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The Indirect Benefits of a Transit Apprenticeship and its Potential Value as a Flexible Postsecondary Pathway

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16. Abstract The transit sector has begun to embrace apprenticeships as a worthwhile training model. Apprenticeships may also address young people's interest in career advancement opportunities, an additional benefit to the transit sector as it replaces an aging workforce and resolves other recruitment challenges. Apprenticeships that emphasize both technical and soft skills invest in career advancement by offering employees the chance to develop "cross-cutting competencies." A highly developed model of this approach is found in the Santa Clara Valley Transportation Authority Joint Workforce Initiative (JWI), which formally recognizes skills acquisition with accredited certificates. Further development of this model would find support in initiatives to restructure postsecondary education in ways that better integrate non-degree and degree programs. Those efforts are gaining strength in response to persistent non-completion rates and declining college wealth premiums. This study contextualizes the JWI's strengths within the revival of non-degree credentials fueled by efforts like the California Guided Pathways Program. It identifies the JWI as a good candidate for pathways that lead to a degree. Drawing on guidelines for connecting job training with degree programs, the study details the importance of affordability, portability, and articulation and outlines how these features could be further developed in the JWI.			
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1. Recruitment Challenges in Public Transit

The U.S. Bureau of Labor of Statistics (BLS) projects a 3 percent growth in bus operator jobs from 2022 to 2032, or about 76,400 openings each year, on average, over the decade. Job growth in the transit sector will intensify the challenge of recruiting bus operators, a key operations position that makes up over 60 percent of the public transit workforce (Government Accountability Office, 2019; Puentes, et al, 2023, p. 6). The BLS expects retirements to generate much of the need in the near future. Most of the projected openings will replace current operators who are, on average, a decade older than workers overall with 44 percent of operators over the age of 55 (BLS, 18b; 11b). In addition to retirements, several factors related to the COVID-19 pandemic may have impacted the demand for operators. Agencies lost bus operators to stressors unique to frontline workers and laid off many other operators after cutting bus routes in response to decreased ridership (Pérez, 2021; Puentes et al., 2022). Transit ridership declined nationally by nearly three quarters during the pandemic and, by 2022, had recovered only by half (Dept of Transportation).

With the focus on retirements and pandemic recovery, transit workforce projections do not yet account for any new job growth that may come from the shift to low and zero-emission modes of transportation.[1] Recent decarbonization plans have identified high-occupancy, zero-emission buses as an attractive investment; however, it is too soon to know how those plans might impact the use of public transit (Muratori et al., 2023). Many different scenarios are possible. Bus ridership may increase in cities that shorten trip times by adding bus routes and dedicated bus lanes. Ridership could increase if private modes of transportation become cost prohibitive. The California Transportation Plan 2050 estimates one possible 2050 scenario that would increase the number of trips taken on foot, by bike, or on transit by 10 percentage points over the 2050 Baseline plan (Shaheen, 2018, p. 92).

The transit sector needs to replace an aging workforce that shrunk during the pandemic. It may also need to meet new demand for bus operators generated by clean energy plans in which buses play a key role. To resolve these workforce shortages, transit agencies will need to attract younger workers. Research suggests that it will be challenging to do so as younger workers tend to see limited career options in transit operations jobs (Adams and Hart, 2017; Hirsch and Kauder, 2017).

[1] California transit agencies aim to transition to zero-emission bus fleets by 2040 and that effort requires specialized workforce training currently under development by California Transit Works. The JOBS Act secured $105B for public transit and the Bipartisan Infrastructure Law secured another $90B.

1.1 Transit Workforce Training Embraces Soft Skills, Credentials of Value

The transit sector's recruitment challenges stem in part from a disconnect between the typical training process, with its focus on technical skills, and the complexities of public transit work, which involves engaging with the public about public transit infrastructure. Nationally, a commercial driver's license is the standard credential required by transit agencies and oftentimes it can be earned on the job (Bureau of Labor). However, research on transit workforce training suggests that credential on its own is insufficient, and it is recommended that bus operators receive on-going education in non-technical soft skills or what one study calls the "human element" and "good judgment" (Anderson, 2011, p. 2; Mackey et al., 2018). Industry guidelines encourage soft skills training in "coping skills" for "intense public contact," and research suggests such training reduces absenteeism and turnover (Gillespie et al., 2014, p. 72). These recommendations are not yet the norm and where a license is the only qualification, transit bus driving appears to be a technical job interchangeable with other commercial driving jobs such as mass trucking. That impression minimizes what Puentes et al. characterize as a bus operator's "ambassador" or "relational" role (p. 6). Bus operators "serve as reliable threads" in the communities in which they work and can serve as both community and transit representatives (Puentes et al., p. 6). In some cases, bus operators may serve as liaisons and translators for stakeholders (Puentes et al., p. 28). These descriptions recognize bus operating as a communication job, both in the historic sense of the term (i.e., communication as the transport of goods) and the modern sense of the term (i.e., communication as the mediation of perspectives) (Craig, 2001; Morley, 2005).

The Urban Institute has translated these recommendations into industry-specific standards for transit coach operators. Two of the six job functions identified in the Institute's curriculum focus on what they call "cross-cutting competencies" (pp. 11–12). Table I highlights thirteen expectations from the curriculum that align with common learning objectives for college communication classes and for degree programs where students develop communication competencies over a multi-year course of study.

Table 1. Representative Examples of Soft Skills Required of Transit Coach Operators

Job Function 4	Provides customer service to passengers and ensures safe transportation
	• Shows empathy • Uses appropriate body language • Understands common emotional triggers • Sets the tone • Exhibits reasonable flexibility • Attempts to resolve conflicts • Speaks clearly and directly • Exhibits awareness of different modes of communication • Uses active listening • Answers questions
Job Function 5	Communicates professionally with others to gain or convey information
	• Coordinates with others • Obtains relevant information and double checks it • Accurately conveys information

Source: The Urban Institute's framework for Transit Coach Operator apprenticeships (2017).

The Urban Institute's training template reflects a turn in workforce development toward soft skills acquisition. The job requirements for many occupations are changing and challenging traditional ideas of "an educated workforce" as employers insist that jobs of all kinds need the kinds of generalizable communication, reasoning, and judgment skills associated with a college degree (Deming, 2018). The California Community Colleges Chancellor's Office developed the New World of Work (NWoW) program specifically to meet the demand from industry partners for skill sets that include communication, diversity awareness, and information literacy (Schulz and Gill, 2014). Oregon's Office of Workforce Investments has launched a similar initiative. They surveyed employers to identify what they call "essential employability skills," and they now guide their regional partners in how to embed those skills in job training programs (Oregon Workforce and Talent Development Board, 2020).

The focus on soft skills in workforce development has prompted questions about design standards that can ensure "credentials of value" and that elevate the value of non-degree credentials (Carnevale, 2020; Zanville, 2020). The concerns about value stem from the assumption that industry-based education lacks the conceptual breadth or instructional conditions to foster complex multipurpose skills like empathy or critical thinking. Historically, these types of skills

have been the domain of degree programs that offer an extended course of study that achieves both breadth and depth. New workforce training practices are challenging those traditional divides. For example, the guidelines for quality credentials drafted by Van Noy et al. (2019) suggest that non-degree credentials can achieve some of the objectives typically reserved for degree programs, including portability, higher earnings, and a sense of civic involvement.

The transit sector has started to recognize the relevance of communication and other soft skills to transit work, and it has begun to embrace these new practices in some of its training programs to improve worker readiness. Training transit workers in soft skills might serve a dual purpose—preparing workers for the actual realities of the job and also equipping them with portable credentials in multipurpose soft skills that enable career advancement. Offering a credential of value could in turn help transit agencies to attract younger workers who are seeking jobs that feature career advancement opportunities.

The transit sector has some programs already in place that align with these new training practices. A handful of transit apprenticeships have laid the foundation for building credentials of value.

1.2 Registered Apprenticeships are a Credential of Value

The apprenticeship is a widely recognized and highly regarded non-degree credential. Registered apprenticeships undergo state and/or federal review. The favorable impression of apprenticeships is due in part to the fact that apprentices typically enjoy stable employment and see meaningful wage gains while employers see higher retention and better job performance. Three recent studies found that participants in registered apprenticeships earn more than matched or comparable groups who did not complete a post-secondary credential (Reed et al., 2012; Hollenbeck and Huang, 2016; DOL ETA, 2016). Reed et al. (2012) found that "participation in a registered apprenticeship was associated with substantially higher annual earnings" in all ten states studied (p. xiv). Hollenbeck and Huang (2016) found the long-term impacts of registered apprenticeships on hourly wages to be "quite positive" while the short-term net impacts "bring substantial positive labor market outcomes in the form of employment and earnings to individuals" (pp. 143, 145). A 2016 evaluation of the Department of Labor's American Apprenticeship Initiative (AAI) found that all AAI apprentices had higher earnings growth relative to comparable workers ("Beyond Productivity"). This evidence of direct monetary benefits for apprentices is consistent with a substantial body of research that finds apprenticeships beneficial for employer recruitment, retention, performance, and productivity (Reed et al., 2012; Rolland, 2015; Bruno and Manzo, 2016; Kuehn et al., 2022; Marotta et al., 2022). Although apprenticeships are typically offered in the trades, they have been found to help with the development of soft skills (Vaughan, 2017).

The benefits of apprenticeships generally have been found to extend to the transportation sector where studies show that transit apprenticeships and training partnerships see a return-on-investment for employers (Mackey, 2018; Schiavone and Wang, 2011). Schiavone and Wang (2011) found the benefits for employers to be substantial enough that they characterized formal

training programs as a necessary "capital investment" for transit agencies seeking to recruit the next generation of transit workers (p. 5). Several studies confirm that employees also see benefits from apprenticeships in the form of better training and support. Wang et al. (2004) found that apprenticeships can help employees with career advancement. Puentes et al. (2023) affirmed this finding and noted that apprenticeships can address the concerns of younger generations who are seeking access to careers and not just stable employment (p. 24).

Despite the value of apprenticeships, their limited number in the U.S. prevents them from serving as a reliable postsecondary education option. Apprenticeships account for only a small portion of U.S. career preparation options. An estimated 27 of 810 occupations recognized by the Department of Labor feature apprenticeships, with most options in construction and extraction industries (Fuller and Sigelman, 2017, p. 4). Fuller and Sigelman (2017) suggest that, in the U.S., the association between apprenticeships and traditional trade occupations is so dominant that even emergent technical occupations do not consider the apprenticeship model (p. 12). While the numbers in the transit sector are improving, they remain quite small. The Office of Apprenticeship reports only 31 programs for transit coach operators, with 28 located in California. This concentration may be due to the fact that California accounts for 19 percent of the 184,990 Transit and Inner City Bus Driver jobs available nationwide as of 2023.[2]

1.3 Santa Clara Valley Transportation Authority Sets the Gold Standard

The California-based Joint Workforce Investment (JWI) partnership between the Santa Clara Valley Transportation Authority (VTA), the Amalgamated Transit Union Local 265, and Mission College Santa Clara exemplifies the benefits of registered apprenticeships. The Amalgamated Transit Union International passed a resolution in 2019 designating the partnership as the "gold standard" for apprenticeship programs in transportation (VTA 2019, p. 10).

JWI apprentices are hired into the program as VTA employees. They simultaneously enroll as Mission College students, complete with a student ID. Apprentices undergo a campus orientation and are recognized as graduates upon completion of a certificate. Apprentices receive the VTA's starting salary for a coach operator ($55,744), and since they do not pay tuition or fees, they see an immediate return on their investment of time. Additionally, all JWI certificates are accredited. In 2023, the JWI graduated 150 apprentices from the 2021–2022 cohort in a ceremony held at Mission College.

[2] The Golden State had 35,960 active positions in 2023. The San Francisco-Oakland-Hayward and San Jose-Sunnyvale-Santa Clara metropolitan areas accounted for 22 percent of those positions, or 7,890 bus drivers (6,480 and 1,410 respectively). These numbers do not include the comparable Light Rail operators because the existing job classifications used by the Bureau of Labor do not specify or distinguish light rail jobs from other related modes of transportation such as streetcar drivers.

The JWI has been the subject of several studies (Anderson, 2011; Mackey et al., 2018; Puentes et al., 2023) that found it responsive to the specific needs of transit work, including the development of soft skills. Mackey et al. (2018) note that the program has mentors introduce apprentices to "actual service delivery on the street" (p. 5). Puentes et al. (2023) likewise note that the program requires mentors to ride along with their mentees on three occasions to observe and "offer advice and encouragement" (p. 116). This real-time instruction in real world situations is geared toward deepening conceptual skills that involve complex judgments, such as how to negotiate cultural differences (Mackey et al., 2018, p. 15).

The JWI offers certificates in five other areas of transit work in addition to the coach operator training. The coach operator courses serve as the point of entry into what will soon be six credentials with the addition of the Public Transit Leader program, which will accept its first cohort in fall 2025 (Table 2). Consolidating its training programs in this way, the JWI can address one of the main shortcomings identified by Adams and Hart (2017), who warn that the transit sector falls short of its workforce goals because its training programs by and large are "not credentialed or stackable" and thus lack advancement opportunities (p. 1). The JWI's constellation of accredited certificates allows potential recruits to see career opportunities at the outset. It signals to employees that they have access to well-defined and stable paths into other transit jobs. It invests in employees' education, encourages career advancement, and recognizes the value of an educated workforce.

Table 2. Six Certificates Offered Through the JWI

Coach Operator	Program entry point with foundational classes required of all JWI apprentices.
Overhead Line Worker	Qualifies for Overhead Line Workers, a high-level Way, Power, and Signal maintenance position in the mass transit field. Can promote to Overhead Line Worker Foreperson.
Service Mechanic	Qualifies for entry-level maintenance mechanic positions in the mass transit field with opportunity to promote to Transit Mechanic or Overhaul and Repair Mechanic.
Track Worker	Qualifies for entry-level Way, Power, and Signal maintenance positions in the mass transit field with opportunity for advancement.
Light Rail Operator	Began accepting apprentices in fall 2023; first certificate of its kind.
Public Transit Leader	Not yet a registered apprenticeship. The certificate standards will be finished by June 2025; likely accepting students by fall 2025. VTA expects to recruit from within for this program. Will qualify graduates to perform leadership duties at the field level across multiple job classifications within the Operations Division of a transit agency.

Apprenticeships are an effective means of preparing a transit workforce. They offer a comprehensive training experience and see a return on investment for the employer and employees. In the case of the JWI, the apprenticeship generates additional value as a means of career advancement within the transit sector. VTA employees can earn entry-level credentials and then move into other areas of transit work that offer higher wages. The program design thus serves the dual purpose of preparing workers for the actual realities of the job while also equipping employees with credentials that can be further developed along a career path within transit.

2. The JWI's Potential Value as a Flexible Post-Secondary Pathway

The JWI demonstrates how the apprenticeship model can elevate the quality and value of industry specific, job-based credentials. It affirms the findings of a growing body of literature that sees rising value in non-degree credentials and "middle-skill pathways" into jobs that require at least a high school diploma but not necessarily a bachelor's degree (Newman and Winston, 2016; Fuller and Sigelman, 2017; Hoffman and Schwartz, 2017; Carnevale et al., 2020; Gallagher and Maxwell, 2020). The current interest in non-degree credentials stems in part from the fact that they already account for 18 percent of undergraduate enrollments in the U.S. at a time when just under 40 percent of all college students start but do not complete a degree (Carnevale et al., 2020; National Student Clearinghouse, 2023). The growth in non-degree credentials signals a growing demand for affordable and relatively quick career pathways (Carnevale et al., 2020). Carnevale et al. (2020) caution, however, that postsecondary institutions and industry partners have yet to unlock the full value of non-degree credentials by "shoring up the connections among and between" certificates, associate's degrees, and bachelor's degrees (p. 32). Bailey et al. (2015) echo this finding where they note that "the lack of coherence" and "poor alignment" between offerings "create barriers to advancement for students" (p. 22). In other words, non-degree credentials will prove more valuable when they come in the form of affordable, portable, multipurpose content that can articulate with degree programs.

Our study applied these three metrics—affordability, portability, and articulation-–to the JWI and found that its certificates hold potential value for all three measures. The full value of JWI as an entry point into progressive, flexible, and "guided" career pathways has not been fully realized.

JWI's unrealized potential is neither a deficiency in the program nor unique to JWI. Several administrative and conceptual obstacles impede further modification of the program. The main problem is that, due to the historic divide between Career Technical Education (CTE) and degree programs, current practices in higher education simply do not support career pathways that route through apprenticeships. The obstacles are not insurmountable and the conditions for change are favorable. The diminished premium of the bachelor's degree has softened the resistance to alternative credential models and opened the door for programs like the JWI to connect with other postsecondary pathways in more meaningful ways.

After briefly explaining what is meant in each case by "potential value," we elaborate on affordability, portability, and articulation options for the JWI. Section 1 contextualizes the JWI affordances within national and regional trends in postsecondary education. Section 2 details the program's structure and explains the administrative barriers to portability. Section 3 reviews three different models of CTE that lead to degrees and identifies content in JWI courses that could eventually articulate with learning objectives common in California's general education programs

and other learning objectives. The concluding section proposes the next steps for program modification and future assessments.

2.1 How this Study Was Conducted

We collected, collated, and analyzed publicly available data gathered from sources such as the U.S Bureau of Labor, the U.S. Department of Transportation, and the U.S. Department of Education to better understand the landscape of higher education and the current challenges associated with traditional postsecondary pathways. This, in turn, set the stage for a focus on apprenticeships and alternate postsecondary pathways, which led to a closer examination of the form and composition of the JWI. Most of the primarily quantitative data were obtained from reports published by the Federal and State governments, peer-reviewed journal articles, and trade publications.

For all three main research foci, we attempted to integrate findings in order to highlight the specific route offered by the JWI and the ways in which this track may favorably integrate with other postsecondary offerings. Additionally, we performed a content analysis of curricular offerings, syllabi, student learning outcomes, and other materials associated with the JWI program. In consultation with the Dean of Workforce Development at Mission College, we took an inventory of features relevant to continuing education and career development to determine what is and what is not currently in place that permits transferability and advancement. Publicly available data was referenced to confirm and contextualize features of the program, such as median earnings, transit sector job growth, and certificate activity.

2.2 Three JWI Apprenticeship Features with Potential

Affordability. The JWI comes at no cost to students who start earning a salary and benefits, making it not only highly affordable but also ensuring that employees see an immediate return on investment of their time. With a salary range of $55,000 to $85,000 for coach operators, the JWI offers apprentices a wage premium[3] and a salary comparable to or higher than the median starting salaries of graduates with bachelor's degrees (Table 3). This affords JWI graduates a short-term financial advantage over many of their degree-holding counterparts, even regionally.

The financial affordances of a JWI credential do not match those of the bachelor's degree apart from the initial wage premium. The bachelor's degree remains the only postsecondary credential that consistently realizes a long-term wage premium, although, as we discuss later, that premium has shrunk considerably (Rose, 2013; Tamborini et al., 2015; Carnevale et al., 2018; Ricketts et

[3] Wage premium here refers to any salary over the median salary of those with only a high school diploma. The median income for high school graduates in Santa Clara and San Mateo Counties in 2022 was $44,800, compared to $38,500 for the state of California (Silicon Valley Institute for Regional Studies and U.S. Census Bureau American Community Survey).

al., 2019).[4] JWI certificates qualify graduates for a select number of jobs within the transit sector with limited advancement options. In contrast, a bachelor's degree is flexible and generalizable enough to qualify graduates for a range of career advancement opportunities.

The JWI could afford students a competitive advantage if it served not as a terminal credential but as an entry point or "stepping stone" to other educational offerings. It would be competitive as such compared to other points of entry that charge students, delay the start of a career until after graduation, and see only modest returns on investment at the time of graduation.

Portability. Any potential affordances depend on the JWI certificates becoming more portable. The JWI sits at the precipice of the kind of "convergence of postsecondary and industry credentials" that Zanville (2020) recommends (p. 85). JWI apprentices earn college credit at Mission College as they complete VTA certificates. The credit hour is the coin of the realm in higher education. It is the administrative device that facilitates credit transfer within and between institutions of higher education. Adoption of the credit hour by industry-based educational programs in exactly the manner of the JWI is the easiest way of realizing a convergence of industry credentials and degree programs. However, most JWI credit hours do not transfer or do not automatically articulate with degree options as they do in some career technical fields. The articulation process is a hurdle for any program, but it is made more challenging in this case by the lack of precedent for articulating apprenticeships with degree programs. The fact that any JWI credits count toward a degree is more surprising than the fact that none of the certificates connect to a degree pathway yet.

The JWI credentials are portable within the transit sector, and a few credit hours are portable within postsecondary education. The value of the credentials would increase if the credits transferred more seamlessly to other postsecondary pathways and if more of the credits applied toward degrees. The program is poised for that kind of modification at a time when public support is growing for postsecondary pathways that include some work-based learning (National Skills Coalition, 2024).

Articulation. Articulation is the administrative process that enables students to take credit hours with them and build on their educational accomplishments. Nudged in recent years by state governing bodies, most colleges and universities now embrace articulation as a shared goal and aim to eliminate the "dead ends" that prevent students from transferring credits from one institution to another.

[4] The college wage premium is the classic measure of the value of a bachelor's degree. The premium refers to the higher earnings that degree-holders typically enjoy compared to those without a degree. Historically, the bachelor's degree has been the most reliable path to upward mobility due to its premium. The premium still exists, but a variety of factors have eroded its margins.

Only the two credit hours earned in "TRN 101: Foundations of Public Service for Transit Workers" currently count toward an associate's degree and students must request that they be applied. That student-initiated administrative step requires some know-how and persistence. For the credits to transfer independently beyond Mission to other colleges would require a review process in accordance with state articulation policies. Reviewers would need to identify the degree requirements to which JWI credits could apply. Reviewing credits for transfer is commonplace and often leads to "articulation agreements" between institutions.

Apprenticeships can seem too tailored to specific jobs to articulate with the kind of general curriculum that a degree represents. However, the new emphasis on "cross-cutting competencies" encourages CTE programs to combine technical skills with soft skills in ways that further expand the possibilities for articulation. Since the JWI already features a curriculum that combines technical and soft skills, it could potentially articulate with general education requirements and other learning objectives. We identify three possible articulation models and use curriculum mapping to identify several possible points of articulation with California's general education programs and with the undergraduate curriculum endorsed by the Association of American Colleges & Universities (AAC&U).

3. Incremental Gains Can Make a Difference in Affordability

At no cost to students, JWI certificates are a highly affordable credential, but a tuition comparison alone does not fully capture the program's potential affordances as a postsecondary pathway. Wage gain is another common measure of postsecondary credentials, but it was more meaningful when higher education maintained a strict separation between CTE and degree programs. It made sense to correlate pathways with lifetime earnings when educational institutions tracked students into specific paths from which they rarely deviated. As non-degree and degree credentials began converging and transfer became commonplace, the place a student started their education no longer served as a reliable indicator of future outcomes.[5]

This section contextualizes the financial affordances of the JWI within national trends that show rising risks for degree seekers, especially first-generation students and students of color, and declining returns on a college degree. The benefits and risks of the college degree have changed such that some analysts are questioning the inclination to push all students toward that path (Newman and Winston, 2016; Hoffman and Schwartz, 2017; Seamster and Charron-Chénier, 2017; Zanville and Travers, 2022). The calls for a convergence of work-based learning and degree programs respond to these educational trends and concerns.

Since the 1980s, a college degree has seen a wage premium for graduates, if not a "sizable economic return" (Carnevale, Rose, and Cheah, 2011, p. 20). The college wage premium has been so reliable that it is the standard measure of the value of a college degree. It is calculated by comparing the lifetime earnings of college graduates to the lifetime earnings of workers with high school diplomas who do not hold any postsecondary credentials (Rose, 2013; Tamborini et al., 2015; Carnevale et al., 2018). Studies consistently show the median lifetime earnings of those with a bachelor's degree to be a little over half a million more than the median lifetime earnings for all workers (Carnevale et al., 2011, p. 4).[6]

The college wage premium is a reliable metric until qualified by factors like type of school attended (e.g., non- or for-profit; selective or open admission), pre-collegiate family wealth, post-collegiate debt, area of study, race and ethnicity, and time to degree. For example, the selectivity of the college is a significant factor in how much college graduates earn over a lifetime (Chetty et al., 2023); first-generation graduates do not see the wage advantages enjoyed by their second-generation peers (Fry, 2021); Black and Latinx degree-holders earn 20 percent less than their white peers over the

[5] A 2012 National Student Clearinghouse study found that upwards of one-third of all college students change institutions before earning a degree (Hossler et al., 2012).
[6] Tamborini et al.'s (2015) findings, based on actual lifetime earnings, confirmed Carnevale et al.'s (2011) synthetic data.

course of a lifetime (Carnevale et al., 2011); and the risk of no premium is highest for the significant numbers of people who start and do not finish college (Webber, 2018).

As of 2022, 36.8 million U.S. adults under 65 had some college experience but no degree (a 2.9 percent increase from 2021), leaving them effectively uncredentialed as only a completed degree counts as college-educated (National Student Clearinghouse, 2024). Just under 40 percent of all college students start but do not complete a degree (Carnevale et al., 2020; National Student Clearinghouse, 2023). A disproportionate number of these students are men and Hispanic, Black, and Native American (National Student Clearinghouse, 2024). Webber (2018) cautions that there is "little pay off without a degree" and the risk increases the more that students finance their own education (p. 3). Lockwood and Webber (2023) maintain that "the single-biggest determinant of the… risk associated with attending college is the substantial likelihood of non-completion" (n.p.).

High non-completion rates illustrate the shortcomings of an "all or nothing" educational economy and the need for midway options. The diminishing returns on the college degree overall give additional reason to rethink the strict separation between degree and CTE programs, if doing so can support degree pathways. Work-based education addresses some of the concerns about "college for all" policies, but it alone may not support long-term career development (Hampf and Woessmann, 2017). The concern here is that job-specific skills such as the ability to provide transit information to riders may not provide students with enough experience to move into other occupations.

The college wage premium has never been equitable, but recent trends show a general decline in the financial benefits of a degree for everyone. Emmons et al. (2019) used the Federal Reserve's Survey of Consumer Finances (SCF) to measure the college *wealth* premium. The wealth premium accounts for all assets and debts (not just wages) over the lifespan of a typical college graduate. When measured by SCF, the wealth advantages of a college degree for all student populations born since 1980 nearly evaporates: "The wealth-building advantage of higher education has declined among recent graduates of all demographic groups, [and] only the wealth premium for White four-year college graduates remains statistically significant" (Emmons et al., 2019, p. 299). Put differently, white people are

> the only racial or ethnic group born in the 1980s for whom a bachelor's degree provides a family with a reliable wealth advantage over comparable nongraduate families—albeit one that is much smaller than those enjoyed by earlier cohorts of college graduates (Emmons et al., 2019, p. 316)

Emmons et al. (2019) have yet to determine why the college wealth premium has declined, but they make a strong case for attributing this decline to the rising cost of college—an explanation supported by historical fact. The cost of attending a four-year public college has more than doubled since 1992 after adjusting for inflation (Ma and Pender, 2022). The sharp increase in tuition

coincides with the 1992 restructuring of federal college loans that outsourced lending programs to banks.[7]

The decline of the college premium is acute enough that attending college now poses unreasonable risks to some student populations. Analyzing SCF data from 2001 to 2013, Seamster and Charron-Chénier (2017) found a racialized gap in debt trends among college students and rising levels of educational debt among Black students and Black college graduates. Student loans have become more available since the 1992 reauthorization of the Higher Education Act (Eaton, 2022). However, Seamser and Charron-Chénier (2017) argue that while the wider availability of loans "may allow an increasing number of black students to pursue a college education," the "evidence suggests that this occurs in a context where differential returns yield much lower returns than those experienced by whites" (p. 200). Black students also manage more risk than their white counterparts. As one analyst explained, higher education's cost/benefit margins are slim enough in many cases that even relatively small differences in asset availability in the range of $10,000 can determine both a person's educational options as well as their returns on investment (McMillan Cottom, 2021). Seamser and Charron-Chénier (2017) found the financial risks for Black students to be substantial enough that they characterize higher education's admissions, enrollment, and financing patterns as a form of "predatory inclusion" (p. 199).

The stubborn college incompletion rates and the decline in the college wealth premium have renewed the interest in non-degree pathways. Higher education's thin margins have fueled a revival in alternative options that travel through apprenticeships and CTE programs (National Skills Coalition, 2024). These alternatives do not replace the degree as a wealth-building instrument, but they could be combined with degree pathways in ways that afford students greater financial stability at the outset of their careers. This is possible in cases like the JWI where students see an immediate wage premium while also gaining competency in flexible skills that can be scaffolded up. That combination of factors is important as job experience alone does not necessarily contribute to career advancement.

Converging pathways afford students new financing and educational options and alter the traditional milestones used to measure career advancement. Credentialing models that support incremental hybrid pathways (non-degree + degree) give students the option of leveraging the benefits of one program to access another. Short term gains become more significant in cases where programs do not "dead end" and instead support next steps in career pursuits (Zanville and Travers, 2022).

[7] The 1992 reauthorization of the Higher Education Act restructured funds previously reserved for direct government student loans and re-routed them to pay banks the interest on subsidized loans while students were in school and to cover any loans that students failed to repay, an arrangement that drastically reduced the risks of easing eligibility for college financing (Eaton, 2022).

The JWI illustrates the potential advantages of starting postsecondary education with an apprenticeship as compared to starting in a degree program at a cost and without a guarantee of seeing a wage premium until some time after graduation. The tuition-free program secures apprentices a wage premium sooner than degree pathways, potentially allowing for incremental gains earlier in a student's career.

As shown in Table 3, the starting salaries for VTA Coach Operators, earned during training, are comparable to the starting salaries of many college graduates, even in California. The national earnings data for college graduates show a gradual ascent in wages, a trend confirmed by Carnevale et al. (2011).[8] As noted previously, the wage premium metric does not account for educational debt, which can erode the premium and stall upward mobility. Educational debt is the norm for some student populations. Of those surveyed by Lightcast (2023), 82 percent of Black and African American alumni reported still carrying college debt as did 75 percent of those who identified as first-generation alumni.

[8] The differences among median earnings by educational level are much smaller at the beginning of an individual's career (25–29 years old) than later in an individual's working life (Carnevale et al., 2011).

Table 3. Earnings Data for JWI Apprentices, Undergraduate Alumni (Nationally), and Undergraduates at Institutions in and Near Santa Clara, California Ten Years after their Initial Enrollment

	JWI Coach Operator apprentice earnings	4-year degree alumni median earnings (nationally)*	Mission College median earnings**	San José State University median earnings**	University of California, Santa Cruz median earnings**
At the start of the program	$55,744				
1 year post-graduation		$35,000 – $39,000			
5 years post-graduation		$60,000 - $69,000			
10 years from initial enrollment as an under-graduate			$51,000	$79,000	$68,000
10 years post-graduation	VTA coach operators can earn upwards of $85,758	$90,000 to $99,000			

Source: *Lightcast's 2023 National Alumni Career Mobility Survey; **U.S. Department of Education College Scorecard.

Notes on sources: The Lightcast 2022 national survey collected 9,000 responses from alumni with undergraduate degrees from 38 not-for-profit colleges and universities. The U.S. Department of Education College Scorecard calculates median earnings for individuals who began college at the reported institution, who were federally aided, and who were working and not enrolled in school as of the measurement point, which is ten years after *initial enrollment* regardless of the student's completion status.

The potential affordances of a tuition-free program like JWI, in which students earn a salary, are twofold. First, it secures students an immediate wage premium that could finance additional education. Second, such a program could provide students an occupational "soft landing" as they explore career options. A future version of the JWI that allows for greater portability and flexibility could be an attractive option for students who want advancement opportunities and who do not have access to other assets such as parental wealth.

4. Portability is Primarily an Administrative Matter

The portability of a credential depends on system processes that govern individual credentialing programs. A credential, be it degree or non-degree, is portable if it is recognized outside of its issuing institution. A non-degree credential earned through an apprenticeship, for example, should qualify its holder for comparable jobs that become available anywhere, just as an accredited bachelor's degree should satisfy any degree requirements for master's applicants. The convergence of non-degree and degree credentials presents unique challenges for portability as it requires refashioning the mechanisms used to determine equivalences. Those mechanisms were designed for a postsecondary landscape in which degree and non-degree credentials circulated for the most part in separate spheres. Integrating these credentials potentially relieves students of the burden of defending credentials and the risk of "lost time." All accredited learning would count in an integrated postsecondary landscape, making it more feasible for students to continue their education regardless of where they begin and after stop outs (Bailey et al., 2015).

Any systems integration will require a willingness to recognize job-based learning as comparable to classroom-based learning, at least in theory. The changing postsecondary landscape has contributed to attitudinal shifts toward CTE. Reconfiguring its role in postsecondary education is nevertheless made difficult by curricular and administrative differences baked into programs in ways that discourage or confound convergence with degrees. CTE programs tend to correspond with only a single occupation, but specialization is not the only obstacle to them becoming more portable. For example, new VTA coach operators join as apprentices and simultaneously enroll as ATU members and Mission College students in an onboarding process that may feel integrated. This sense of coherence requires a great deal of behind-the-scenes coordination of policy, procedure, funding, and administration that is more cooperative than seamless. The joint effort implied in the program's name is visible in staffing and curriculum management arrangements designed to bridge fundamentally different organizations. These arrangements help to explain why JWI certificates are not currently portable beyond the transit sector regardless of a student's preferences or efforts. JWI students are unable to build on their transit credentials in the way that an associate's degree sometimes builds on a career technical certificate and a bachelor's degree builds on an associate's degree.

This section takes a closer look at the structure of the JWI, highlighting how it differs from a degree program and exploring the practical considerations of an apprenticeship-degree convergence. It compiles publicly available program information that was confirmed and clarified by Mission College Dean of Workforce Innovation Jeffrey Pallin.

The mechanisms for staffing the JWI illustrate the differences that keep CTE structurally separate from degree programs. In California, registered apprenticeships are managed through the California Department of Industrial Relations, Division of Apprenticeship Standards (DAS), and the California Apprenticeship Council (CAC). DAS distributes the California Proposition 98

funding allocated for apprenticeships. With a goal of increasing apprenticeships from 100,000 to 500,000 by 2029, California increasingly routes funding for apprenticeships through community colleges using several mechanisms, including the California Apprenticeship Initiative (CAI) and the Related and Supplemental Instruction (RSI) Reimbursement Program. Mission College receives RSI Reimbursement funds from DAS, retaining approximately 15 percent for administrative purposes and remitting the rest to VTA to defray their program costs, which includes compensation for the VTA employees who serve as instructors and mentors. Mission College registers VTA instructors as non-district employee faculty.

It is important to note that industries are not required to partner with colleges to offer apprenticeship programs, but RSI is a requirement of registered apprenticeships that industries would otherwise need to fund.[9] Routing RSI Reimbursements through community colleges, which are mandated to assist with workforce development, serves a centralizing function for the state. The funding structure effectively retains educational matters within educational domains rather than outsourcing the responsibility to industry sectors that are not designed for education. RSI Reimbursement pairs the educational expertise of community colleges to sector-specific subject matter expertise as mandated by apprenticeship guidelines and the California education code. The codified model is premised on the understanding that unions and employers typically have the most qualified instructors for job-based education while colleges have ready-made educational services that support instruction, including outreach and advising. This model allows for circumstances in which the people most qualified to instruct apprentices need not meet the academic qualifications for college faculty such as holding a bachelor's degree.

The partnership model is meant to leverage different strengths in industry and education. It is not designed to reconcile those differences, nor is there any need to reconcile wherever apprenticeships sit apart from other educational offerings as a non-degree option. The gradual convergence of non-degree and degree programs changes that balance. A series of resolutions by the Academic Senate for California Community Colleges (ASCCC) illustrate the thorny questions that convergence raises. In 2017, the ASCCC resolved that all faculty evaluation processes and professional development requirements apply to faculty teaching in apprenticeships, a decision meant to address "a lack of integration of apprenticeship instructors into the professional life of college faculty" (n.p.). The resolution contains an important caveat related to funding streams: It applies only to apprenticeship courses for which funding is determined by "full-time equivalent students" or FTES, an accounting device wholly different from RSI Reimbursements. In effect, and due to divisions between funding streams, the resolution does not extend to all apprenticeship faculty, and it is unlikely to include those who are industry based, such as those involved in the JWI.

[9] "Registered apprenticeship" is a U.S. Department of Labor designation. It indicates an apprenticeship has been vetted by an industry and validated by the Department's Office of Apprenticeship and/or State Apprenticeship Agencies, a process that can happen without any college involvement.

The point here is not that all faculty evaluation and development must reside within the community colleges for program integration to succeed. Rather, we note these faculty differences as an example of the complexities that must be negotiated for integration to happen. Since further integration of the JWI into degree pathways has yet to be attempted, we cannot say to what extent the structural differences between apprenticeship and classroom faculty may impede the process. It is unknown, for example, whether or how differences in faculty evaluation processes might hamper articulation efforts which require a review of course equivalencies.

A second similar and related issue stems from the differences between apprenticeship job-based hours and classroom-based credit hours. The JWI coach operator certificate involves 19 weeks of classroom instruction and 2000 hours of on-the-job training. For the purposes of the apprenticeship, on-the-job training accounts for 6 units of the program, but there is no arithmetical relationship between hours and units. The California Education Code guides the creation of work experience sections from 1 to 6 units based on learning objectives, not necessarily hours. As with instructional differences, these design details stem from the need to serve purposes other than academic qualifications, which are measured by instructional hours.

For an apprenticeship to become portable, i.e., for a portion of apprenticeship hours to be accepted for transfer, there must be some means of reconciling apprenticeship activities with classroom activities to generate credit hour equivalences. This raises practical questions about how 2000 work hours might be differentiated and weighted in academic terms, reintroducing questions of instructor qualifications and development in so far as individual instructors play a role in defining and assessing learning activities. The VTA and ATU would each need to contribute to the design of any additional credits-for-transfer, but as credit hours are the domain of colleges, the current balance would likely shift. Colleges would need to decide, for example, if they are setting standards for their industry partners or developing new ways of recognizing different learning modes.

A third issue further illustrates the complexities of these questions. Unlike college-based CTE programs that reside wholly within a college's domain, an apprenticeship curriculum can be "owned" by an industry partner. Such is the case for the JWI, which is owned by the VTA. This third issue raises additional questions about how curriculum review would occur.

All partners would need the will to address these questions, should the JWI elect to integrate with degree pathways. Each project stakeholder may first need to clarify their own reasons for that type of restructuring and any benefits they expect from it.

5. The Possibilities for Articulating Transit Apprenticeships and Degree Programs

The issues with integration identified in Section 2 may seem more relevant to academic programs than to industry partners. Our study presumes that an interest in resolving recruitment challenges with the proven benefits of apprenticeships is enough reason for the transit sector to explore the potential of hybrid career pathways. In reality, employee career development may not be a compelling reason for transit agencies to invest in deeper, messier partnerships with academic institutions.

For employer purposes, the existing direct benefits of apprenticeships (e.g., increased productivity, improved retention rates, and improved job performance) already suffice to justify the costs, and it would be a disservice to apprenticeships to require them to justify their existence by further expanding beyond their existing objective, which is to recruit and prepare apprentices for a single occupation. Reconfiguring apprenticeships as an alternative degree pathway should not introduce a different standard for registered apprenticeships.

That said, the public dimensions of transit work make transit apprenticeships a particularly interesting candidate for degree pathways, which are designed to offer broad multipurpose competencies, often called the liberal arts or general education, and to foster a bigger sense of purpose, often grounded in notions of the public good. Historically, civic education was meant to foster that sense of purpose, and, historically, civic education has been separate from career development. Public transit work, which demonstrably serves a public good, challenges the wisdom of separating the two. Colleges and universities open to rethinking that separation might see new ways of meeting workforce development needs. Likewise, transit agencies that understand public transit systems as a public good may see additional benefit in partnering with postsecondary education to fill middle-skill transit jobs. In other words, public transit work is uniquely suited to providing all stakeholders with new reasons to value civic education and thus new tangible reasons to undertake the time and expense of articulating non-degree and degree pathways. Finding innovative, worker-centered ways of staffing our growing public transit systems is the kind of concrete, measurable public benefit that would help demonstrate the value of college beyond the narrow metric of wage premiums. Van Noy et al. (2019) foreshadow this line of thinking where they recommend adding civic engagement as a feature that strengthens the value of a credential.

The concept of public good is not new to apprenticeships, but if career development is to connect with civic education, the meanings of "public good," "civic virtue," and "social benefit" may need to be reconfigured to show the alignment between them (e.g., to show alignment between the maintenance of shared resources and returns on public investments). When Reed et al. (2012) looked at the social benefits of registered apprenticeships, for example, they defined social benefits as the "added productivity of workers" and the "reduced use of government programs (unemployment insurance, welfare, and food stamps) as a result of…higher earnings" (xvi). In

contrast, the AAC&U Civic Engagement VALUE Rubric, which outlines a common college curriculum for civic education, uses a more elastic definition of social benefits when defining "civic engagement." By that rubric, civic engagement "encompasses actions wherein individuals participate in activities of personal and public concern that are both individually life enriching and socially beneficial to the community" (p. 1). Its wide domain for civic practice includes "producing a tangible product" such as "a business, building or civic infrastructure, water quality or scientific assessment" (2009, p. 1). Public transit infrastructure undoubtedly qualifies for that domain and transit literature acknowledges the sector's contributions to the public good where it characterizes coach operators as ambassadors and transit representatives. Table 4 illustrates the overlap between the learning objectives of "TRN 101: Foundations of Public Service for Transit Workers" and the AAC&U's Civic Engagement VALUE rubric, an established guideline for curriculum development.

Table 4. Curriculum Mapping

TRN 101: Foundations of Public Service for Transit Workers	AAC&U's Civic Engagement VALUES rubric
Students differentiate between public service industries and private businesses and use this distinction to explain the guiding mission of the public transit agencies.	Civic Contexts/Structures: Student demonstrates experience identifying intentional ways to *participate in* civic contexts and structures.
Students discuss the concept of public service and the mission of the public transit agencies.	Civic Action and Reflection: Student participates in civically-focused actions and begins to reflect or describe how these actions may benefit individual(s) or communities.
Students learn about the role of public transportation in the community	Analysis of knowledge: Student connects knowledge (facts, theories, etc.) from one's own academic study/field/discipline to civic engagement and to one's own participation in civic life, politics, and government.
Students employ effective interpersonal communication skills… when dealing with the public.	Civic communication: Student communicates in a civic context, showing ability to do more than one of the following: express, listen and adapt ideas and messages based on others' perspectives.

Figuring out how a transit apprenticeship might contribute to civic education serves a practical purpose. Integrating the JWI apprenticeship with degree pathways will require identifying points of articulation between it and degree requirements so that completing the apprenticeship can advance a student toward a degree. Overlap might be found in specific, transportation-related majors, but where it fosters multipurpose competencies, the apprenticeship might also satisfy general education requirements. Many California colleges and universities embed civic education in their general education programs. It is more likely that transit education can satisfy general education requirements if it can be shown to meet both core competencies such as oral communication and civic learning objectives.

The fact that the JWI contains content related to these areas means that it need not necessarily articulate with a transportation-related degree. To illustrate, the JWI could adopt any of the following three existing models to connect its apprenticeship with degree pathways.

One common model in California community colleges combines a CTE program with general education requirements to earn students an associate's degree. An example of this is the water resource management program at Gavilan College in Gilroy, California. Gavilan offers a 25 credit hour certificate designed to prepare students for state certification exams. Students can also apply 18 credit hours of their certificate toward an Associate in Arts degree.

A second model combines specialized coursework with general education requirements so that students simultaneously earn a job credential while advancing toward a degree. For example, Cabrillo College in Watsonville, California offers an Associate in Science degree in Fire Technology. The program includes general education requirements relevant to fire prevention, including chemistry and communication. The 60 credit hour degree transfers to four-year degree programs. The JWI could adopt this model by identifying points of articulation in fields related to transportation such as logistics and supply chain management. Any expansion of course topics better positions the JWI to articulate with a degree. Mission College has already partnered with the California Energy Commission (CEC) to add alternative fuel buses to the JWI curriculum (Gamble, 2021). This new area of study could articulate with degree programs related to clean energy.

A third model emphasizes the relevance of the curriculum to broader topics, such as public works administration or the role of public transit in clean energy economies. This model would allow CTE special topics courses to count toward both a specific certification and degree requirements. Linn-Benton Community College in Albany, Oregon takes this approach in its Water Technology and Environment program, which prepares students for jobs in water supply and wastewater management. The 4-credit hour "Introduction to Environmental Technology" class is specialized and general enough to satisfy both a certificate requirement while simultaneously counting toward general education science requirements.

Students have more options when certificates articulate at multiple points with degree programs. The JWI certificates have the potential to do so. Formalizing those connections would increase the value of the program for young people seeking flexible career advancement opportunities.

6. Conclusion

Recruitment challenges in the transit sector and changing currents in postsecondary education warrant consideration of merging transit apprenticeships with degree pathways. Hybrid career pathways may be more attractive to younger people because they can secure additional economic benefits for apprentices and overlap with the indirect benefits of the college degree. We identified three features—affordability, portability, and articulation—that could unlock additional benefit in the California-based Joint Workforce Investment (JWI) partnership between the Santa Clara Valley Transportation Authority (VTA), the Amalgamated Transit Union Local 265, and Mission College Santa Clara, which has already been deemed the gold standard in the transit sector.

Merging the JWI with degree pathways is in line with the push towards a more comprehensive California Master Plan for Career Education 2024, which seeks to align various entities and programs towards a more coherent and sensible superstructure, supporting equitable outcomes for all California learners. Realizing a merger requires program modifications approved by all three partners and likely requires involvement with other institutional bodies. To facilitate the preliminary work, a follow-up study would identify other non-degree to degree pathways that allow for transfer of apprenticeship credits with more specificity to the transit sector. A qualitative survey of all the stakeholders would gauge level of interest and investment in career pathways of this type. A component of that study would attend to the training and education experiences of women and people of color working in the transit sector with an eye to strengthening career support for these employee-student populations.

Bibliography

Academic Senate for California Community Colleges. (2017). Application of Faculty Policies to Apprenticeship Instructors. Resolution Number 17.09. https://asccc.org/resolutions/application-faculty-policies-apprenticeship-instructors

Adams, T. and Hart, M. (2017). Region V Transportation Workforce Assessment and Summit. NEXTRANS Project No. 142UWY2.1 and 142UWY2.1

Anderson, L. (2011). Guide to implementing strategies to attract and retain a capable transportation workforce. Santa Clara Valley Transportation Authority (VTA) Joint Workforce Investment (JWI) Program. Transportation Research Board.

Bailey, T. R., Jaggars, S. S., & Jenkins, D. (2015). *Redesigning America's community colleges. A clearer path to student success*. Harvard University Press.

California Master Plan for Carer Education 2024. https://careereducation.gov.ca.gov/master-plan-engage/

California Transportation Plan 2050. https://dot.ca.gov/programs/transportation-planning/stateplanning/california- transportation-plan

Carnevale, A., Rose, S., and Cheah, B. (2011). *The college payoff: Education, occupations, and lifetime earnings.* Washington, DC: Georgetown University Center on Education and Workforce.

Carnevale A. et al. (2018). *Educational Adequacy in the Twenty-First Century*.

Carnevale, A., Garcia, T., Ridley, N., & Quinn, M. (2020). The overlooked value of certificates and associate's degrees. Washington, DC: Georgetown University Center on Education and the Workforce.

Chetty, R., Deming, D. J., and Friedman, J. N. (2023). Diversifying society's leaders?: the determinants and causal effects of admission to highly selective private colleges. National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w31492/w31492.pdf

Craig, R. (2001). "Communication," *Encyclopedia of Rhetoric*, Thomas O. Sloane (Ed.) New York: Oxford University Press, 125–37.

Deming, D. J. (2018). The value of soft skills in the labor market. *The Reporter*. National Bureau of Economic Research. https://www.nber.org/reporter/2017number4/value-soft-skills-labor-market

Eaton, C. (2022). *Bankers in the Ivory Tower: The Troubling Rise of Financiers in US Higher Education*. University of Chicago Press.

Emmons, W. R. and Hernández Kent, A. Ricketts, L.R., (2019). Is college still worth it?: the new calculus of falling returns. Federal Reserve Bank of St. Louis Review, Fourth Quarter, 101(4), pp. 297-329. https://doi.org/10.20955/r.101.297-329

Fry, R. (2021, May 18). First generation college graduates lag behind their peers on key economic outcomes. Pew Research Center. https://www.pewresearch.org/wp-content/uploads/sites/20/2021/05/PSDT_05.18.21_parental.education.report.pdf

Fuller, J. B., & Sigelman, M. (2017). Room to grow: Identifying new frontiers for apprenticeships. Boston, MA: Burning Glass Technologies and Harvard Business School.

Gallagher, S., & Maxwell, N. (2020). A Dialogue about the Emerging Market for New Credentials. *New Directions for Community Colleges*, *2020*(189).

Gamble, R. (December 2021). Mission College: Energy Transit Apprenticeships. California Energy Commission. https://www.energy.ca.gov/sites/default/files/2021-12/CEC-600-2021-047.pdf

Gillespie, R.M.; Wang, X.; and Brown, T. (2014). *Developing Best-Practice Guidelines for Improving Bus Operator Health and Retention*. Washington, DC: The National Academies Press. https://doi.org/10.17226/22322.

Government Accountability Office, "Transit Workforce Development: Improved Strategic Planning Practices Could Enhance FTA Efforts," March 2019.

Hampf, F. and Woessmann, L. (2017). Vocational vs general education and employment over the life cycle: new evidence from PIAAC. CESifo Economic Studies: 255-269. https://doi.org/10.1093/cesifo/ifx012

Hendler Ross, S. "SCVTA's JWI Apprenticeship Graduates Receive First-Time College Certificate of Achievement." Mass Transit. December 27, 2019.

Hirsch, L., P. Hoberman, and R. Kauder. 2017. Major Workforce Challenges Confronting New York City Transit. City University of New York.

Hoffman, N. and Schwartz, R.B. (2017). *Learning for careers: the pathways to prosperity network*. Harvard Education Press.

Hossler, D., Shapiro, D., Dundar, A., Ziskin, M., Chen, J., Zerquera, D., and Torres, V. (2012). Transfer and Mobility: A National View of the Pre-degree Student Movement in Postsecondary Institutions. National Student Clearinghouse Research Center.

Itzkowitz, M. (2024). "Golden Opportunities: Measuring Return on Investment in California Higher Education for Low and Moderate-Income Learners." The HEA Group and College Futures Foundation.

Lightcast. (2023). National Alumni Career Mobility Annual Report. https://www.datocms-assets.com/62658/1698163616-nacm-annual-report-2023.pdf

Lockwood, J. and Webber, D. (2023). Non-Completion, Student Debt, and Financial Well-Being: Evidence from the Survey of Household Economics and Decisionmaking. Board of Governors of the Federal Reserve System. https://www.federalreserve.gov/econres/notes/feds-notes/non-completion-student-debt-and-financial-well-being-20230821.html

Ma, J. and Pender, M. (2022). Trends in College Pricing and Student Aid 2022. New York: College Board.

Mackey, M., Dresser, L., and Young-Jones, M. (2018). Equity from the frontline: Worker voice leads to a network of accessible apprenticeship pathways. University of Wisconsin, Madison.

McMillan Cottom, T. (2021). Tressie McMillian Cottom Interviews Louise Seamster for 'The Ezra Klein Show.' *The New York Times*.

Morley, D. (2005). "Communication," *New Keywords: A Revised Vocabulary of Culture and Society*, Tony Bennett, Lawrence Grossberg, and Meaghan Morris (eds.), (Victoria, Australia: Blackwell), 47–50.

Muratori, M., Kunz, T., Hula, A., & Freedberg, M. (2023). *US National Blueprint for Transportation Decarbonization: A Joint Strategy to Transform Transportation* (No. DOE/EE-2674). United States. Department of Energy. Office of Energy Efficiency and Renewable Energy.

National Skills Coalition (2024). National Skills Coalition's legislative agenda for the 118th Congress. https://nationalskillscoalition.org/wp-content/uploads/2024/05/NSC_LegislativeAgenda_118Congress.pdf

National Student Clearinghouse. (November 2023). Completing college: National and state reports. National Student Clearinghouse Research Center. https://nscresearchcenter.org/wp-content/uploads/Completions_Report_2023.pdf

National Student Clearinghouse. (June 2024). Some College, No Credential: A 2024 snapshot for the nation and the states. National Student Clearinghouse Research Center. https://nscresearchcenter.org/some-college-no-credential/

Newman, K. S., & Winston, H. (2016). *Reskilling America: Learning to labor in the twenty-first century*. Metropolitan Books.

Office of Apprenticeship. (Summer 2024). Apprentices By State. Registered Apprenticeship Partners Information Database System. https://www.apprenticeship.gov/data-and-statistics/apprentices-by-state-dashboard

Oregon Workforce and Talent Development Board. (December 2020). Essential Employability Skills, Needed Now More Than Ever.

Pérez, Benito. (November 2, 2021). "After COVID, who's driving the bus?" Transportation For America. https://t4america.org/2021/11/02/bus-operator-shortage/.

Puentes, R., Plotch, P., Eby, B., Lewis, P., Holdzkom, K., Wang, X., & Huber, M. (2023). *Bus Operator Workforce Management: Practitioner's Guide* (No. Project F-28).

Rose, S. (2013). The value of a college degree. *Change: The Magazine of Higher Learning*, *45*(6), 24-33.

Seamster, S. and Charron-Chénier, R. (2017). "Predatory Inclusion and Educational Debt: Rethinking the Racial Wealth Gap," *Social Currents* 4, no. 3: 199- 207.

Schiavone, J., & Wang, X., (2011). *Method and processes for transit training metrics and return on investment.* Transportation Learning Center.

Schulz, A. and Gill, R. (April 2014). Community Colleges and 21st Century Skills: Skills Panels to Assist Student Career Success. New World of Work white paper.

Shaheen, S., Totte, H., & Stocker, A. (2018). Future of Mobility White Paper: California Transportation Plan 2050.

Silicon Valley Institute for Regional Studies. (2022). Silicon Valley Indicators: Individual Median Income, By Educational Attainment. https://siliconvalleyindicators.org/data/economy/income/personal-income/individual-median-income-by-educational-attainment/

Tamborini, C. R., Kim, C., & Sakamoto, A. (2015). Education and lifetime earnings in the United States. *Demography*, *52*(4), 1383-1407.

Urban Institute. (August 2017). "Competency-Based Occupational Framework for Registered Apprenticeship: Transit Coach Operator."

U.S. Bureau of Labor Statistics. (January 26, 2024). Labor force statistics from the current population survey: 11b. Employed persons by detailed occupation and age: https://www.bls.gov/cps/cpsaat11b.htm

U.S. Bureau of Labor Statistics. (January 26, 2024). Labor force statistics from the current population survey: 18b. Employed persons by detailed industry and age. https://www.bls.gov/cps/cpsaat18b.htm

U.S. Bureau of Labor Statistics, Occupational Outlook Handbook: Bus Drivers (April 17, 2024). https://www.bls.gov/ooh/transportation-and-material-moving/bus-drivers.htm

U.S. Bureau of Labor Statistics, Occupational Employment and Wages, May 2023: 53-3052 Bus Drivers, Transit and Intercity (April 3, 2024). https://www.bls.gov/oes/current/oes533052.htm#st

U.S. Department of Transportation Bureau of Transportation Statistics, Transit Ridership - Fixed Route Bus (December 2022). https://data.bts.gov/Research-and-Statistics/Transit-Ridership-Fixed-Route-Bus/dwrv-9qyx

Van Noy, M., McKay, H., & Michael, S. (2019). Non-degree credential quality: A conceptual framework to guide measurement. Rutgers Education and Employment Research Center.

Vaughan, K. (2017). The role of apprenticeship in the cultivation of soft skills and dispositions. *Journal of Vocational Education & Training*, *69* (4), 540–557. https://doi.org/10.1080/13636820.2017.1326516

Webber, D.A. (2018). Is College Worth It? Going Beyond Averages. Third Way. https://www.thirdway.org/report/is-college-worth-it-going-beyond-averages

Zanville, H. (2020). Reflections on Education in a New Era of Work and Learning. *New Directions for Community Colleges*, *2020*(189), 83-94.

Zanville, H. and Travers, N. (2022.) Transforming the Nation's Degree-Centric Postsecondary System to an Incremental Credential System. *Change: The Magazine of Higher Learning*, 54:5, 4-11. https://doi.org/10.1080/00091383.2022.2101859

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