate (1=yes, 0=no)	Casewise deletion	3 Months	0.50	0.10	0.40	0.17	0.00	796
	Dummy variable method	3 Months	0.43	0.11	0.32	0.14	0.00	901
Log hourly wage	Casewise deletion	3 Months	2.58	2.79	-0.22	0.25	0.39	439
	Dummy variable method	3 Months	2.69	2.79	-0.10	0.22	0.66	492
12-Month Follow-Up survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	12 Months	0.91	0.72	0.19	0.06	0.03	859
	Dummy variable method	12 Months	0.86	0.71	0.15	0.07	0.08	1000
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	12 Months	0.81	0.53	0.29	0.13	0.10	579
	Dummy variable method	12 Months	0.71	0.52	0.19	0.13	0.19	670
Have a permanent job (1=yes, 0=no)	Casewise deletion	12 Months	0.76	0.65	0.11	0.16	0.54	533
	Dummy variable method	12 Months	0.74	0.68	0.06	0.15	0.68	637
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	12 Months	0.30	0.32	-0.02	0.13	0.87	849
	Dummy variable method	12 Months	0.25	0.32	-0.08	0.10	0.47	988

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Transportation & Logistics Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
Received wage increase since baseline (1=yes, 0=no)	Casewise deletion	12 Months	0.45	0.25	0.21	0.19	0.22	609
	Dummy variable method	12 Months	0.35	0.24	0.11	0.15	0.44	719
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	12 Months	1.00	0.03	0.97	0.00	0.00	603
	Dummy variable method	12 Months	1.00	0.02	0.98	0.00	0.00	712
Have a AA or higher degree (1=yes, 0=no)	Casewise deletion	12 Months	0.11	0.32	-0.21	0.12	0.26	867
	Dummy variable method	12 Months	0.09	0.33	-0.24	0.08	0.07	1006
Log hourly wage	Casewise deletion	12 Months	3.13	2.93	0.20	0.84	0.81	203
	Dummy variable method	12 Months	3.09	2.95	0.14	0.70	0.84	244
CCCCO MIS Data								
Enrolled in community college (1=yes, 0=no)	Casewise deletion	1 Semester	0.14	0.67	-0.53	0.05	0.00	1959
		2 Semesters	0.10	0.48	-0.38	0.04	0.00	1959
		3 Semesters	0.03	0.39	-0.36	0.03	0.00	1316
		4 Semesters		0.23				603
	Dummy variable method	1 Semester	0.13	0.67	-0.54	0.05	0.00	2329
		2 Semesters	0.10	0.48	-0.38	0.03	0.00	2329
		3 Semesters	0.03	0.40	-0.37	0.03	0.00	1593
		4 Semesters		0.23				698
Have attained any certificate or 2-year college degree since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.04	0.06	-0.02	0.02	0.43	1959
		2 Semesters	0.06	0.08	-0.02	0.03	0.58	1959
		3 Semesters	0.00	0.17	-0.17	17.38	1.00	1309
		4 Semesters	0.00	0.21	-0.21	0.03	0.00	670 (a)
	Dummy variable method	1 Semester	0.03	0.07	-0.04	0.02	0.16	2329
		2 Semesters	0.05	0.08	-0.04	0.03	0.28	2329
		3 Semesters	0.00	0.31	-0.31	0.03	0.00	1586(a)
		4 Semesters	0.00	0.43	-0.43	81.84	1.00	831
Have transferred to a 4-year college since baseline (1=yes, 0=no)	Casewise deletion	1 Semester		0.01				1406
		2 Semesters		0.01				1707
		3 Semesters		0.02				1126

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Transportation & Logistics Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
		4 Semesters		0.03				555
	Dummy variable method	1 Semester	0.00	0.00	0.00	0.01	0.96	1949
		2 Semesters	0.00	0.01	-0.01	0.01	0.46	2109
		3 Semesters	0.00	0.04	-0.04	0.01	0.00	1343(a)
		4 Semesters	0.00	0.08	-0.08	0.02	0.00	630(a)
Have taken occupational class since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.08	0.55	-0.48	0.04	0.00	1959
		2 Semesters	0.09	0.62	-0.53	0.04	0.00	1959
		3 Semesters	0.03	0.68	-0.65	0.04	0.00	1316
		4 Semesters	0.11	0.77	-0.66	0.09	0.00	670
	Dummy variable method	1 Semester	0.06	0.55	-0.49	0.04	0.00	2329
		2 Semesters	0.07	0.62	-0.54	0.04	0.00	2329
		3 Semesters	0.03	0.70	-0.67	0.04	0.00	1593
		4 Semesters	0.07	0.78	-0.71	0.06	0.00	831
Have earned community college units since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.14	0.65	-0.50	0.05	0.00	1959
		2 Semesters	0.16	0.70	-0.54	0.05	0.00	1959
		3 Semesters	0.11	0.72	-0.60	0.06	0.00	1316
		4 Semesters	0.26	0.79	-0.52	0.12	0.00	670
	Dummy variable method	1 Semester	0.13	0.65	-0.52	0.05	0.00	2329
		2 Semesters	0.15	0.70	-0.55	0.05	0.00	2329
		3 Semesters	0.10	0.73	-0.62	0.06	0.00	1593
		4 Semesters	0.20	0.79	-0.59	0.09	0.00	831

Source: IMPAQ staff calculations based on the student surveys and CCCC MIS data.

Notes: Each model assumed random cohort effects and fixed site (college) effects. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status, and disability. Blank cells indicate that there were not enough observations to make statistical calculation. The effect estimates measure differences between Transportation and Logistics students and other DBS and non-DBS students. The sector-specific effects were estimated including a set of priority sector indicators in estimation models.

(a)Provisional estimates based on 100 iterations of the Newton-Raphson method.

Exhibit E.8-3 Estimated Effects of DBS Programs in Biosciences on Student Outcomes

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Biosciences Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
3-Month Follow-Up Survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	3 Months	0.64	0.68	-0.04	0.07	0.54	826
	Dummy variable method	3 Months	0.64	0.68	-0.04	0.06	0.55	933
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	3 Months	0.42	0.47	-0.05	0.08	0.49	512
	Dummy variable method	3 Months	0.39	0.49	-0.10	0.07	0.17	580
Have a permanent job (1=yes, 0=no)	Casewise deletion	3 Months	0.61	0.70	-0.09	0.08	0.25	422
	Dummy variable method	3 Months	0.63	0.70	-0.07	0.07	0.31	478
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	3 Months	0.23	0.29	-0.07	0.05	0.21	803
	Dummy variable method	3 Months	0.24	0.30	-0.05	0.05	0.28	906
Received wage increase since baseline (1=yes, 0=no)	Casewise deletion	3 Months	0.04	0.06	-0.02	0.02	0.23	782
	Dummy variable method	3 Months	0.04	0.06	-0.02	0.02	0.14	884
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	3 Months	0.02	0.01	0.00	0.01	0.81	735
	Dummy variable method	3 Months	0.01	0.02	0.00	0.01	0.60	832
Have received or reviewed a certificate (1=yes, 0=no)	Casewise deletion	3 Months	0.19	0.09	0.10	0.05	0.02	796
	Dummy variable method	3 Months	0.18	0.10	0.08	0.04	0.04	901
Log hourly wage	Casewise deletion	3 Months	2.84	2.76	0.08	0.11	0.46	439
	Dummy variable method	3 Months	2.86	2.76	0.10	0.10	0.31	492
12-Month Follow-Up survey								
Have a paid job (1=yes, 0=no)	Casewise deletion	12 Months	0.73	0.72	0.01	0.05	0.85	859
	Dummy variable method	12 Months	0.72	0.71	0.01	0.05	0.89	1000
Have a job closely related to the course taken (1=yes, 0=no)	Casewise deletion	12 Months	0.52	0.55	-0.03	0.07	0.69	579
	Dummy variable method	12 Months	0.57	0.52	0.05	0.07	0.48	670
Have a permanent job (1=yes, 0=no)	Casewise deletion	12 Months	0.67	0.64	0.02	0.07	0.73	533
	Dummy variable method	12 Months	0.71	0.67	0.04	0.06	0.47	637
Working at least 30 hours per week (1=yes, 0=no)	Casewise deletion	12 Months	0.25	0.35	-0.10	0.05	0.04	849
	Dummy variable method	12 Months	0.26	0.34	-0.08	0.04	0.07	988
	Casewise deletion	12 Months	0.30	0.24	0.06	0.06	0.32	609

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Biosciences Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
Received wage increase since baseline (1=yes, 0=no)	Dummy variable method	12 Months	0.29	0.24	0.06	0.06	0.32	719
Got promoted since baseline (1=yes, 0=no)	Casewise deletion	12 Months	0.07	0.06	0.01	0.03	0.75	603
	Dummy variable method	12 Months	0.07	0.05	0.01	0.02	0.53	712
Have a AA or higher degree (1=yes, 0=no)	Casewise deletion	12 Months	0.43	0.28	0.16	0.09	0.07	867
	Dummy variable method	12 Months	0.49	0.26	0.23	0.09	0.01	1006
Log hourly wage	Casewise deletion	12 Months	2.82	2.96	-0.15	0.19	0.43	203
	Dummy variable method	12 Months	2.77	3.00	-0.23	0.18	0.20	244
CCCCO MIS Data								
Enrolled in community college (1=yes, 0=no)	Casewise deletion	1 Semester	0.48	0.65	-0.17	0.05	0.00	1959
		2 Semesters	0.41	0.45	-0.04	0.04	0.28	1959
		3 Semesters	0.29	0.34	-0.05	0.05	0.31	1316
		4 Semesters	0.55	0.21	0.34	0.14	0.01	603
	Dummy variable method	1 Semester	0.49	0.63	-0.13	0.04	0.00	2329
		2 Semesters	0.39	0.44	-0.05	0.04	0.17	2329
		3 Semesters	0.27	0.32	-0.05	0.04	0.29	1593
		4 Semesters	0.43	0.21	0.22	0.11	0.02	698
Have attained any certificate or 2-year college degree since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.07	0.05	0.02	0.02	0.30	1959
		2 Semesters	0.10	0.07	0.03	0.02	0.08	1959
		3 Semesters	0.03	0.04	-0.02	6.27	0.13	1309
		4 Semesters	0.01	0.03	-0.03	0.01	0.00	670 (a)
	Dummy variable method	1 Semester	0.06	0.06	0.00	0.01	0.89	2329
		2 Semesters	0.09	0.08	0.01	0.02	0.65	2329
		3 Semesters	0.02	0.04	-0.02	0.01	0.01	1586(a)
		4 Semesters	0.01	0.04	-0.03	11.87	0.00	831
Have transferred to a 4-year college since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.01	0.01	0.01	0.01	0.35	1406
		2 Semesters	0.03	0.01	0.02	0.01	0.03	1707
		3 Semesters	0.08	0.01	0.06	0.03	0.00	1126
		4 Semesters	0.02	0.03	0.00	0.03	0.91	555

Outcome	Model Specification	# of Months/ Semesters After Baseline	DBS in Biosciences Probability/ Mean	Other DBS/ Comparison Probability/ Mean	Difference	SE of Difference	p-value	N
	Dummy variable method	1 Semester	0.01	0.00	0.01	0.01	0.06	1949
		2 Semesters	0.03	0.01	0.02	0.01	0.01	2109
		3 Semesters	0.05	0.01	0.04	0.02	0.00	1343(a)
		4 Semesters	0.02	0.02	0.00	0.02	0.89	630(a)
Have taken occupational class since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.24	0.56	-0.32	0.04	0.00	1959
		2 Semesters	0.32	0.62	-0.30	0.04	0.00	1959
		3 Semesters	0.37	0.65	-0.27	0.06	0.00	1316
		4 Semesters	0.36	0.74	-0.38	0.15	0.01	670
	Dummy variable method	1 Semester	0.23	0.54	-0.31	0.03	0.00	2329
		2 Semesters	0.29	0.59	-0.30	0.04	0.00	2329
		3 Semesters	0.34	0.62	-0.28	0.05	0.00	1593
		4 Semesters	0.28	0.70	-0.42	0.10	0.00	831
Have earned community college units since baseline (1=yes, 0=no)	Casewise deletion	1 Semester	0.46	0.63	-0.18	0.05	0.00	1959
		2 Semesters	0.54	0.68	-0.14	0.05	0.00	1959
		3 Semesters	0.54	0.68	-0.14	0.06	0.03	1316
		4 Semesters	0.43	0.77	-0.34	0.16	0.02	670
	Dummy variable method	1 Semester	0.47	0.61	-0.15	0.04	0.00	2329
		2 Semesters	0.55	0.66	-0.11	0.04	0.01	2329
		3 Semesters	0.56	0.66	-0.10	0.06	0.06	1593
		4 Semesters	0.55	0.73	-0.18	0.11	0.08	831

Source: IMPAQ staff calculations based on the student surveys and CCCCO MIS data.

Notes: Each model assumed random cohort effects and fixed site (college) effects. Select baseline covariates in the reported models included employment status, age, gender, race, number of dependents, veteran status, and disability. The effect estimates measure differences between Biosciences students and other DBS and non-DBS students. The sector-specific effects were estimated including a set of priority sector indicators in estimation models.

(a)Provisional estimates based on 100 iterations of the Newton-Raphson method.

APPENDIX F.1 STUDENT BASELINE SURVEY

Student Survey

Thank you for your interest in career path training through the community college system. The following information is completely confidential and will be used only to evaluate the effectiveness of our training programs and services. Thank you for taking the time to help us understand who we serve and how we can improve our college programs.

Student ID:									
7	1	9	8	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

MARKING INSTRUCTIONS

- Use a No. 2 pencil only.
- Do not use ink, ballpoint, or felt tip pens.
- Make solid marks that fill the response completely.
- Erase cleanly any marks you wish to change.
- Make no stray marks on this form.

CORRECT: ● INCORRECT: ☒ ☓ ☉ ☪

Name: _____

Program: _____

Year: ① 2013 ② 2014 ③ 2015 ④ 2016

Term: ① Fall ② Spring ③ Summer

Which college are you attending?

- ① Alameda ② Berkeley ③ Chabot ④ Contra Costa ⑤ Diablo Valley
 ⑥ Laney ⑦ Los Medanos ⑧ Merritt ⑨ Ohlone ⑩ Solano

Educational background: (Select the highest level.)

- ① No High School Diploma ② GED ③ HS Diploma-No College
 ④ Some College-No Degree ⑤ College Certificate(s) ⑥ 2 year AA or AS degree
 ⑦ 4 year Degree ⑧ Master's Degree ⑨ Ph.D.

Are you currently receiving help with your job search from the following providers?

- ① One Stop (WIA) ② Community non-profit ③ Staffing Agency
 ④ Other ⑤ None

Are you currently attending? (Select all that apply.)

- ① Community College ② 4-year College ③ Trade/Technical School
 ④ Adult Education ⑤ ROP ⑥ Community Education
 ⑦ No I am not

What is your current goal? (Select all that apply.)

- ① Find a job or get a better job ② Get a certificate or a degree ③ Transfer to a 4 year College
 ④ Advance in my current job ⑤ Personal Development

Are you receiving any of the following kinds of public benefits? (Select all that apply.)

- ① CalWORKs ② Food Stamps-CalFresh ③ Unemployment Insurance
 ④ SSI ⑤ Medicaid ⑥ Section 8 Housing

What is your estimated household income per year from all sources?

- ① Less than \$10,000 ③ \$25,000 to \$50,000 ⑤ More than \$75,000
 ② \$10,000 to \$25,000 ④ \$50,000 to \$75,000

Marital status: ① Single
 ② Married or Domestic Partnership/Civil Union

Number of dependents: ① None ② One ③ Two ④ Three
 ⑤ Four ⑥ Five or more

Are you a Veteran of the US Armed Forces? ① Yes ② No

Are you currently receiving Veteran's benefits? ① Yes ② No

Employment status:

① Working Full Time ③ Unemployed/Seeking Job
 ② Working Part Time ④ Unemployed/Not Looking

ANSWER THE FOLLOWING (3) QUESTIONS ONLY IF YOU ARE CURRENTLY WORKING.

On average how many hours are you working?
 ① Less than 10 ② 10 to 20 ③ 20 to 30 ④ 30 to 40 ⑤ More than 40 ⑥ Varies

How long have you been at your current job?
 ① Less than 1 year ② More than 1 year ③ More than 2 years ④ More than 5 years

Approximately how much do you make per hour?
 ① Less than \$10 ② \$10 to \$15 ③ \$15 to \$20 ④ \$20 to \$25 ⑤ More than \$25

ANSWER THE FOLLOWING (4) QUESTIONS ONLY IF YOU ARE CURRENTLY UNEMPLOYED.

Have you ever had a job? ① Yes ② No

When did you last work?
 ① Less than 6 months ago ③ More than 1 year ago
 ② 6 months to 1 year ago ④ More than 2 years ago

When you last worked, approximately how much do you make per hour?
 ① Less than \$10 ② \$10 to \$15 ③ \$15 to \$20 ④ \$20 to \$25 ⑤ More than \$25

When you last worked, approximately how many hours a week were you working?
 ① Less than 10 ② 10 to 20 ③ 20 to 30 ④ 30 to 40 ⑤ More than 40 ⑥ Varies

This product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, expressed or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.

For College Use Only:
 College: _____ Program: _____
 Date of Enroll: _____ Control Code: _____

U.S. Patent No. 4,887,715. For use with the method and system of U.S. Patent No. 4,887,494.
 DE Mark Ref: EN-103184-37
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APPENDIX F.2 STUDENT OUTCOMES FOLLOW-UP SURVEY 1

This survey was administered to students online three months following the completion of their first term.

East Bay Community College Study Follow-Up 1

Dear {FIRSTNAME} {LASTNAME},

You are receiving this survey because you enrolled in a course or training program at {COLLEGE NAME} in the {TERM} semester. Your participation in this survey will help the college learn about how these courses and programs have prepared students for work or further education.

You may have received a survey like this last Fall. This is the last survey you will receive as part of this study. Your participation in this survey is voluntary, and we appreciate you taking the time to complete it.

After completing the survey, we will email you a \$10 Amazon.com gift code. Please note that you will receive an electronic code by email, rather than an actual gift card. More details will be provided at the end of the survey.

Survey Procedures

This survey will take about 10-15 minutes to complete. There are no right or wrong answers. You can skip any questions you don't want to answer.

Confidentiality

The information you provide on this survey will be kept strictly confidential. Your identity and your individual responses on the survey will never be reported. Your responses on this survey will be combined with responses from all other survey participants to create summary results. Only these summary results will be reported. Any personal information such as your name and your student ID number will never be disclosed to any party other than to the authorized research staff for the purpose of conducting the study.

Once you complete this survey and your gift code is emailed to you, your contact information will be deleted. We will not contact you with any further surveys or requests related to this study.

Questions

The survey is being conducted by IMPAQ International, an independent research organization, in partnership with {COLLEGE NAME}. If you have any questions about this survey, please contact Nada Rayyes at IMPAQ International (ebccstudy@impaqint.com or 510-597-2402). You may also contact {COLLEGE COORDINATOR NAME} at {COLLEGE NAME} {COORDINATOR EMAIL}.

Thank you very much for your participation!

College Status

Please use the "Previous" and "Next" buttons to navigate through the survey. Do NOT use your web browser's navigation buttons.

First, we would like to ask you about your current enrollment in college and/or other training programs.

Are you currently enrolled at {COLLEGE NAME}?

- Yes
- No

Are you currently enrolled at another community college?

Please choose **only one** of the following:

- Yes
- No

Are you currently enrolled in a four-year college or university?

Please choose **only one** of the following:

- Yes
- No

Are you currently taking any job skills or technical training course(s) anywhere (at a community college, four-year college, one-stop, employer-sponsored program, or any other agency)?

Please choose **only one** of the following:

- Yes
- No

Certificate and Edu Questions

In the past 12 months, have you obtained or renewed any certificate, license, or permit related to specific job skills?

Please choose **only one** of the following:

- Yes
- No

What is the highest level of education you have achieved?

Please choose **only one** of the following:

- Less than high school diploma
- GED
- HS diploma, no college
- Some college, no degree
- College certificate
- AA or AS degree
- 4-year degree (Bachelor's level)
- Master's degree

PhD/ EDD/ MD/ other doctorate

Please choose how much you agree or disagree with the following:

The course(s) or program(s) I participated in during {TERM} at {COLLEGE NAME} helped prepare me well for...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
My current job/career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Furthering my education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Starting my own business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Current Employment Status question(s)

Which of the following best describes your current employment status?

Please choose **only one** of the following:

- Self-Employed
- Employed at one job
- Employed at more than one job
- Paid internship
- Working, but not for pay (for example, unpaid internship, caregiving, volunteering, etc.) and NOT seeking paid employment
- Working, but not for pay, and seeking paid employment
- Unemployed, seeking paid employment
- Not working, and NOT seeking paid employment

TOTAL Hours Worked

In a typical week, how many hours do you work in total, combining hours from all your jobs?

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

Job Questions 1

For the following questions, if you have more than one job, please answer for the job which you consider your main job. This is usually the job that you work the most hours.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

In a typical week, how many hours do you work at this job?

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

In a typical week, how many hours do you work at your main job?

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

What is your current job title?

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please write your answer here:

How closely related is your current job to the field of study in the coursework and training that you took at {COLLEGE NAME} in {TERM}?

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Very close - my current job is in the same field as my coursework and training
- Close - I use what I learned in my coursework and training even though I am not working in the exact same field
- Not close - my studies and training are not at all related to my current job

Job Sector or Industry question(s)

For the following question, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

What sector or industry is your employer's primary business in? Check the answer that best describes your employer's business. If you are self-employed, in which sector or industry is your primary business?

Example: A person is employed by a hospital, and is working for the hospital's technology support department. Although the person's job is related to technology, the employer's business is best described as health care. So, in this case, check "health care" as the answer.

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Employed at more than one job' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Manufacturing or Advanced Manufacturing
- Bio-technology/Bio-manufacturing/Bioscience
- Transportation and Warehousing
- Automotive, Mechanical and Electrical Repair and Maintenance
- Waste Management and Remediation Services
- Utilities/Energy
- Mining, Quarrying, and Oil and Gas Extraction
- Construction
- Retail Trade
- Wholesale Trade
- Information Technology
- Education/Educational Services
- Finance, Insurance, Real Estate
- Health Care/Hospitals/Medical services
- Social Services/Social Assistance
- Personal Services (laundry/cleaning, beauty/personal care, house/baby sitting, photographers, etc.)
- Other Professional and Technical Services
- Public Administration
- Hotel/Hospitality/Food Services/Restaurants
- Arts, Entertainment, and Recreation
- Other

Job status - FT/PT/Temp & Pay Rate

For the following questions, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Is your current job:

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Permanent
- Temporary/Seasonal

How much do you earn at your current job?

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Only numbers may be entered in this field.

Please write your answer here:

Is that pay rate:

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Per Hour
- Per Day
- Per Week
- Per Month
- Per Year
- Other

Pay rate verification question(s)

You reported that you earn $\${\text{INSERT AMOUNT}}$ $\{\text{PER UNIT}\}$. Is that correct?

Only answer this question if the following conditions are met:

Answer was 'Employed at one job' or 'Employed at more than one job' or 'Self-Employed' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?) and Answer was NOT ' ' at question '20 [Q14a]' (How much do you earn at your current job?) and Answer was NOT 'Other' at question '21 [Q14b]' (Is that pay rate:)

Please choose **only one** of the following:

- Yes
 No

Company zip code question(s)

For the following questions, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please enter the name of the city in which your current job is located:

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' *or* 'Paid internship' *or* 'Employed at one job' *or* 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please write your answer here:

Please enter the 5 digit zip code of your current job below. If you do not know, leave this question blank.

Only answer this question if the following conditions are met:

Answer was 'Paid internship' *or* 'Employed at more than one job' *or* 'Employed at one job' *or* 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Only an integer value may be entered in this field.

Please write your answer here:

Promotion/Raise Question

In the past 12 months, have any of the following happened?

Please **choose all that** apply:

- I got a promotion at my job
 I got a wage/salary raise at my job
 I got a new position (at the same workplace)
 I got a new job (at a different workplace)
 I started my own business
 None of the above

Last Month's Income

How much did you earn in the last month? That is, how much did you take home after taxes and deductions? Include wages/ tips/ salary from all of your paid work, including all jobs if you

have more than one. Do not include other earners in your household. We only want to know how much YOU took home in the last month.

Please choose **only one** of the following:

- No earnings (\$0) in the last month
- \$1 - \$1,000
- \$1,001 - \$2,000
- \$2,001 - \$3,000
- \$3,001 - \$4,000
- \$4,001 - \$5,000
- More than \$5,000

Future Plans

Finally, we'd like to ask you about your future plans:

Within the next year, do you plan to:

Please choose **all** that apply:

- Change jobs (if currently employed)
- Find a job (if unemployed)
- Change careers
- Move into a different industry
- Advance in your current job
- Gain education/ training at your job
- Take courses at a community college (for transfer, job training, career enhancement, or any other reason)
- Take job training/career enhancement courses/programs at an agency or organization other than a community college
- Take courses at a four-year college or university
- Obtain a new degree
- Obtain a new certificate/license
- Start your own business
- Retire
- Other:

Feedback

Do you have any comments or suggestions about the courses or program you participated in back in {TERM} at {COLLEGE NAME}?

Please write your answer here:

Contact Info

As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?

Please choose **only one** of the following:

- Yes
- No

We will send the \$10 gift card to your email address after you complete the survey. Please make sure the email address we have for you is accurate.

Your contact information is kept strictly confidential, and will never be shared with anyone outside the authorized research team. This site is a secure site, and all information you provide on this website is encrypted, which will keep others from getting your contact information.

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Is {TOKEN:EMAIL} the best email address to use to send you the gift card after you complete this survey?

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Please choose **only one** of the following:

- Yes
- No

What is the best email address we should use to reach you?

Only answer this question if the following conditions are met:

Answer was 'No' at question '35 [CT1]' (Is {TOKEN:EMAIL} the best email address to use to send you the gift card after you complete this survey?) *and* Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Please write your answer here:

Thank you very much for your participation in this study! Your input is very important, and will help determine the effectiveness of the programs offered at {COLLEGE NAME} and other community colleges in the Bay Area.

If the survey is complete, we will send a \$10 gift code to your email address. You will be able to use this code at Amazon.com. This could take one to two weeks to process.

Please contact us at EBCStudy@impaqint.com for further assistance if you do not receive a gift card in 3 weeks or have any other questions.

PLEASE CLICK THE "SUBMIT" BUTTON BELOW

TO SUBMIT YOUR SURVEY RESPONSES

Failure to submit your survey will result in delayed gift code processing.

APPENDIX F.3 STUDENT OUTCOMES FOLLOW-UP SURVEY 2

This survey was administered to students online 12 months following the completion of their first term.

East Bay Community College Study Follow-Up 2

Dear {FIRSTNAME} {LASTNAME},

You are receiving this survey because you enrolled in a course or training program at {COLLEGE NAME} in the **{TERM} semester**. Your participation in this survey will help the college learn about how these courses and programs have prepared students for work or further education.

You may have received a survey like this last Fall. This is the last survey you will receive as part of this study. Your participation in this survey is voluntary, and we appreciate you taking the time to complete it.

After completing the survey, we will email you a \$10 Amazon.com gift code. Please note that you will receive an electronic code by email, rather than an actual gift card. More details will be provided at the end of the survey.

Survey Procedures

This survey will take about 10-15 minutes to complete. There are no right or wrong answers. You can skip any questions you don't want to answer.

Confidentiality

The information you provide on this survey will be kept strictly confidential. Your identity and your individual responses on the survey will never be reported. Your responses on this survey will be combined with responses from all other survey participants to create summary results. Only these summary results will be reported. Any personal information such as your name and your student ID number will never be disclosed to any party other than to the authorized research staff for the purpose of conducting the study.

Once you complete this survey and your gift code is emailed to you, your contact information will be deleted. We will not contact you with any further surveys or requests related to this study.

Questions

The survey is being conducted by IMPAQ International, an independent research organization, in partnership with {COLLEGE NAME}. If you have any questions about this survey, please contact Nada Rayyes at IMPAQ International (ebccstudy@impaqint.com or 510-597-2402). You may also contact {COLLEGE COORDINATOR NAME} at {COLLEGE NAME} {COORDINATOR EMAIL}.

Thank you very much for your participation!

College Status

Please use the "Previous" and "Next" buttons to navigate through the survey. Do NOT use your web browser's navigation buttons.

First, we would like to ask you about your current enrollment in college and/or other training programs.

Are you currently enrolled at {COLLEGE NAME}?

Please choose **only one** of the following:

- Yes
 No

Are you currently enrolled at another community college?

Please choose **only one** of the following:

- Yes
 No

Are you currently enrolled in a four-year college or university?

Please choose **only one** of the following:

- Yes
 No

Are you currently taking any job skills or technical training course(s) anywhere (at a community college, four-year college, one-stop, employer-sponsored program, or any other agency)?

Please choose **only one** of the following:

- Yes
 No

Certificate and Edu Questions

In the past 12 months, have you obtained or renewed any certificate, license, or permit related to specific job skills?

Please choose **only one** of the following:

- Yes
 No

What is the highest level of education you have achieved?

Please choose **only one** of the following:

- Less than high school diploma
 GED
 HS diploma, no college
 Some college, no degree
 College certificate
 AA or AS degree
 4-year degree (Bachelor's level)
 Master's degree
 PhD/ EDD/ MD/ other doctorate

Please choose how much you agree or disagree with the following:

The course(s) or program(s) I participated in during {Term} at {College Name} helped prepare me well for...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
My current job/career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Furthering my education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Starting my own business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Current Employment Status question(s)

Which of the following best describes your current employment status?

Please choose **only one** of the following:

- Self-Employed
- Employed at one job
- Employed at more than one job
- Paid internship
- Working, but not for pay (for example, unpaid internship, caregiving, volunteering, etc.) and NOT seeking paid employment
- Working, but not for pay, and seeking paid employment
- Unemployed, seeking paid employment
- Not working, and NOT seeking paid employment

TOTAL Hours Worked

In a typical week, how many hours do you work in total, combining hours from all your jobs?

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

Job Questions 1

For the following questions, if you have more than one job, please answer for the job which you consider your main job. This is usually the job that you work the most hours.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

In a typical week, how many hours do you work at this job?**Only answer this question if the following conditions are met:**

Answer was 'Paid internship' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

In a typical week, how many hours do you work at your main job?**Only answer this question if the following conditions are met:**

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- 40 or more hours per week
- 30-39 hours per week
- 20-29 hours per week
- Less than 20 hours per week
- Other

What is your current job title?**Only answer this question if the following conditions are met:**

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please write your answer here:

How closely related is your current job to the field of study in the coursework and training that you took at {College Name} in {Term}?**Only answer this question if the following conditions are met:**

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Very close - my current job is in the same field as my coursework and training
- Close - I use what I learned in my coursework and training even though I am not working in the exact same field
- Not close - my studies and training are not at all related to my current job

Job Sector or Industry question(s)

For the following question, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

What sector or industry is your employer's primary business in? Check the answer that best describes your employer's business. If you are self-employed, in which sector or industry is your primary business?

Example: A person is employed by a hospital, and is working for the hospital's technology support department. Although the person's job is related to technology, the employer's business is best described as health care. So, in this case, check "health care" as the answer.

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Employed at more than one job' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Manufacturing or Advanced Manufacturing
- Bio-technology/Bio-manufacturing/Bioscience
- Transportation and Warehousing
- Automotive, Mechanical and Electrical Repair and Maintenance
- Waste Management and Remediation Services
- Utilities/Energy
- Mining, Quarrying, and Oil and Gas Extraction
- Construction
- Retail Trade
- Wholesale Trade
- Information Technology
- Education/Educational Services
- Finance, Insurance, Real Estate
- Health Care/Hospitals/Medical services
- Social Services/Social Assistance
- Personal Services (laundry/cleaning, beauty/personal care, house/baby sitting, photographers, etc.)
- Other Professional and Technical Services
- Public Administration
- Hotel/Hospitality/Food Services/Restaurants
- Arts, Entertainment, and Recreation
- Other

Job status - FT/PT/Temp & Pay Rate

For the following questions, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Is your current job:

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Permanent
- Temporary/Seasonal

How much do you earn at your current job?

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Only numbers may be entered in this field.

Please write your answer here:

Is that pay rate:

Only answer this question if the following conditions are met:

Answer was 'Self-Employed' or 'Employed at one job' or 'Employed at more than one job' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please choose **only one** of the following:

- Per Hour
- Per Day
- Per Week
- Per Month
- Per Year
- Other

Pay rate verification question(s)

You reported that you earn \${Insert Amount} {Per Unit}. Is that correct?

Only answer this question if the following conditions are met:

Answer was 'Employed at one job' or 'Employed at more than one job' or 'Self-Employed' or 'Paid internship' at question '9 [Q8]' (Which of the following best describes your current employment status?) and Answer was NOT ' ' at question '20 [Q14a]' (How much do you earn at your current job?) and Answer was NOT 'Other' at question '21 [Q14b]' (Is that pay rate:)

Please choose **only one** of the following:

- Yes
 No

Company zip code question(s)

For the following questions, if you have more than one job, please answer for the job which you consider your main job.

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please enter the name of the city in which your current job is located:

Only answer this question if the following conditions are met:

Answer was 'Employed at more than one job' or 'Paid internship' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Please write your answer here:

Please enter the 5 digit zip code of your current job below. If you do not know, leave this question blank.

Only answer this question if the following conditions are met:

Answer was 'Paid internship' or 'Employed at more than one job' or 'Employed at one job' or 'Self-Employed' at question '9 [Q8]' (Which of the following best describes your current employment status?)

Only an integer value may be entered in this field.

Please write your answer here:

Promotion/Raise Question

In the past 12 months, have any of the following happened?

Please choose **all** that apply:

- I got a promotion at my job
 I got a wage/salary raise at my job
 I got a new position (at the same workplace)
 I got a new job (at a different workplace)
 I started my own business
 None of the above

Last Month's Income

How much did you earn in the last month? That is, how much did you take home after taxes and deductions? Include wages/ tips/ salary from all of your paid work, including all jobs if you have more than one. Do not include other earners in your household. We only want to know how much **YOU took home in the last month.**

Please choose **only one** of the following:

- No earnings (\$0) in the last month
- \$1 - \$1,000
- \$1,001 - \$2,000
- \$2,001 - \$3,000
- \$3,001 - \$4,000
- \$4,001 - \$5,000
- More than \$5,000

Future Plans

Finally, we'd like to ask you about your future plans:

Within the next year, do you plan to:

Please choose **all** that apply:

- Change jobs (if currently employed)
- Find a job (if unemployed)
- Change careers
- Move into a different industry
- Advance in your current job
- Gain education/ training at your job
- Take courses at a community college (for transfer, job training, career enhancement, or any other reason)
- Take job training/career enhancement courses/programs at an agency or organization other than a community college
- Take courses at a four-year college or university
- Obtain a new degree
- Obtain a new certificate/license
- Start your own business
- Retire
- Other:

Feedback

Do you have any comments or suggestions about the courses or program you participated in back in {Term} at {College Name}?

Please write your answer here:

Contact Info

As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?

Please choose **only one** of the following:

- Yes
- No

We will send the \$10 gift card to your email address after you complete the survey. Please make sure the email address we have for you is accurate.

Your contact information is kept strictly confidential, and will never be shared with anyone outside the authorized research team. This site is a secure site, and all information you provide on this website is encrypted, which will keep others from getting your contact information.

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Is {TOKEN:EMAIL} the best email address to use to send you the gift card after you complete this survey?

Only answer this question if the following conditions are met:

Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Please choose **only one** of the following:

- Yes
 No

What is the best email address we should use to reach you?

Only answer this question if the following conditions are met:

Answer was 'No' at question '35 [CT1]' (Is {TOKEN:EMAIL} the best email address to use to send you the gift card after you complete this survey?) *and* Answer was 'Yes' at question '33 [CT1a]' (As a token of appreciation for your time, we would like to email you a \$10 Amazon.com gift code. Are you interested in receiving the gift code?)

Please write your answer here:

Thank you very much for your participation in this study! Your input is very important, and will help determine the effectiveness of the programs offered at {College Name} and other community colleges in the Bay Area.

If the survey is complete, we will send a \$10 gift code to your email address. You will be able to use this code at Amazon.com. This could take one to two weeks to process.

Please contact us at EBCCStudy@impaqint.com for further assistance if you do not receive a gift card in 3 weeks or have any other questions.

PLEASE CLICK THE "SUBMIT" BUTTON BELOW

TO SUBMIT YOUR SURVEY RESPONSES

Failure to submit your survey will result in delayed gift code processing.

APPENDIX G. OUTCOMES SAMPLES

The tables below show gradually growing enrollment in DBS-funded programs, which peaked in Spring 2015. Exhibit G.1 provides an overview of the number of colleges, programs, and DBS and comparison students by each term. Exhibit G.2 provides a more detailed breakdown of DBS enrollment by college and term. Note that the DBS enrollment numbers provided by these exhibits is slightly different from the analytic sample.

Exhibit G.1 DBS Enrollment by Semester

Semester	Number of colleges offering DBS courses	Number of programs of study	Number of students enrolled in DBS	Number of students enrolled in Comparison	Total
Spring 2013	1	1			
Summer 2013	1	1	31	0	31
Fall 2013	8	20	530	352	882
Spring 2014	9	322	477	335	812
Summer 2014	2	1	56	25	81
Fall 2014	9	321	485	310	795
Spring 2015	11	24	555	299	854
Summer 2015	3	3	49	0	49
Fall 2015	8	15	290	0	290
Spring 2016	3	3	43	0	43
Unduplicated total	11	29	2516	1321	3837

Exhibit G.2 DBS Enrollment by College

	SU13	F13	S14	SU14	F14	S15	SU15	F15	S16	Total
BCC	0	0	61	0	124	152	22	0	0	359
Chabot	0	62	43	2*	110	58	0	44	0	319
COA	0	63	27	12	20	17	0	0	0	139
CCC	0	77	41	0	31	56	13	29	17	264
DVC	0	38	49	0	12	23	0	25	0	147
Laney	0	70	73	0	90	65	0	55	0	353
LPC	0	0	0	0	0	17	0	20	0	37
LMC	0	153	112	0	67	98	0	66	0	496
Merritt	0	28	0	0	9	3	0	0	0	40
Ohlone	0	38	38	0	22	33	0	7	14	152
Solano	31	1*	33	42	0	33	14	44	12	210
Total	31	530	477	56	485	555	49	290	43	2516

* We do not have any record of there being an active course at Solano Community College in Fall 2013, or at Chabot College in Summer 2014. Therefore, the two students at Chabot and one at Solano during these terms are likely due to misclassification of student reference term.

APPENDIX H. SUMMARY OF SURVEY RESPONSES

Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
CCCCO DATA										
Term										
SUMMER 2013	31	1.27	0	0.00	31	0.82	0.00	2450	1311	3761
FALL 2013	519	21.18	349	26.62	868	23.08	0.00	2450	1311	3761
SPRING 2014	473	19.31	333	25.40	806	21.43	0.00	2450	1311	3761
SUMMER 2014	56	2.29	25	1.91	81	2.15	0.00	2450	1311	3761
FALL 2014	470	19.18	306	23.34	776	20.63	0.00	2450	1311	3761
SPRING 2015	525	21.43	297	22.65	822	21.86	0.00	2450	1311	3761
SUMMER 2015	49	2.00	0	0.00	49	1.30	0.00	2450	1311	3761
FALL 2015	284	11.59	1	0.08	285	7.58	0.00	2450	1311	3761
SPRING 2016	43	1.76	0	0.00	43	1.14	0.00	2450	1311	3761
College										
(1) COLLEGE OF ALAMEDA	135	5.51	65	4.96	200	5.32	0.00	2450	1311	3761
(2) BERKELEY CITY COLLEGE	354	14.45	194	14.80	548	14.57	0.00	2450	1311	3761
(3) CHABOT COLLEGE	311	12.69	38	2.90	349	9.28	0.00	2450	1311	3761
(4) CONTRA COSTA COLLEGE	253	10.33	104	7.93	357	9.49	0.00	2450	1311	3761
(5) DIABLO VALLEY COLLEGE	145	5.92	357	27.23	502	13.35	0.00	2450	1311	3761
(6) LANEY COLLEGE	346	14.12	226	17.24	572	15.21	0.00	2450	1311	3761
(7) LOS MEDANOS COLLEGE	486	19.84	165	12.59	651	17.31	0.00	2450	1311	3761
(8) MERRITT COLLEGE	38	1.55	43	3.28	81	2.15	0.00	2450	1311	3761
(9) OHLONE COLLEGE	151	6.16	60	4.58	211	5.61	0.00	2450	1311	3761
(10) SOLANO COMMUNITY COLLEGE	195	7.96	49	3.74	244	6.49	0.00	2450	1311	3761
(11) LAS POSITAS COLLEGE	36	1.47	10	0.76	46	1.22	0.00	2450	1311	3761
Male	1417	72.74	853	73.47	2270	73.01	0.66	1948	1161	3109
Mean Age	29.25	11.23 (SD)	28.07	11.27 (SD)	28.81	11.25 (SD)				
Race/Ethnicity										

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	White	628	31.23	390	32.50	1018	31.70	0.00	2011	1200	3211
	Black or African American	308	15.32	121	10.08	429	13.36	0.00	2011	1200	3211
	Hispanic	493	24.52	302	25.17	795	24.76	0.00	2011	1200	3211
	Asian	396	19.69	225	18.75	621	19.34	0.00	2011	1200	3211
	Multiracial	186	9.25	162	13.50	348	10.84	0.00	2011	1200	3211
	Disability Flag	123	6.12	106	8.83	229	7.13	0.00	2011	1200	3211
	Ever Received any Financial Aid	1276	63.45	727	60.58	2003	62.38	0.10	2011	1200	3211
	Ever Received Pell Grant	707	35.16	436	36.33	1143	35.60	0.50	2011	1200	3211
	Pell Grant in Reference Term	543	27.00	351	29.25	894	27.84	0.17	2011	1200	3211
	EOPS Flag (first gen college student)	60	2.98	44	3.67	104	3.24	0.29	2011	1200	3211
	Ever Received EOPs program grant	122	6.07	85	7.08	207	6.45	0.26	2011	1200	3211
	Ever Received BOG Waiver (CA low income)	1249	62.11	707	58.92	1956	60.92	0.07	2011	1200	3211
	Received BOG Waiver in Reference Term	1078	53.61	613	51.08	1691	52.66	0.17	2011	1200	3211
BASELINE SURVEY											
	Currently attending Community College	2247	91.75	1247	95.12	3494	92.93	0.00	2449	1311	3760
	Currently attending 4-year-college	55	2.25	14	1.07	69	1.84	0.01	2449	1311	3760
	Currently attending Trade/Technical School	45	1.84	38	2.90	83	2.21	0.03	2449	1311	3760
	Currently attending Adult Education	26	1.06	4	0.31	30	0.80	0.01	2449	1311	3760
	Currently attending ROP	1	0.04	0	0.00	1	0.03	0.46	2449	1311	3760
	Currently attending Community Education	43	1.76	8	0.61	51	1.36	0.00	2449	1311	3760
	Currently attending None of the Above	105	4.29	19	1.45	124	3.30	0.00	2449	1311	3760
	What is your current goal?										
	Find a job or get a better job	1306	53.33	441	33.64	1747	46.46	0.00	2449	1311	3760
	Get a certificate or degree	1464	59.78	690	52.63	2154	57.29	0.00	2449	1311	3760
	Transfer to a 4-year-college	73	2.98	22	1.68	95	2.53	0.02	2449	1311	3760
	Receive CalFresh (SNAP)	215	8.78	65	4.96	280	7.45	0.00	2449	1311	3760
	Receive SSI	73	2.98	34	2.59	107	2.85	0.50	2449	1311	3760
	Receive Medicaid	107	4.37	43	3.28	150	3.99	0.10	2449	1311	3760

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	Receive Section 8 Housing	44	1.80	15	1.14	59	1.57	0.12	2449	1311	3760
	Receive any income-based benefits	345	14.09	118	9.00	463	12.31	0.00	2449	1311	3760
	Annual Household Income										
	(1) Less than \$10,000	646	27.89	291	24.03	937	26.57	0.04	2316	1211	3527
	(2) \$10,000 to \$25,000	548	23.66	270	22.30	818	23.19	0.04	2316	1211	3527
	(3) \$25,000 to \$50,000	510	22.02	287	23.70	797	22.60	0.04	2316	1211	3527
	(4) \$50,000-\$75,000	263	11.36	149	12.30	412	11.68	0.04	2316	1211	3527
	(5) More than \$75,000	349	15.07	214	17.67	563	15.96	0.04	2316	1211	3527
	Single Marital Status	1826	80.16	1064	84.44	2890	81.68	0.00	2278	1260	3538
	Married or Domestic Partnership/Civil Union	452	19.84	196	15.56	648	18.32	0.00	2278	1260	3538
	Dependents										
	(1) None	1592	69.25	894	73.10	2486	70.58	0.04	2299	1223	3522
	(2) One	314	13.66	129	10.55	443	12.58	0.04	2299	1223	3522
	(3) Two	185	8.05	97	7.93	282	8.01	0.04	2299	1223	3522
	(4) Three	106	4.61	42	3.43	148	4.20	0.04	2299	1223	3522
	(5) Four	50	2.17	34	2.78	84	2.39	0.04	2299	1223	3522
	(6) Five or more	52	2.26	27	2.21	79	2.24	0.04	2299	1223	3522
	U.S. Veteran	211	8.62	54	4.12	265	7.05	0.00	2449	1311	3760
	Employment Status										
	(1) Working Full Time	405	17.50	228	18.45	633	17.83	0.00	2314	1236	3550
	(2) Working Part Time	811	35.05	411	33.25	1222	34.42	0.00	2314	1236	3550
	(3) Unemployed/Seeking Job	805	34.79	355	28.72	1160	32.68	0.00	2314	1236	3550
	(4) Unemployed/Not Looking	293	12.66	242	19.58	535	15.07	0.00	2314	1236	3550
	Hours worked per week (if employed)										
	(1) Less than 20	458	34.62	221	34.48	679	34.57	0.87	1323	641	1964
	(2) 20 to 30	331	25.02	157	24.49	488	24.85	0.87	1323	641	1964
	(3) 30 to 40	284	21.47	140	21.84	424	21.59	0.87	1323	641	1964
	(4) More than 40	178	13.45	94	14.66	272	13.85	0.87	1323	641	1964

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
How long at current job (if employed)											
	(1) Less than 1 year	559	22.83	285	21.74	844	22.45	0.07	2449	1311	3760
	(2) More than 1 year	257	10.49	126	9.61	383	10.19	0.07	2449	1311	3760
	(3) More than 2 years	246	10.04	140	10.68	386	10.27	0.07	2449	1311	3760
	(4) More than 5 years	170	6.94	124	9.46	294	7.82	0.07	2449	1311	3760
Hourly wage (if employed)											
	(1) Less than \$10	292	23.91	159	25.94	451	24.59	0.14	1221	613	1834
	(2) \$10 to \$15	503	41.20	217	35.40	720	39.26	0.14	1221	613	1834
	(3) \$15 to \$20	197	16.13	101	16.48	298	16.25	0.14	1221	613	1834
	(4) \$20 to \$25	103	8.44	57	9.30	160	8.72	0.14	1221	613	1834
	(5) More than \$25	126	10.32	79	12.89	205	11.18	0.14	1221	613	1834
	Never had a job (if not currently employed)	195	18.82	148	27.16	343	21.70	0.00	1036	545	1581
When did you last work? (if unemployed)											
	(1) Less than 6 months ago	302	34.67	129	33.16	431	34.21	0.27	871	389	1260
	(2) 6 months to 1 year ago	187	21.47	81	20.82	268	21.27	0.27	871	389	1260
	(3) More than 1 year ago	144	16.53	82	21.08	226	17.94	0.27	871	389	1260
	(4) More than 2 years ago	238	27.32	97	24.94	335	26.59	0.27	871	389	1260
Hours worked per week at last job (if unemployed)											
	(1) Less than 20	458	34.62	221	34.48	679	34.57	0.87	1323	641	1964
	(2) 20 to 30	331	25.02	157	24.49	488	24.85	0.87	1323	641	1964
	(3) 30 to 40	284	21.47	140	21.84	424	21.59	0.87	1323	641	1964
	(4) More than 40	178	13.45	94	14.66	272	13.85	0.87	1323	641	1964
Hourly wage at last job (if unemployed)											
	(1) Less than \$10	233	27.44	114	31.84	347	28.75	0.22	849	358	1207
	(2) \$10 to \$15	300	35.34	135	37.71	435	36.04	0.22	849	358	1207
	(3) \$15 to \$20	134	15.78	43	12.01	177	14.66	0.22	849	358	1207
	(4) \$20 to \$25	75	8.83	29	8.10	104	8.62	0.22	849	358	1207
	(5) More than \$25	107	12.60	37	10.34	144	11.93	0.22	849	358	1207

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
Highest Level of Education											
	(1) No High School Diploma	69	2.85	28	2.18	97	2.62	0.10	2422	1285	3707
	(2) GED	121	5.00	75	5.84	196	5.29	0.10	2422	1285	3707
	(3) HS Diploma-No College	535	22.09	296	23.04	831	22.42	0.10	2422	1285	3707
	(4) Some College-No Degree	1046	43.19	537	41.79	1583	42.70	0.10	2422	1285	3707
	(5) College Certificate(s)	88	3.63	58	4.51	146	3.94	0.10	2422	1285	3707
	(6) 2 year AA or AS degree	173	7.14	105	8.17	278	7.50	0.10	2422	1285	3707
	(7) 4 year Degree	303	12.51	160	12.45	463	12.49	0.10	2422	1285	3707
	(8) Master's Degree	75	3.10	24	1.87	99	2.67	0.10	2422	1285	3707
	(9) Ph.D.	12	0.50	2	0.16	14	0.38	0.10	2422	1285	3707
Education--Simplified Categories											
	No post-secondary education	725	29.93	399	31.05	1124	30.32	0.39	2422	1285	3707
	Some College (no degree), or College Certificate	1134	46.82	595	46.30	1729	46.64	0.39	2422	1285	3707
	Certificate or 2-Year Degree (AA/AS)	173	7.14	105	8.17	278	7.50	0.39	2422	1285	3707
	Bachelor's Degree or higher	390	16.10	186	14.47	576	15.54	0.39	2422	1285	3707
FOLLOW-UP SURVEY 1											
	Currently enrolled at the reference college	425	70.25	282	73.82	707	71.63	0.23	605	382	987
	Currently enrolled at another community college	95	15.70	45	11.78	140	14.18	0.09	605	382	987
	Currently enrolled in a 4-Year College or University	39	6.45	32	8.38	71	7.19	0.25	605	382	987
	Currently taking job skills/tech training anywhere	178	29.42	114	29.84	292	29.58	0.89	605	382	987
	Obtained/renewed any certificate since reference term	103	17.67	51	13.78	154	16.16	0.11	583	370	953
	Course offered you the certificate or prepared you for it	85	82.52	46	90.20	131	85.06	0.21	103	51	154
	Why are you no longer enrolled? (If no longer enrolled at reference college)										
	I am still enrolled	5	2.84	3	3	8	2.90	0.94	176	100	276
	I completed a degree program	13	7.39	21	21	34	12.32	0.00	176	100	276
	I completed a training program	41	23.30	13	13	54	19.57	0.04	176	100	276
	I transferred to another community college	14	7.95	9	9	23	8.33	0.76	176	100	276

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	I transferred to a 4-year college	21	11.93	22	22	43	15.58	0.03	176	100	276
	I got a new or different job	52	29.55	16	16	68	24.64	0.01	176	100	276
	Courses I wanted were not available	26	14.77	11	11	37	13.41	0.38	176	100	276
	Program was not what I wanted/expected	11	6.25	3	3	14	5.07	0.24	176	100	276
	I needed more basic skills or courses	5	2.84	3	3	8	2.90	0.94	176	100	276
	Financial Reasons	33	18.75	10	10	43	15.58	0.05	176	100	276
	Family or Personal Reasons	33	18.75	23	23	56	20.29	0.40	176	100	276
	Other Reasons	31	17.61	19	19	50	18.12	0.77	176	100	276
	Courses I took enabled me to stay in current job										
	1Strongly Agree	94	16.04	84	22.22	178	18.46	0.10	586	378	964
	2Agree	120	20.48	80	21.16	200	20.75	0.10	586	378	964
	3Disagree	59	10.07	40	10.58	99	10.27	0.10	586	378	964
	4Strongly Disagree	21	3.58	9	2.38	30	3.11	0.10	586	378	964
	Courses I took enabled me to get a promotion or wage increase										
	1Strongly Agree	59	10.09	44	11.64	103	10.70	0.22	585	378	963
	2Agree	86	14.70	51	13.49	137	14.23	0.22	585	378	963
	3Disagree	86	14.70	71	18.78	157	16.30	0.22	585	378	963
	4Strongly Disagree	27	4.62	10	2.65	37	3.84	0.22	585	378	963
	Courses I took enabled me to get a job at a new organization										
	1Strongly Agree	104	17.84	50	13.30	154	16.06	0.07	583	376	959
	2Agree	106	18.18	60	15.96	166	17.31	0.07	583	376	959
	3Disagree	87	14.92	73	19.41	160	16.68	0.07	583	376	959
	4Strongly Disagree	19	3.26	7	1.86	26	2.71	0.07	583	376	959
	Courses I took enabled me to start my own business										
	1Strongly Agree	29	4.97	24	6.42	53	5.53	0.11	584	374	958
	2Agree	51	8.73	42	11.23	93	9.71	0.11	584	374	958

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	3Disagree	111	19.01	88	23.53	199	20.77	0.11	584	374	958
	4Strongly Disagree	45	7.71	21	5.61	66	6.89	0.11	584	374	958
	Courses I took prepared me to look for a possible new job										
	1Strongly Agree	218	37.14	132	35.29	350	36.42	0.22	587	374	961
	2Agree	206	35.09	155	41.44	361	37.57	0.22	587	374	961
	3Disagree	41	6.98	23	6.15	64	6.66	0.22	587	374	961
	4Strongly Disagree	14	2.39	4	1.07	18	1.87	0.22	587	374	961
	Courses I took did not have any impact on my employment										
	1Strongly Agree	72	12.33	45	11.94	117	12.17	0.54	584	377	961
	2Agree	114	19.52	87	23.08	201	20.92	0.54	584	377	961
	3Disagree	134	22.95	93	24.67	227	23.62	0.54	584	377	961
	4Strongly Disagree	115	19.69	69	18.30	184	19.15	0.54	584	377	961
	Courses I took helped me transfer to a 4-year college/university										
	1Strongly Agree	82	14.02	69	18.40	151	15.73	0.43	585	375	960
	2Agree	101	17.26	63	16.80	164	17.08	0.43	585	375	960
	3Disagree	76	12.99	44	11.73	120	12.50	0.43	585	375	960
	4Strongly Disagree	21	3.59	10	2.67	31	3.23	0.43	585	375	960
	Employment Status										
	1Self-Employed	22	3.74	31	8.22	53	5.49	0.02	588	377	965
	2Employed at one job	289	49.15	160	42.44	449	46.53	0.02	588	377	965
	3Employed at more than one job	44	7.48	32	8.49	76	7.88	0.02	588	377	965
	4Paid internship	17	2.89	4	1.06	21	2.18	0.02	588	377	965
	5Working, but not for pay & not seeking employment	11	1.87	11	2.92	22	2.28	0.02	588	377	965
	6Working, but not for pay, & seeking paid employment	15	2.55	9	2.39	24	2.49	0.02	588	377	965
	7Unemployed, seeking paid employment	119	20.24	74	19.63	193	20.00	0.02	588	377	965
	8Not working, not seeking paid employment	71	12.07	56	14.85	127	13.16	0.02	588	377	965

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	Hourly Wage (Derived Mean)	27.00	39.86 (SD)	24.68	43.17 (SD)	26.13	41.1 (SD)	0.54			
	How closely related is current job to field of study in training you took?										
	1Very close	73	19.73	52	23.01	125	20.97	0.53	370	226	596
	2Close	96	25.95	61	26.99	157	26.34	0.53	370	226	596
	3Not close	201	54.32	113	50.00	314	52.68	0.53	370	226	596
	What sector or industry is your employer's primary business in?										
	1Manufacturing or Advanced Manufacturing	40	11.08	6	2.73	46	7.92	0.00	361	220	581
	2Bio-technology/Bio-manufacturing/Bioscience	32	8.86	3	1.36	35	6.02	0.00	361	220	581
	3Transportation and Warehousing	13	3.60	12	5.45	25	4.30	0.00	361	220	581
	4Automotive, Mechanical and Electrical Repair and Maintenance	16	4.43	21	9.55	37	6.37	0.00	361	220	581
	5Waste Management and Remediation Services	3	0.83	2	0.91	5	0.86	0.00	361	220	581
	6Utilities/Energy	11	3.05	3	1.36	14	2.41	0.00	361	220	581
	7Mining, Quarrying, and Oil and Gas Extraction	3	0.83	0	0.00	3	0.52	0.00	361	220	581
	8Construction	17	4.71	8	3.64	25	4.30	0.00	361	220	581
	9Retail Trade	43	11.91	32	14.55	75	12.91	0.00	361	220	581
	10Wholesale Trade	7	1.94	3	1.36	10	1.72	0.00	361	220	581
	11Information Technology	9	2.49	4	1.82	13	2.24	0.00	361	220	581
	12Education/Educational Services	32	8.86	19	8.64	51	8.78	0.00	361	220	581
	13Finance, Insurance, Real Estate	5	1.39	5	2.27	10	1.72	0.00	361	220	581
	14Health Care/Hospitals/Medical services	19	5.26	22	10.00	41	7.06	0.00	361	220	581
	15Social Services/Social Assistance	3	0.83	5	2.27	8	1.38	0.00	361	220	581
	16Personal Services (laundry/cleaning, beauty/personal care, house/baby-sitting, photographers, etc.)	8	2.22	8	3.64	16	2.75	0.00	361	220	581
	17Other Professional and Technical Services	17	4.71	11	5.00	28	4.82	0.00	361	220	581
	18Public Administration	5	1.39	2	0.91	7	1.20	0.00	361	220	581

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
19	Hotel/Hospitality/Food Services/Restaurants	46	12.74	30	13.64	76	13.08	0.00	361	220	581
20	Arts, Entertainment, and Recreation	20	5.54	19	8.64	39	6.71	0.00	361	220	581
	How many hours per week do you usually work at your current job?										
1	Less than 20 hrs	123	34.07	62	28.18	185	31.84	0.15	361	220	581
2	20-29 hrs	64	17.73	36	16.36	100	17.21	0.15	361	220	581
3	30-39 hrs	79	21.88	69	31.36	148	25.47	0.15	361	220	581
4	40+ hrs	91	25.21	51	23.18	142	24.44	0.15	361	220	581
	Current job is Permanent	203	66.78	123	65.78	326	66.40	0.82	304	187	491
	Current job is Temporary/Seasonal	101	33.22	64	34.22	165	33.60	0.82	304	187	491
	Got a promotion since you took reference courses	22	3.91	16	4.49	38	4.13	0.66	563	356	919
	Received a wage increase since took reference courses	40	7.10	39	10.96	79	8.60	0.04	563	356	919
	Started a business since took references courses	5	0.89	12	3.37	17	1.85	0.01	563	356	919
	None of the above happened since reference courses	504	89.52	300	84.27	804	87.49	0.02	563	356	919
	How much did you earn in the last month after deductions?										
1	No earnings	160	30.89	113	34.98	273	32.46	0.05	518	323	841
2	\$1-1000	161	31.08	105	32.51	266	31.63	0.05	518	323	841
3	\$1,001-2000	94	18.15	57	17.65	151	17.95	0.05	518	323	841
4	\$2,001-3000	58	11.20	26	8.05	84	9.99	0.05	518	323	841
5	\$3,001-4000	19	3.67	14	4.33	33	3.92	0.05	518	323	841
6	\$4,001-5000	15	2.90	0	0.00	15	1.78	0.05	518	323	841
7	More than \$5000	11	2.12	8	2.48	19	2.26	0.05	518	323	841
	Derived Variables										
	Is Student Employed?	372	63.27	227	60.21	599	62.07	0.34	588	377	965
	Employed Full Time	170	47.09	120	54.55	290	49.91	0.22	361	220	581
	Employed Part Time	187	51.80	98	44.55	285	49.05	0.22	361	220	581
FOLLOW-UP SURVEY 2											

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	Currently enrolled at the reference college	305	47.96	228	56.72	533	51.35	0.01	636	402	1038
	Currently enrolled at another community college	78	12.26	40	9.95	118	11.37	0.25	636	402	1038
	Currently enrolled in a 4-Year College or University	85	13.36	61	15.17	146	14.07	0.41	636	402	1038
	Currently taking job skills/tech training anywhere	147	23.11	86	21.39	233	22.45	0.52	636	402	1038
	Obtained/renewed any certificate in the past 12 months	163	25.75	106	26.57	269	26.07	0.77	633	399	1032
	Highest Level of Education										
	(1) No High School Diploma	4	0.64	4	1.00	8	0.78	0.03	629	399	1028
	(2) GED	9	1.43	14	3.51	23	2.24	0.03	629	399	1028
	(3) HS Diploma-No College	55	8.74	35	8.77	90	8.75	0.03	629	399	1028
	(4) Some College-No Degree	252	40.06	170	42.61	422	41.05	0.03	629	399	1028
	(5) College Certificate(s)	67	10.65	30	7.52	97	9.44	0.03	629	399	1028
	(6) 2 year AA or AS degree	90	14.31	72	18.05	162	15.76	0.03	629	399	1028
	(7) 4 year Degree	118	18.76	62	15.54	180	17.51	0.03	629	399	1028
	(8) Master's Degree	27	4.29	12	3.01	39	3.79	0.03	629	399	1028
	(9) Ph.D.	7	1.11	0	0.00	7	0.68	0.03	629	399	1028
	Courses I took helped prepare me well for my current job/career										
	1Strongly Agree	205	33.06	112	28.64	317	31.36	0.41	620	391	1011
	2Agree	218	35.16	134	34.27	352	34.82	0.41	620	391	1011
	3Disagree	55	8.87	44	11.25	99	9.79	0.41	620	391	1011
	4Strongly Disagree	24	3.87	15	3.84	39	3.86	0.41	620	391	1011
	Courses I took helped prepare me well for furthering my education										
	1Strongly Agree	318	51.04	190	48.47	508	50.05	0.70	623	392	1015
	2Agree	242	38.84	168	42.86	410	40.39	0.70	623	392	1015
	3Disagree	19	3.05	9	2.30	28	2.76	0.70	623	392	1015
	4Strongly Disagree	10	1.61	7	1.79	17	1.67	0.70	623	392	1015
	Courses I took helped prepare me well for starting my own business										

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	1Strongly Agree	54	8.81	52	13.44	106	10.60	0.01	613	387	1000
	2Agree	121	19.74	96	24.81	217	21.70	0.01	613	387	1000
	3Disagree	117	19.09	72	18.60	189	18.90	0.01	613	387	1000
	4Strongly Disagree	38	6.20	29	7.49	67	6.70	0.01	613	387	1000
	Employment Status										
	1Self-Employed	38	6.09	26	6.55	64	6.27	0.69	624	397	1021
	2Employed at one job	313	50.16	181	45.59	494	48.38	0.69	624	397	1021
	3Employed at more than one job	63	10.10	47	11.84	110	10.77	0.69	624	397	1021
	4Paid internship	21	3.37	9	2.27	30	2.94	0.69	624	397	1021
	5Working, but not for pay and not seeking employment	7	1.12	6	1.51	13	1.27	0.69	624	397	1021
	6Working, but not for pay, and seeking paid employment	13	2.08	11	2.77	24	2.35	0.69	624	397	1021
	7Unemployed, seeking paid employment	112	17.95	72	18.14	184	18.02	0.69	624	397	1021
	8Not working, and not seeking paid employment	57	9.13	45	11.34	102	9.99	0.69	624	397	1021
	Hourly Wage (Mean)*	33.94	58.03 (SD)	30.12	43.15 (SD)	32.26	51.97 (SD)	0.57			
	How many hours per week do you usually work at your current job? (if work at one job)										
	1 Less than 20 hrs	154	41.51	65	30.23	219	37.37	0.06	371	215	586
	2 20-29 hrs	49	13.21	41	19.07	90	15.36	0.06	371	215	586
	3 30-39 hrs	66	17.79	47	21.86	113	19.28	0.06	371	215	586
	4 40+ hrs	97	26.15	59	27.44	156	26.62	0.06	371	215	586
	How many hours per week do you work total, at all jobs (if work at more than one job)										
	1 Less than 20 hrs	9	14.29	4	8.51	13	11.82	0.67	63	47	110
	2 20-29 hrs	11	17.46	10	21.28	21	19.09	0.67	63	47	110
	3 30-39 hrs	13	20.63	13	27.66	26	23.64	0.67	63	47	110
	4 40+ hrs	29	46.03	20	42.55	49	44.55	0.67	63	47	110

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
	How many hours per week do you usually work at your main job (if work at more than one job)										
	1 Less than 20 hrs	9	21.95	8	20.51	17	21.25	0.80	41	39	80
	2 20-29 hrs	9	21.95	12	30.77	21	26.25	0.80	41	39	80
	3 30-39 hrs	9	21.95	8	20.51	17	21.25	0.80	41	39	80
	4 40+ hrs	13	31.71	11	28.21	24	30.00	0.80	41	39	80
	How many hours per week do you work total (regardless of whether work one or more than one job)										
	Less than 20 hrs	163	37.56	69	26.34	232	33.33	0.02	434	262	696
	20-29 hrs	60	13.82	51	19.47	111	15.95	0.02	434	262	696
	30-39 hrs	79	18.20	60	22.90	139	19.97	0.02	434	262	696
	40+ hrs	126	29.03	79	30.15	205	29.45	0.02	434	262	696
	How closely related is current job to field of study in training you took?										
	1Very close	125	29.41	71	27.73	196	28.78	0.10	425	256	681
	2Close	114	26.82	53	20.70	167	24.52	0.10	425	256	681
	3Not close	186	43.76	132	51.56	318	46.70	0.10	425	256	681
	What sector or industry is your employer's primary business in?										
	1Manufacturing or Advanced Manufacturing	48	11.16	14	5.34	62	8.96	0.01	430	262	692
	2Bio-technology/Bio-manufacturing/Bioscience	47	10.93	4	1.53	51	7.37	0.01	430	262	692
	3Transportation and Warehousing	23	5.35	12	4.58	35	5.06	0.01	430	262	692
	4Automotive, Mechanical and Electrical Repair and Maintenance	23	5.35	23	8.78	46	6.65	0.01	430	262	692
	5Waste Management and Remediation Services	5	1.16	6	2.29	11	1.59	0.01	430	262	692
	6Utilities/Energy	10	2.33	9	3.44	19	2.75	0.01	430	262	692
	7Mining, Quarrying, and Oil and Gas Extraction	2	0.47	2	0.76	4	0.58	0.01	430	262	692
	8Construction	25	5.81	18	6.87	43	6.21	0.01	430	262	692
	9Retail Trade	38	8.84	22	8.40	60	8.67	0.01	430	262	692

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
10	Wholesale Trade	5	1.16	2	0.76	7	1.01	0.01	430	262	692
11	Information Technology	23	5.35	15	5.73	38	5.49	0.01	430	262	692
12	Education/Educational Services	28	6.51	20	7.63	48	6.94	0.01	430	262	692
13	Finance, Insurance, Real Estate	8	1.86	8	3.05	16	2.31	0.01	430	262	692
14	Health Care/Hospitals/Medical services	35	8.14	30	11.45	65	9.39	0.01	430	262	692
15	Social Services/Social Assistance	7	1.63	3	1.15	10	1.45	0.01	430	262	692
16	Personal Services (laundry/cleaning, beauty/personal care, house/baby-sitting, photographers, etc.)	8	1.86	10	3.82	18	2.60	0.01	430	262	692
17	Other Professional and Technical Services	17	3.95	12	4.58	29	4.19	0.01	430	262	692
18	Public Administration	7	1.63	3	1.15	10	1.45	0.01	430	262	692
19	Hotel/Hospitality/Food Services/Restaurants	42	9.77	25	9.54	67	9.68	0.01	430	262	692
20	Arts, Entertainment, and Recreation	18	4.19	15	5.73	33	4.77	0.01	430	262	692
	Current job is Permanent	271	67.41	158	62.70	429	65.60	0.22	402	252	654
	Current job is Temporary/Seasonal	131	32.59	94	37.30	225	34.40	0.22	402	252	654
	Got a promotion at job in last 12 months	52	11.82	30	10.27	82	11.20	0.52	440	292	732
	Got a wage/salary raise at job in last 12 months	128	29.09	82	28.08	210	28.69	0.77	440	292	732
	Got a new position at same workplace in last 12 months	60	13.64	38	13.01	98	13.39	0.81	440	292	732
	Got a new job at different workplace in last 12 months	112	22.18	62	18.40	174	20.67	0.18	505	337	842
	Started my own business in last 12 months	11	2.50	16	5.48	27	3.69	0.04	440	292	732
	None of the above happened in last 12 months	130	64.04	92	62.16	222	63.25	0.72	203	148	351
	How much did you earn in the last month after deductions?										
	1 No earnings	164	27.15	105	27.42	269	27.25	0.66	604	383	987
	2 \$1-1000	138	22.85	100	26.11	238	24.11	0.66	604	383	987
	3 \$1,001-2000	102	16.89	53	13.84	155	15.70	0.66	604	383	987
	4 \$2,001-3000	56	9.27	35	9.14	91	9.22	0.66	604	383	987
	5 \$3,001-4000	24	3.97	10	2.61	34	3.44	0.66	604	383	987
	6 \$4,001-5000	12	1.99	10	2.61	22	2.23	0.66	604	383	987

	Variable	DBS Freq.	DBS Percent	Comp Freq.	Comp Percent	Subtotal	Percent	Chi2	DBS N	Comp N	Total N
7	More than \$5000	108	17.88	70	18.28	178	18.03	0.66	604	383	987
	In the next year do you plan to...										
	Change jobs (if currently employed)	160	25.72	97	24.62	257	25.30	0.69	622	394	1016
	Find a job (if unemployed)	134	21.54	81	20.56	215	21.16	0.71	622	394	1016
	Change careers	65	10.45	42	10.66	107	10.53	0.92	622	394	1016
	Move into a different industry	67	10.77	43	10.91	110	10.83	0.94	622	394	1016
	Advance in current job	147	23.63	78	19.80	225	22.15	0.15	622	394	1016
	Gain education/training at your job	134	21.54	74	18.78	208	20.47	0.29	622	394	1016
	Take courses at a community college	250	40.19	171	43.40	421	41.44	0.31	622	394	1016
	Take job/career training courses	72	11.58	40	10.15	112	11.02	0.48	622	394	1016
	Take courses at a 4-year college/university	132	21.22	96	24.37	228	22.44	0.24	622	394	1016
	Obtain a new degree	116	18.65	85	21.57	201	19.78	0.25	622	394	1016
	Obtain a new certificate/license	127	20.42	80	20.30	207	20.37	0.97	622	394	1016
	Start your own business	40	6.43	28	7.11	68	6.69	0.67	622	394	1016
	Retire	13	2.09	3	0.76	16	1.57	0.10	622	394	1016
	Employed (Derived Binary Variable)	435	69.71	263	66.25	698	68.36	0.25	624	397	1021
	Employed Full Time (Derived Binary Variable)	205	47.24	139	53.05	344	49.43	0.33	434	262	696
	Employed Part Time (Derived Binary Variable)	223	51.38	120	45.80	343	49.28	0.33	434	262	696

Notes: Hourly wage is a derived variable, calculated from three variables: hours per week worked (categorical variable), wage (continuous), and wage unit (categorical). Hourly wage should be considered approximate because hours per week worked was categorical, and it was therefore impossible to determine exactly how many hours per week students worked. We only knew a range. For each of these categories, the median hours per week worked was used to determine hourly wage (e.g. for the category 10 hours per week or fewer, 5 was imputed).