Racial and Ethnic Equity Gaps in Postsecondary Career and Technical Education

Considerations for Online Learning

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High-quality career and technical education (CTE) programs offered by community and technical colleges can provide students a path to well-paying careers (Durham and Bragg 2019; Stevens 2019). For-credit postsecondary CTE programs, sometimes referred to as workforce education or professional technical education programs, lead to a subbaccalaureate college credential (i.e., a certificate or associate's degree) in an occupational field of study. As economic insecurity and disparities persist for Black people, Latinx people, Indigenous people, and other communities of color and are exacerbated by the coronavirus pandemic, CTE programs that develop skills aligned with in-demand sectors can improve outcomes and mobility for communities facing structural barriers to equal opportunity.

Many postsecondary CTE programs have followed the gradual shift toward online learning that has been occurring at colleges for years, a trend accelerated by the pandemic and the associated rapid shift to remote education. Although online education (and other forms of technology-enhanced education) can create opportunities for students struggling to attend in-person classes,[1] structural racism and other systemic inequalities limit some students' access to and success in online educational settings. For example, low levels of reading comprehension due to school segregation and digital literacy gaps due to lower exposure to technology can result in unequal educational opportunities. Lack of investment in

broadband infrastructure in communities of color and the high costs of devices and internet service result in unequal access to technology, which can make online participation more challenging for Black, Latinx, and Indigenous students (Hecker and Briggs 2021). These barriers are exacerbated when CTE programs do not offer necessary technology access or academic and career-oriented advising supports, and when instruction is not responsive to students' needs.

Significant disparities in postsecondary CTE outcomes exist between students of color and white students within postsecondary CTE programs at community and technical colleges, and these gaps are wider in online programs. Identifying and narrowing these disparities is important because research has shown the positive labor market returns of community and technical college certificates and degrees, especially in health-related and technical fields (Minaya and Scott-Clayton 2020). In addition, the impact of reaching key academic milestones such as completing an associate's degree has disproportionate positive benefits for Black and Latinx students,[2] leading to a higher likelihood of transfer to a four-year college when compared to rates of upward transfer among white peers (Lin, Fay, and Fink 2020). The purpose of this brief is to identify the key challenges involved in improving outcomes for students of color in online CTE programs and to provide a framework of strategies for achieving equity in those outcomes. We review the state of online CTE programming and emerging knowledge about how institutions can double down on efforts to improve economic outcomes for students of color, particularly students who are Black, Latinx, or Indigenous, the communities for which equity gaps are most significant. It is also a foundational document for the CTE CoLab, an initiative led by the Urban Institute in partnership with five organizations (box 1). Building on the framework described herein, the initiative will engage a group of community and technical colleges (the College Community of Practice) working to improve for-credit online CTE programs and will develop knowledge for the field.

BOX 1

The CTE CoLab and College Community of Practice

The CTE CoLab aims to reduce equity gaps for students of color—especially students who are Black, Latinx, or Indigenous—enrolled in credit-bearing online postsecondary CTE programs. Funded by ECMC Foundation, the CTE CoLab is a collaboration led by the Urban Institute in partnership with five national organizations: World Education, Inc., the National Council for Workforce Education, the Office of Community College Research and Leadership at the University of Illinois at Urbana-Champaign, the Instructional Technology Council, and the National Coalition of Advanced Technology Centers. This coalition supports the College Community of Practice—a group of community and technical colleges—to build knowledge, center equity in program goals and delivery, and develop and share resources to improve education and career outcomes in online CTE programming. Learn more at https://www.urban.org/policy-centers/income-and-benefits-policy-center/projects/career-and-technical-education-colab.

The rest of this brief is organized as follows. First, we provide context on CTE programs, including the current state of CTE delivery and considerations for transitioning CTE programs online identified through a survey of college staff administered in late 2020. Next, we present data on outcomes for students in online for-credit CTE programs and consider differences in outcomes by students' race and ethnicity. Then, we offer a preliminary framework of strategies to promote equitable student success in online postsecondary CTE pathways; these strategies were informed by the work of CTE CoLab members, interviews with experts, and a literature review. Lastly, we identify gaps in evidence on how to advance equitable outcomes for students of color, so that colleges, policymakers, and researchers can work to close them.

We focus on for-credit postsecondary CTE programs at community and technical colleges (i.e., public two-year colleges) offered fully or partially online. We recognize that CTE programs are offered at other types of educational institutions,[3] can focus on secondary or postsecondary students,[4] can be offered for credit or for no credit,[5] and can be delivered in person or remotely. Our focus on credit-bearing postsecondary online CTE programs aligns with the CoLab's focus (see box 1) and a shift occurring in higher education toward career pathways programs that blend in-demand stackable credentials with the opportunity to earn credit toward two- and four-year college degrees (Bragg et al. 2017).[6]

The CTE Context

For-credit postsecondary CTE programs are an important part of the higher education landscape in the United States. Sixty-five percent of students in credit-bearing programs at community and technical colleges were studying in a CTE field during the 2015–16 academic year, totaling 4.25 million students, according to the 2016 National Postsecondary Student Aid Study (NPSAS).[7] Key terminology is defined in box 2.

BOX 2

Key Terms: Online Learning and CTE Students

Online education is a learning environment in which technology facilitates interactions between teachers and students separated by time or space. Online education involves a continuum of instructional approaches ranging from traditional in-person instruction to "hybrid" or "blended" approaches to fully online courses and programs. In this brief, we treat the terms "online education" and "distance education" as interchangeable.

An **online course** is a course in which all instruction occurs virtually. Online course-taking can include completing one fully online course during a semester or participating in a fully online program.

An **online program** is a program of study in which all instruction occurs virtually.

Hybrid and **blended** instructional approaches combine online and face-to-face delivery of course content.[a]

The term **career and technical education**, as used in this brief, means *for-credit*, *postsecondary* career and technical education programs offered at public community and technical colleges. The term **CTE students** means students enrolled in for-credit courses who have declared a major in a CTE field of study—one of 13 occupational fields defined by the National Center for Education Statistics (figure 1).

[a] See more information about hybrid and blended learning at https://www.panopto.com/blog/blended-learning-hybrid-learning-flipped-classroom-whats-difference/.

In the 2015–16 academic year, CTE students in credit-bearing fields of study (figure 1) comprised roughly one-quarter of all US undergraduate students.[8] Of CTE students that year, 86 percent sought an associate's degree, whereas the other 14 percent sought a certificate.[9] Health sciences was the most common field of study, accounting for roughly 30 percent of enrolled students. The next largest fields were business and marketing (20 percent) and engineering and architecture (9 percent).

FIGURE 1

CTE and Academic Fields of Study

CTE fields of study	Academic fields of study
• Agriculture and natural resources • Business management • Business support • Communications and design • Computer and information sciences • Consumer services • Education • Engineering, architecture, and science technologies • Health sciences • Manufacturing, construction, repair, and transportation (also known as "trades") • Marketing • Protective services • Public, legal, and social services	• Fine and performing arts • Humanities (foreign languages, liberal/general studies, and religion) • Interdisciplinary studies • Letters/English • Mathematics • Science • Social and behavioral sciences

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Source: "Postsecondary Taxonomy," National Center for Education Statistics, accessed February 24, 2021, https://nces.ed.gov/surveys/ctes/tables/postsec_tax.asp.
Note: CTE = career and technical education.

The Perkins Act is the primary federal legislation authorizing funding and planning activities for secondary (K-12) and postsecondary CTE in the United States. The most recent reauthorization of the act, known as Perkins V, occurred in 2018 and requires states to develop and submit plans about how they will make progress toward equal access to high-quality CTE courses and programs of study for all students.[10] States' plans must include strategies to overcome barriers that result in performance gaps in

or lower rates of access to courses and programs for special populations,[11] to provide programs designed to enable special populations to meet local levels of performance, and to provide activities to prepare special populations for high-skill, high-wage, or in-demand industry sectors or occupations in competitive, integrated settings that will lead to self-sufficiency.[12] Though special populations include groups in which students of color are overrepresented, no special population is explicitly defined by race or ethnicity.

Characterizing CTE Programs and the Shift of Courses Online

Career and technical education programs have increasingly moved online, following the overall trend toward online learning at community and technical colleges. By 2016, 46 percent of CTE students had taken at least one course online, whereas by 2000 only 10 percent had, and from 2000 to 2016, the share of CTE students enrolled in fully online programs increased from 3 to approximately 7 percent.[13] The extent to which CTE students engage in online courses or programs varies by major. During that period, roughly one-half of CTE students in business and marketing (52 percent) and education (50 percent) completed at least one course online, and both sectors had the highest share of CTE students in fully online programs, at 9 percent. By contrast, CTE students in engineering and architecture were the least likely to participate in online course-taking (37 percent), and only 3 percent participated in fully online programs.

Shifts Resulting from the COVID-19 Pandemic

Since the outbreak of the pandemic in 2020, nearly all students in CTE programs are expected to have taken at least one course online. Urban researchers administered a survey ("CoLab survey") to community and technical colleges in our national partner network in December 2020 to understand the shift to online learning that was occurring prepandemic, how that shift accelerated during the pandemic, and colleges' plans for course delivery after the pandemic. We received 104 responses from 86 colleges in 30 states.[14]

Most of the CTE programs the survey asked about were being delivered primarily in person before the pandemic.[15] The programs most commonly offered fully online before the pandemic (information technology, early childhood education, and business administration) are expected to continue to rely most heavily on online delivery after the pandemic; other sectors are more likely to shift to hybrid delivery even after it is safe to resume in-person classes. This change toward online or hybrid delivery was particularly pronounced in licensed practical nursing programs (31 percent of respondents expected their program to shift from in-person delivery before the pandemic to online or hybrid delivery after the pandemic), in manufacturing technologies (29 percent expected this shift), and in heating, ventilation, and air conditioning (27 percent expected this shift).

CoLab survey respondents indicated that continuing an online or hybrid modality would depend on student and instructor willingness, and on the availability of good technology tools and student success in online and hybrid coursework. Also notable is that in each sector, some colleges anticipated moving programs that were offered online or in a hybrid format to an in-person modality after the pandemic,

suggesting that colleges that had to quickly adapt to providing remote learning may have experienced complications.

Characterizing Postsecondary CTE Students

As more CTE programs move to online delivery, online programs will have to address the needs of students who have mostly taken courses in person. Examining how CTE students in online courses and programs compare with CTE students overall and with all students in two-year community and technical colleges can elucidate some of the specific needs and issues of different groups. This can also provide insight into how colleges, programs, and instructors may have to adapt as programs move online.

We found the following differences in representation across CTE fields of study from the 2016 NPSAS:

- Although white students are the plurality in all sectors, they are most represented in trades (56 percent of students in this field) and are least represented in consumer services (43 percent).
- Black students are most represented in health sciences (17 percent) and least represented in engineering and architecture (12 percent).
- Latinx students are most represented in consumer services (29 percent) and least represented in computer and information technology (17 percent).
- Other students of color are most represented in computer and information technology (19 percent) and least represented in trades (7 percent).[16]

Importantly, the trades field, in which white students are most represented, is one of the two highest compensated fields of study (the other being engineering and architecture). The consumer services field, in which white students are least represented, is the least well compensated. Average earnings in 2017 for CTE students who started in consumer services in the 2011–12 academic year were only 60 percent of the average earnings among students in the same cohort who started in trades.[17]

Table 1 shows student demographics and selected social and economic conditions among CTE students in more detail. Our analysis of these data yielded the following takeaways:[18]

- CTE students were slightly more likely than all students in community and technical colleges to be male, Black, or Latinx, and to be older than 23.
- CTE students were also more likely than all students in community and technical colleges to have dependent children, to work more than 30 hours a week in a non-work-study job, to be first-generation college students, to have taken a developmental or remedial course, and to receive a Pell grant. They were also more likely to have a prior college certificate or degree, though not a four-year degree, and to have income above the lowest 25th percentile, perhaps because they were more likely to be working.
- Students in fully online CTE programs were more likely to be female, white, and to be older than 23.

- CTE students in fully online programs were also much more likely than all CTE students to have dependent children, to work more than 30 hours a week, and to be first-generation college students. They were less likely than all CTE students to have taken a developmental or remedial course and were less likely to be in the lowest income bracket or to receive a Pell Grant. They were also more likely to have a prior certificate or degree, including a four-year degree or higher.

TABLE 1

Key Characteristics of Students in Credit-Bearing Programs at Public Community and Technical Colleges

	All students	CTE students	CTE students: At least one course online	CTE students: Fully online
Total number of students	6.6 million	4.3 million	1.9 million	0.3 million
Race/ethnicity				
White (non-Hispanic)	50%	48%	53%	54%
Black (non-Hispanic)	15%	16%	13%	15%
Latinx	24%	24%	21%	19%
Asian	7%	7%	7%	8%
Native Hawaiian and Pacific Islander	1%	1%	0%	0%
American Indian and Alaskan Native	1%	1%	1%	1%
More than one race	3%	3%	4%	3%
Age				
Younger than 18	1%	1%	1%	0%
18 to 23	51%	48%	45%	28%
24 to 35	32%	34%	36%	48%
36 or older	16%	18%	18%	25%
Gender				
Male	44%	45%	41%	40%
Female	56%	55%	59%	60%
College preparation				
Parent had no college experience	29%	32%	32%	36%
Previously took a developmental/remedial course	54%	56%	55%	53%
Prior college experience				
Prior college certificate or degree	28%	29%	31%	37%
Prior four-year degree or higher	8%	7%	7%	11%
Work experience/family commitments				
Working > 30 hours/week in non-work-study job	34%	34%	39%	54%
Has dependent children	25%	28%	32%	43%
Income				
Income in bottom 25th percentile	23%	22%	20%	17%
Pell grant receipt	34%	37%	38%	36%

Source: US Department of Education 2015–16 National Postsecondary Student Aid Study.

Notes: The category "All students" includes students in public two-year community and technical colleges. "CTE students," a subset of all students, includes students in for-credit CTE courses who have declared a major in a CTE "field of study." The table also shows the share of CTE students completing at least one course online and the share of CTE students in fully online programs. All students involved in a fully online program have taken at least one online course by definition—the categories are not mutually exclusive.

Understanding the characteristics and circumstances of students in CTE programs and especially those in online programs is critical for designing programs to meet their needs. In the next section, we examine opportunity and outcome gaps in CTE students' education and employment by race and ethnicity as a first step to understanding how programs may not be meeting the needs of students of color. The gaps shown largely reflect racialized inequities in CTE that are the result of structural barriers and systemic racism. For example, other researchers have demonstrated that white students and some groups of Asian students have better employment and earnings outcomes from community and technical college programs than Black and Latinx students, in part because of sorting into different fields, differential success in programs, and differences in labor market outcomes after program completion (Lin, Fay, and Fink 2020).[19] Moreover, as previously discussed, CTE programs in the trades, which tend to be in high demand and well compensated, disproportionately enroll students who are white.

Though not reflected in the data we present in this brief, the coronavirus pandemic furthered racial and ethnic inequities in many ways.[20] Among them, a sharp decline in college enrollments occurred primarily in community and technical colleges, which serve a larger share of Black students, Indigenous students, and especially Latinx students than four-year public institutions.[21] Community and technical college enrollment declined by nearly 10 percent in fall 2020 from a year earlier, and enrollment among Black, Latinx, and Indigenous students declined by 13 percent, 11 percent, and 13 percent, respectively, compared with a decline of 10 percent among white students.[22] A further discussion of segmented opportunities and the impact of these discrepancies for students of color appears later in this brief.

Gaps in Outcomes in CTE Programs and Online CTE Programs by Race and Ethnicity

We observed large gaps in CTE students' outcomes by race and ethnicity in grade point average (GPA), in obtaining an associate's or bachelor's degree or certificate, and employment and earnings outcomes six years after enrollment. These outcome disparities remain even when comparing students who started in the same field of study.

These results are based on data from the Beginning Postsecondary Students Longitudinal Study, which the US Department of Education administers to track students from the National Postsecondary Student Aid Study—a representative sample of all postsecondary students—for six years after enrollment. The latest available data track students who began a CTE program at a public two-year college in the 2011–12 school year through 2017–18.[23] We present differences in means conditional on program sector.[24] For earnings (figure 4), we also account for highest degree eventually earned, showing differentials in earnings outcomes even for those who ultimately get the same level of degree.[25] Although we would ideally also include Indigenous students as a focus subgroup, we could not include groups other than students identifying as white, Black, or Latinx because of small sample sizes.

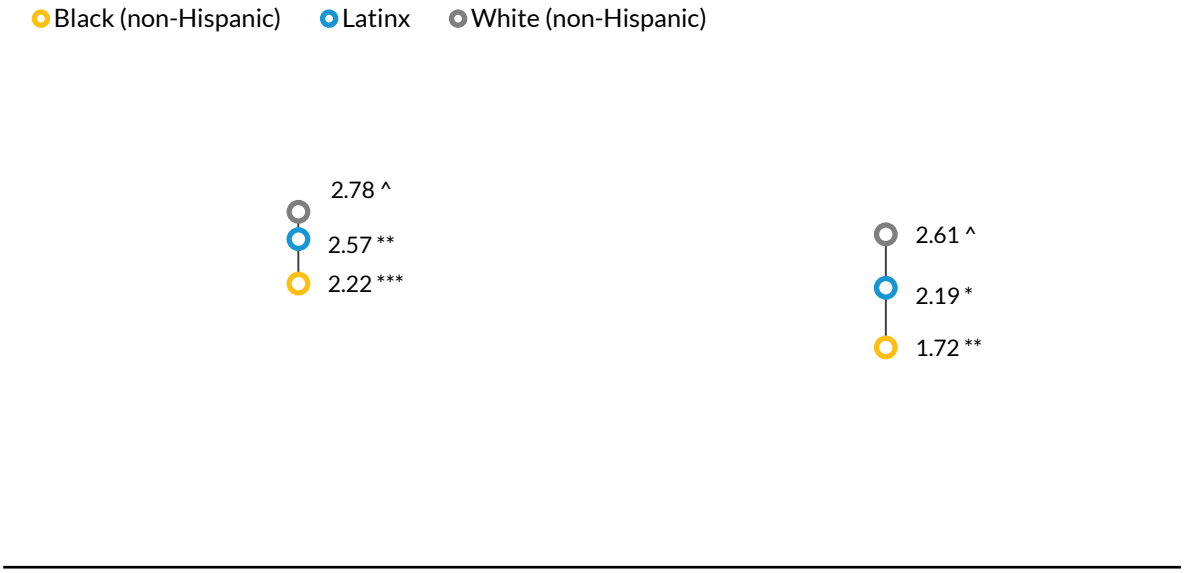
The comparison of Black and Latinx students with white students in the figures that follow allows us to examine gaps in education, employment, and earnings. Education, employment, and earnings outcomes are low for all groups, but the relatively higher performance of white students is due in part to social advantages of white students compared with Black and Latinx students.

Among students beginning in CTE programs in 2011–12, Black and Latinx students had significantly lower GPAs (figure 2) and were significantly less likely than white students to earn a degree or credential and to gain a job related to their program of study six years after entry into the CTE programs (figure 3). The disparities are larger among students who took at least one course online or were in an online program when they started their CTE program, though the differences are less precise (that is, they are not always significant owing to smaller sample size). One exception is that rates of transfer to four-year colleges did not differ by race or ethnicity among CTE students overall, but among students involved in online course-taking or in an online program in the 2011–12 school year, Black and Latinx students were somewhat less likely to transfer than white students (figure 3). Moreover, the earnings gap by race and ethnicity among CTE students who started in online courses and programs was much larger than the earnings gap by race and ethnicity among CTE students overall (figure 4).

Across all of these outcomes, Black students experienced larger gaps relative to white students than did Latinx students. For example, Latinx students were 7 percentage points less likely than white students to earn a degree or certificate at their first college, whereas Black students were 12 percentage points less likely than white students to earn a degree or certificate (figure 3). Nonetheless, even after controlling for highest degree attained and sector of study, Latinx students earned roughly $2,600 less than white students on average, whereas Black students earned more than $8,200 less on average (figure 4). Among students starting in online courses or programs, the earnings gaps were more than $8,800 annually on average for Latinx students and more than $12,000 annually on average for Black students, meaning Black CTE students earned less than half what their white counterparts did when comparing students who started in the same program in the same year and eventually earned the same degree (figure 4). These gaps remain even when controlling for preparation for college (that is, for high school GPA and for whether they had ever taken a developmental course), though those detailed results are not shown here. The observed earnings gaps likely relate not only to opportunity gaps stemming from their educational experiences, but also to racial earnings disparities in the labor market, where Black and Latinx workers are systematically discriminated against and face structural barriers to entering higher-quality jobs with greater upward mobility (Brown 2020; Hamilton et al. 2015).

FIGURE 2

Grade Point Average among CTE Students Beginning in For-Credit Programs at Community and Technical Colleges in 2011–12, by Race/Ethnicity and Online Enrollment



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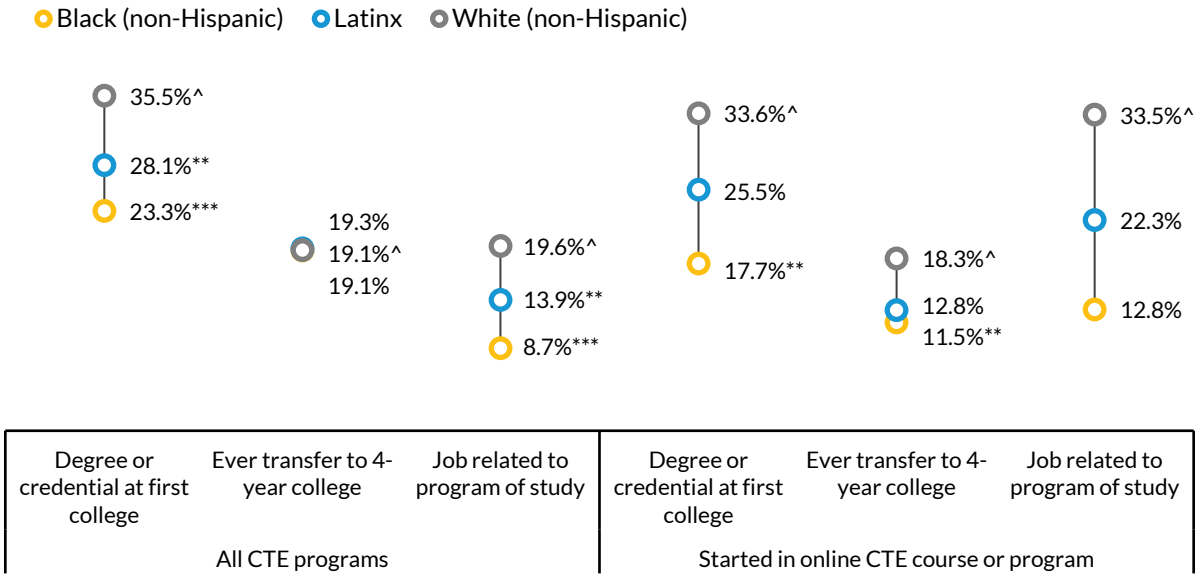
Source: US Department of Education 2012/17 Beginning Postsecondary Students Longitudinal Study.
Notes: CTE = career and technical education; GPA = grade point average. This figure shows a comparison of means by race/ethnicity conditioned on field of study for students enrolled in CTE programs in public two-year colleges in the 2011–12 school year. Each outcome on the horizontal axis is the dependent variable in separate regressions, which control for race/ethnicity (Black, Latinx, white, and other [group results for other are not shown]) and field of study (computer and information sciences; engineering and engineering technology; personal and consumer services; manufacturing, construction, repair, and transportation; military technology and protective services; health care fields; business; and other). Health care fields is the reference category for the field of study, meaning the values are the regression-adjusted average for students in that sector. ^ indicates the racial/ethnic reference group, which is white students to identify opportunity gaps. Asterisks indicate racial and ethnic groups with values significantly different from the reference group: * denotes $p < 0.1$, ** denotes $p < 0.05$, and *** denotes $p < 0.01$.

FIGURE 3

Selected Education and Employment Outcomes for CTE Students Six Years after Beginning in For-Credit Programs at Community and Technical Colleges in 2011–12, by Race/Ethnicity and Online Enrollment



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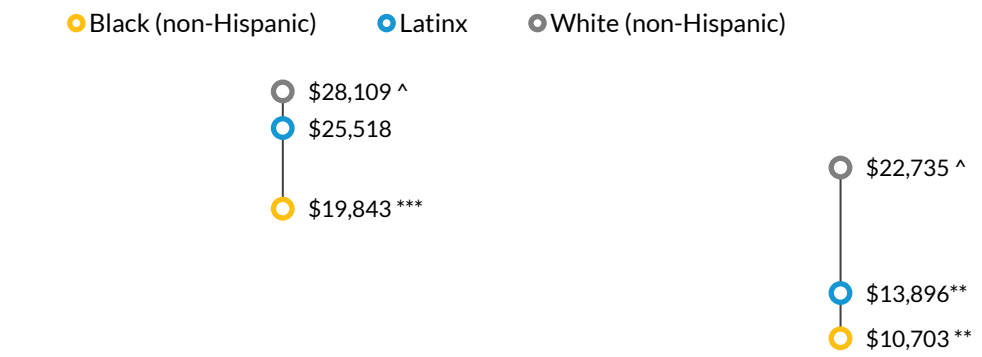
Source: US Department of Education 2012/17 Beginning Postsecondary Students Longitudinal Study.

Notes: CTE = career and technical education. In the category "Ever transfer to 4-year college," "19.3%" corresponds to Latinx students, and 19.1 corresponds to Black students and white students. This figure shows a comparison of means by race/ethnicity conditioned on field of study for students enrolled in CTE programs in public two-year colleges in the 2011–12 school year. Each outcome on the horizontal axis is the dependent variable in separate regressions, which control for race/ethnicity (Black, Hispanic, white, and other [group results for other are not shown]) and field of study (computer and information sciences; engineering and engineering technology; personal and consumer services; manufacturing, construction, repair, and transportation; military technology and protective services; health care fields; business; and other). Health care fields is the reference category for the field of study, meaning the values are the regression-adjusted average for students in that sector. ^ indicates the racial/ethnic reference group, which is white students to identify opportunity gaps. Asterisks indicate racial and ethnic groups with values significantly different from the reference group: * denotes $p < 0.1$, ** denotes $p < 0.05$, and *** denotes $p < 0.01$.

FIGURE 4

Salaries of CTE Students Six Years after Beginning in For-Credit Programs at Community and Technical Colleges in 2011–12, by Race/Ethnicity and Online Enrollment



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Source: US Department of Education 2012/17 Beginning Postsecondary Students Longitudinal Study.
Notes: CTE = career and technical education. This figure shows a comparison of means by race/ethnicity conditioned on field of study and highest degree attained for students enrolled in CTE programs in public two-year colleges in the 2011–12 school year. Each outcome on the horizontal axis is the dependent variable in separate regressions, which control for race/ethnicity (Black, Hispanic, white, and other [group results for other are not shown]); field of study (computer and information sciences; engineering and engineering technology; personal and consumer services; manufacturing, construction, repair, and transportation; military technology and protective services; health care fields; business; and other); and highest degree attained anywhere through June 2017 (no degree, certificate, associate's degree, and bachelor's degree). Health care fields is the reference category for the field of study and an associate's degree is the reference category for highest degree, meaning the values are the regression-adjusted average for students in that sector with an Associate's degree. ^ indicates the racial/ethnic reference group, which is white students to identify opportunity gaps. Asterisks indicate racial and ethnic groups with values significantly different from the reference group, where * denotes $p < 0.1$, ** denotes $p < 0.05$, and *** denotes $p < 0.01$.

Notably, these disparities persist when comparing students with the same level of preparation for college, based on high school GPA and based on whether they ever took a developmental education college course. Those results are not shown.

Given these findings and the disproportionate impact of the COVID-19 pandemic on students of color, the task of creating equitable structures that promote success for all students is increasingly urgent. Colleges and policymakers can implement practices and policies that close the gaps described in this section and help students meet their education and employment goals.

Equity in Postsecondary CTE

Closing gaps in outcomes and addressing systemic barriers affecting students of color requires a purposeful effort to promote *equity* in college CTE programs, especially those delivered online. By "equity" we mean that students who have been systematically disadvantaged are given targeted and intentional opportunities to access high-quality opportunities and achieve the outcomes they desire. Equity can be understood as a process of identifying how disparities affect the educational opportunities of students based on marginalized social identities and then developing strategic solutions to take systemic action to redress these inequities through ongoing, sustainable, equity-centered efforts.[26] Equity requires targeted and intentional approaches that purposefully consider the perspectives, belief systems, structures, and practices that best advance educational opportunities and outcomes for marginalized, underrepresented, and/or underserved students through culturally responsive initiatives that reflect the needs, cultural backgrounds, and lived experiences of diverse learners.[27] In this section, we describe emerging thinking about strategies for addressing these disparities, drawing largely from interviews with a few experts (including CTE CoLab Coalition members; see the appendix for the list of experts we interviewed) and available literature. Using this information, we propose a preliminary framework describing how colleges, programs, and instructors can address equity gaps in online CTE programming.

Policymakers and practitioners are paying attention to equity in multiple domains, including in relation to Perkins, one of the primary policy levers for CTE programs. But there is limited evidence about what strategies are most effective for closing equity gaps in online CTE programs, despite efforts by organizations like the Office of Community College Research and Leadership at the University of Illinois to promote effective strategies that help students of color achieve equitable outcomes in community and technical colleges and CTE programs.

Broadly speaking, disparities in access to education and outcomes in education result from systemic inequities, implicit biases, and/or outright discrimination (Advance CTE, ACTE, and ECS 2020). It is not sufficient to presume that "a rising tide lifts all boats." Even if programs take actionable steps to promote student success, a more holistic approach is needed. Closing opportunity gaps through equitable practices is about targeting systemic racial and ethnic inequities that are multilayered at the individual, interpersonal, institutional, and structural levels (Welton, Owens, and Zamani-Gallaher 2018).

Equity mindedness is a first step to making CTE programs more equitable. Coined by Estela Bensimon, founding director of the Center for Urban Education and used by other leaders in the field, equity mindedness is "the mode of thinking exhibited by practitioners who are willing to acknowledge that their policies and practices have not been designed to produce racial equity and that they need to be rethought and remediated in order to do so."[28] This requires instructors, staff, and administrators at all levels to recognize the historical and institutional factors driving persistent disparities in outcomes for students of color. According to Eboni Zamani-Gallaher, director of the Office of Community College Research and Leadership, "Equity-mindedness is one step toward equity consciousness, and equity

consciousness purposely promotes culturally responsive practices that best advance educational opportunities and outcomes for racially minoritized, marginalized students."[29] Instructors need to acknowledge that colleges and universities have performed poorly (and continue to perform poorly) for students of color, and that racial inequities are an outcome of structures, policies, and practices that are presumed to be race neutral (Bensimon 2018; Liera and Dowd 2019; McNair, Bensimon, and Malcom-Piqueux 2020). Hence, equity-conscious faculty are not only data driven but are data informed and encompass critical cultural awareness coupled with action to provide culturally relevant materials and deliver asset-based instruction that readily fosters antiracist education (Zamani-Gallaher 2020a).

Addressing Equity and Opportunity Gaps in Online CTE Programs

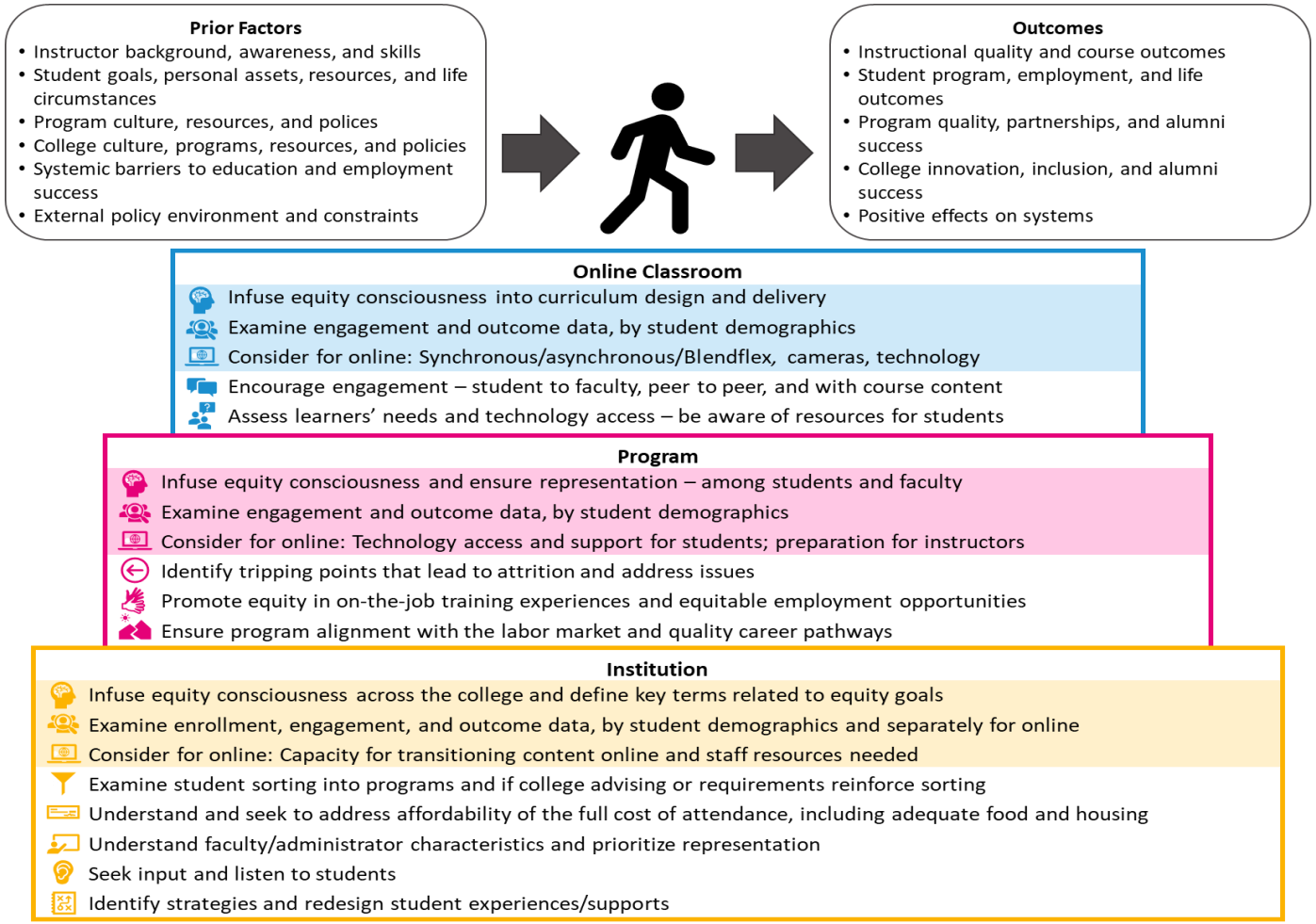
In our technology-rich society, digital inequity compounds existing racial and ethnic disparities (Digital US Coalition 2020), meaning that online program delivery raises additional concerns about equity. "Digital equity" encompasses broadband access and equitable "information technology capacity," which refers to the opportunity to use technology, the quality of opportunities available, and digital literacy.[30] Moreover, the "digital divide"—the gap between groups that have access to technology and those that do not—is related to race, gender, and economic capital, which are intertwined (Campos-Castillo 2015; Ragnedda and Ruiu 2017).

In online or hybrid CTE programs, narrowing the significant opportunity gaps that exist along racial lines necessitates increasing access to, participation in, and success in pathways that improve academic and workforce outcomes among students of color. Colleges and programs can identify some manifestations of opportunity gaps by using an equity lens to look at, for example, policies that disproportionately affect certain students or opportunities that are more available to some students than others. Other manifestations are harder to identify and directly address, like how students stratify (or are stratified) into different programs according to their racial and ethnic background, gender, and class, stratifications that can eventually cause large wage differentials. Online education can drive equity by increasing students' access to programming and by enabling individualized learning, but only if it is undertaken purposefully and with the goal of expanding options for high-quality instruction rather than simply saving costs.

In the framework depicted in figure 5, we identify strategies that instructors, programs, and colleges can use to address equity gaps and improve outcomes for students of color. Colleges can set goals for achieving equity outcomes; these goals can be for students, individual courses, programs, and institutions, and can also involve broader systemic changes. The details of a college's strategy and whether that strategy is equity conscious will depend on contextual factors, and on the policy environment and constraints it experiences (e.g., state funding and rules, accreditation and licensing requirements, and financial aid rules). In the next sections, we highlight strategies at each level (online classroom, program, and institution) that could be considered "core strategies" across levels (these strategies are highlighted in figure 5). These include equity consciousness, disaggregating and examining data, and considerations for evening the playing field in online learning.

FIGURE 5

Equity Strategies to Promote Student Success in Online Postsecondary CTE Pathways



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Note CTE = career and technical education.

How CTE Instructors Can Promote Equity in the Online Classroom

In postsecondary online CTE classroom environments, instructors can be explicitly conscious when developing curricula, when designing instruction, when providing instruction, and in overall program delivery to ensure their virtual classroom environments and communication foster a sense of belonging for all students.[31] Strategies for instructors to be equity conscious include the following:

- examining their personal awareness and mindfulness of students' needs, their behavior toward students, their course policies, and the (virtual) settings where learning occurs (Welton, Owens, and Zamani-Gallaher 2018)
- clearly articulating expectations of students
- recognizing students' diversity and acknowledging barriers to their inclusion when selecting course content
- designing all course elements to be accessible
- reflecting on one's own beliefs about teaching online to maximize self-awareness and commitment to inclusion[32]
- considering whether assignments allow students equal opportunities to succeed given their resources and background
- encouraging students to engage with instructors and with their classmates, including providing mechanisms for peer group interactions
- connecting course content to students' own lives and experiences[33]

Research has demonstrated the importance of designing technology tools and course programming in ways that improve student engagement and that remove inherent bias.[34] Among the modalities and resources that instructors can consider for administering course content online are synchronous learning, asynchronous learning, and a "Blendflex" model, which are defined as follows:

- **Synchronous instruction** requires students to join lectures or class activities virtually at the same time as their instructor, as if they were attending an in-person class. This limits students' flexibility but may allow them to engage more actively with course content and one another.
- **Asynchronous instruction** has lower barriers to entry because students can engage with course content on their own schedule, but they may be less supported in their learning without additional opportunities to connect.
- **A Blendflex model** allows students to choose to engage with content in real time (synchronously) or after the fact (asynchronously), but it can be expensive or complex for colleges and instructors to implement.[35]

Instructors implementing coursework with synchronous components must determine whether and when they will require students to join with cameras, which may present challenges involving privacy,

technology, and internet bandwidth. Instructors seeking to promote equity in online classrooms can also consider whether they are asking students to engage with content in a way that requires substantial computing power, internet bandwidth, or digital literacy. Instructors should be clear about the technology demands of a course in course descriptions. They should assess students' needs and technology access and connect students with necessary resources. To support students, instructors should be informed about complementary services or programs students may want to access, be they in their institution (e.g., academic or technology support) or outside it (e.g., public benefit programs).

For each course, closely examining and tracking student data disaggregated by student characteristics is also important for being equity conscious. It allows instructors to understand where student outcome gaps exist and whether they are widening. In general, teaching in virtual environments can surface information about students' challenges that can be used to support individual students and design broader solutions.

How CTE Programs Can Promote Equity

Staff running CTE programs can raise awareness about equitable behaviors, policies, and settings that affect students' experiences. In addition to considering its college's broader mission and vision for achieving equitable outcomes for students of color, every CTE program should define for itself what equity means, where it wants to go, and where it is in that process.

In online and hybrid learning environments, strategies for programs to be equity conscious when providing educational experiences include

- ensuring that students have access to technology, software, and internet resources necessary for success (Sharma, Vanek, and Ascher Webber 2019);
- providing students appropriate supports, including academic and technological assistance, for remote learners at times that make sense for their schedules, which may mean offering support during evenings or weekends (Briggs, Gebrekristos, and Spaulding 2019); and
- providing instructors appropriate and ongoing professional development and sufficient time to prepare them for teaching online with an equity focus, then providing technical assistance as issues arise.

A strong example of instructor professional development is CTE TEACH, which, in partnership with the California Department of Education, supports the unique needs of CTE teachers transitioning from industry to the classroom (as well as the needs of veteran teachers). CTE TEACH provides training and professional development using an online early orientation program, an online professional development program, and a two-year teacher induction program.[36] These types of efforts also help ensure that students have instructors who are at the cutting edge of their fields because they're working in industry.

Career and technical education programming does not end with classroom learning. It often involves on-the-job training and assistance placing students in employment opportunities. An area of

emerging knowledge is how to take an equity-conscious approach to supporting students in work-based learning experiences and transitions to employment. As a starting point, programs can ask employers and other partners about whether their practices and the opportunities they provide their employees are equitable, and whether they look for nontraditional résumés in the hiring process (Sharma, Vanek, and Ascher Webber 2019). Programs can also ensure that they know about other potentially valuable external supports, such as online platforms like JobSpeaker, which assists students and career staff during job searches and has been piloted at numerous colleges in the California Community Colleges system.[37]

Just as instructors should examine data at the course level, programs should interrogate their data to identify any gaps in student success, and then use those insights to develop interventions to improve equity (see the Office of Community College Research and Leadership's needs assessment tool). It is critical that data be disaggregated by race and ethnicity, especially when examining online learning modalities. As researchers have documented, doing this can show that students are getting tripped up at specific program milestones (e.g., certain core academic courses), information that can help programs target resources to supporting students through points of common struggle (Lin, Fay, and Fink 2020). Programs should also collect and use labor market information (about their field of study and about their own alumni) to understand how students sort into professions based on their demographic characteristics and the implications of that sorting on job quality and stability. They can also use labor market information in aggregate and for their own students to see whether and how students use subsequent rungs of career pathways to get additional training and to advance in their professions (e.g., moving from certified nurse aid to a licensed practical nurse to a registered nurse, and so on). If students are not advancing along career pathways—for example, never advancing beyond entry-level health care positions to family-sustaining wages—programs should try to identify the barriers to advancement (Eyster and Gebrekristos 2018).

How Colleges Can Promote Equity as Institutions

Community and technical colleges can also commit to equity consciousness, in addition to instructors and programs. As a starting point, colleges should examine who their students are using data disaggregated by student demographics (including race/ethnicity, gender, class, and intersections of these). It may be useful to compare these characteristics with the characteristics of the local community. As part of this investigation, they should consider recruitment and enrollment practices, who accesses high-value degrees and high-value programs, who accumulates credits and completes major milestones in those programs, and who transfers successfully or becomes meaningfully employed in their area of study after leaving the institution (Lin, Fay, and Fink 2020; Zamani-Gallaher 2020b).[38] Institutions should focus on online or hybrid programs as a subset of their analysis. In addition, institutions can define key terms (e.g., race, equity, racial inequity) and operationalize them in the college context (Zamani-Gallaher 2020b), which can help colleges and programs progress toward achieving their own equity goals.

Noting inequitable representation and/or outcomes through data is a useful diagnostic, but does not necessarily inform a college about where the problem is occurring or the best solution. Instead, it can highlight opportunities to reconsider the design of student experiences—in the (virtual) classroom, in advising, in navigating the institution, and in peer engagement. Institutional structures (including admissions, financial aid, advising, and technology resources) likely play a large role in student experiences and success (Hurtado et al. 1998). Strategies for colleges to be equity conscious in providing students of color access to high-quality programs with strong labor market prospects include the following:

- examining recruitment and admission practices[39]
- creating meaningful on-ramps that allow different types of students to access CTE programs, such as through dual-enrollment programs with adult education (Couch 2018)
- assessing program cost, including accumulated debt, to improve affordability (Murphy, Williams, and Miller 2020)
- reviewing advising that students receive when deciding on a program of study
- providing career mentoring to help students "see" themselves represented in different fields of study

Further, colleges can examine whether faculty and staff demographics are proportionate to those of their students and, if not, focus recruiting and hiring efforts on expanding diversity.[40] This representation could pertain to race and/or ethnicity, but also to being a first-generation student, having gone back to school later in life, sharing similar socioeconomic backgrounds, and having other shared life experiences that they are willing to talk about. Diverse faculty help students understand that there are opportunities for people like them in a range of fields; can understand and relate to students' perspectives and challenges; and may bring new approaches to instruction that enrich the curriculum and college experience.

Additional interventions at the institutional level can involve the following:

- providing professional development to educators
- engaging stakeholders, including thought leaders on equitable CTE, representatives of diverse student communities, technology providers, and other colleges
- examining bias and awareness of microaggressions, perhaps through formal bias awareness training
- understanding high-impact practices[41]
- disaggregating data and triangulating student data with program data on an ongoing basis
- inviting meaningful input from (and collaborating with) students

Soliciting students' experiences and listening to their suggestions enables interventions to respond to real problems and gives students agency to improve their educational opportunities (Spievack et al.

2020). Colleges taking student-centered approaches have prioritized open admissions policies, improved choice among pathways, and implemented equity-conscious academic advising (Rosen and Dalporto 2020; Rosen, Visher, and Beal 2018).

Gaps in Evidence about Equity in CTE

This brief highlights student opportunity gaps by race and ethnicity and challenges and opportunities for improving delivery of online for-credit CTE programming to community and technical college students. Our findings identify ways that colleges, policymakers, and researchers can close these gaps. Nonetheless, there are opportunities for further developments in this field, and opportunities remain for policymakers and funders, researchers, and colleges and programs to continue to build the knowledge base about effective strategies for making outcomes more equitable for students of color taking CTE coursework and programs online.

Improving Data and Tracking

There are various opportunities to improve data disaggregation and tracking. Standardizing indicators across colleges on outcomes for all CTE students and CTE students who enroll in partially or fully online programs would be a large improvement. The current metrics applied through routine federal accountability reporting (such as Perkins V) are insufficient, as they do not apply to all CTE participants and do not disaggregate by program modality.

Other data limitations can make it challenging to understand gaps and inequities. Colleges could do more to routinely collect data on additional student characteristics and conditions that may require specific supports (e.g., parental status). Small sample sizes among small groups, such as Indigenous communities (who are often particularly marginalized), are a persistent challenge, but colleges may be able to disaggregate these student populations by combining data across multiple years. Moreover, because students' persistence in college can be impacted by how students are financing their education (Herzog 2018), colleges should track financial aid and whether students are paying for school out of pocket, through their employer, with Pell grants, with other state aid, or with federal grants and loans.

Understanding Effective Strategies to Expand Equity

Research on the effectiveness of strategies for improving outcomes for CTE students of color is limited, although expanding. The pace of the shift to online learning environments has been rapid and was accelerated by the coronavirus pandemic. Further evidence is needed about the key ingredients for successfully serving students of color in online programs, especially given the challenges and changes introduced by the pandemic. For example, in online classrooms, an opportunity exists to examine equity-centered strategies for effective student engagement and pedagogy. In online CTE programs, what does it look like to take an equity-minded approach to soliciting employer feedback, developing work-based learning opportunities, and helping students transition to good jobs? At the institutional level, what are effective approaches for supporting faculty in applying equity-minded instruction in the

online context or for ensuring that students of color are accessing career pathways with the most promise of labor market success?

Examining Accreditation, Licensing, and Funding Policies

In credit-bearing programming, accreditation is a commonly cited policy concern that drives many colleges' decisions about CTE program delivery. Licensing and certification requirements, as well as data and reporting requirements and accountability measures, may have important implications for the types of innovations colleges can undertake in moving CTE programs online and changing practice in ways that will benefit historically underserved students. New evidence should be generated on these policies. Colleges can explore where long-term policy changes are possible beyond the immediate flexibilities that are being afforded by accrediting bodies and other regulators during the pandemic.

Concluding Thoughts

This brief is intended to provide the foundation for efforts to examine and expand equity in online CTE programs. The coronavirus pandemic has exposed racial inequalities and accelerated the shift to online learning in CTE programs. As the pandemic has expanded awareness of the effects of structural racism in postsecondary education and the labor market, an opportunity exists to help community and technical colleges transform institutional practices, programs, and courses to better support CTE students of color in realizing their goals of economic security and mobility. Over the next several years, the CTE CoLab Coalition will build knowledge and tools that help the field navigate this transformation.

Appendix. Experts Interviewed for This Brief

In recommending strategies to promote equitable student success in online postsecondary CTE pathways, we drew on insights provided by the following experts in interviews with the research team:

- Amanda Bergson-Shilcock, senior fellow, National Skills Coalition
- Craig McAtee, CEO and executive director, National Coalition of Advanced Technology Centers
- Darci Duran, instructional design manager, Colorado Community Colleges Online
- Darlene G. Miller, executive director, National Council for Workforce Education
- Fred Lokken, retired chair of the Instructional Technology Council
- Jen Vanek, director of digital learning and research, World Education
- Sandy Goodman, director, National College Transition Network
- Steve Partridge, vice president of strategic partnerships and workforce innovation, Northern Virginia Community College
- Tia McNair, associate vice president for diversity, equity, and student success, Association of American Colleges & Universities
- Ursula Dyer, program director and instructor, Radiologic Science Department

Notes

[1] Examples of technology-enhanced learning include hybrid, blended, and Blendflex learning. See https://www.panopto.com/blog/blended-learning-hybrid-learning-flipped-classroom-whats-difference/ and https://digitallearning.ucf.edu/newsroom/keepteaching/blendflex-model/.

[2] Throughout this brief, we use the preferred term "Latinx" to refer to Hispanic, Latino, and Latinx people. We use the term "non-Hispanic" as a modifier for other racial groups (e.g., non-Hispanic white). Some of the underlying data sources we reference use "Hispanic" instead of Latinx, but we keep one term for consistency. Moreover, the National Postsecondary Student Aid Study refers to white students and Black students as "white (non-Hispanic)" and "Black (non-Hispanic)," respectively. When discussing NPSAS data about white students and Black students, we are referring to these categories.

[3] Over two-thirds (67 percent) of students in CTE programs were enrolled in public two-year colleges, while other students were enrolled in private two-year colleges, four-year colleges, or other types of institutions (see https://nces.ed.gov/surveys/ctes/tables/p178.asp). It is important to note that Black students enrolled in CTE programs are more likely than other groups to be enrolled in private, for-profit colleges. Only 13 percent of white Students, 16 percent of Latinx students, and 8 percent of Asian students are enrolled at for-profit colleges, while over 25 percent of Black students are enrolled at these institutions (see https://nces.ed.gov/surveys/ctes/tables/p177.asp). Female students are also more likely than male students to be enrolled at private, for-profit colleges (19 percent versus 11 percent).

[4] Postsecondary CTE should be distinguished from secondary CTE, which is covered by the same federal legislation, but which is oriented toward high school students. Students in secondary CTE programs may be enrolled in college CTE courses, but they are not the primary focus of this report or work, since they face

learning contexts and considerations that are different from postsecondary and adult students. Where possible, we focus the discussion in this brief on only postsecondary and adult CTE programs and students.

[5] We recognize there are also important equity implications to consider in the articulation of CTE coursework from noncredit to for-credit, and in bridging dual enrollment in CTE in high school to college, but noncredit programs are not the focus of this current effort.

[6] "Overview: What Is a Career Pathway?" Career Pathways, accessed March 4, 2021, https://career-pathways.org/about-career-pathways/.

[7] Data from the 2016 and 2020 National Postsecondary Student Aid Study, unless otherwise cited, come from the National Center for Education Statistics PowerStat tool: https://nces.ed.gov/datalab/powerstats. That study (and the associated Beginning Postsecondary Students survey, also cited) are better sources of data on CTE students in community colleges than indicators tracked through Perkins reporting for at least four reasons: (1) It includes all students who are "CTE majors," whereas the Perkins accountability data only include students who are "CTE concentrators." Over 90 percent of students in community and technical colleges have declared a major, whereas a much smaller subset of students attains Perkins' CTE concentrator status, which is only achieved when a student completes 12 academic or CTE credits or completes a short-term CTE program that is less than 12 credits but results in an industry-recognized credential, a certificate, or a degree; (2) Data from NPSAS include a broader definition of CTE programs associated with certain major fields of study toward subbaccalaureate credentials (see figure 1 in the text). Perkins data only track students who are in Perkins-funded programs, which may not encompass all programs that could be considered CTE programs, depending on how states and colleges decide to allocate federal resources. For example, Perkins data count 3.89 million students as enrolled in postsecondary or adult CTE in the 2015–16 school year (US Department of Education Consolidated Annual Report, Perkins participant report data), whereas NPSAS puts that number closer to 4.25 million (2016 National Postsecondary Student Aid Study); (3) Whereas Perkins funds may be used for some noncredit CTE programs, programs included in NPSAS are almost exclusively credit bearing. A small set of noncredit students may be included in NPSAS if they are enrolled in an occupational or vocational program that required at least three months or 300 clock hours of instruction to receive a degree, certificate, or other type of formal award (see https://nces.ed.gov/pubs2018/2018466.pdf). Neither data source allows for explicit subsetting to students in credit-bearing programs, but we believe that NPSAS almost exclusively comprises students seeking college credit, and we treat it as such in the body of the report. We are less certain about what share of Perkins participants are in for-credit versus noncredit programs. This empirical question may merit further investigation in future research; (4) NPSAS allows for cross-tabbing and regression analysis with multiple student, program, institution, and contextual characteristics, whereas the Perkins tabulations are only available in limited aggregate categories, substantially limiting the analysis possible with the Perkins data.

[8] See National Center for Education Statistics, table 303.70.

[9] See National Center for Education Statistics CTE Statistics, table P178.

[10] See additional Perkins V resources at the National Alliance for Partnerships in Equity, available at https://napequity.org/public-policy/frontline-legislation/strengthening-career-and-technical-education-for-the-21st-century-act/.

[11] Special populations include students with disabilities, students from economically disadvantaged families (including youth and adults with low incomes), students preparing for nontraditional fields, single parents and single pregnant women, students out of the workforce, English-language learners, students who are homeless, students who have experience in the foster care system, and children of members of the armed forces.

[12] Strengthening Career and Technical Education for the 21st Century Act, Pub. L. No. 115-224.

[13] 2016 National Postsecondary Student Aid Survey and 2020 National Postsecondary Student Aid Survey, accessed March 4, 2021, available at https://nces.ed.gov/surveys/npsas/.

[14] A forthcoming brief will summarize the survey results in more detail.

[15] The survey asked about the course modality colleges utilized to offer their for-credit CTE programs in the fall 2019 semester (before the COVID-19 pandemic), in the fall 2020 semester (during the pandemic), and how they plan to administer programs in the fall 2021 semester (assuming this would be after the pandemic). The survey asked about the following programs: manufacturing technologies; welding; automotive repair; heating,

ventilation, and air conditioning (HVAC); information technology (IT); help desk/technical support; licensed practical nursing (LPN); early childhood education; and business administration. These were meant to be a representative, but not exhaustive, list of common CTE programs.

Over 100 respondents from 86 community and technical colleges in 30 states responded to the survey, which was fielded from December 2–11, 2020. There were five colleges that had two respondents and three colleges that had three respondents. One respondent did not specify their college. In most cases, multiple respondents provided information about a different set of programs and provided a unique perspective. Therefore, we did not collapse them by college.

[16] Because of small overall representation, we combined students who identify as Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, and more than one race in this category.

[17] These figures come from the Beginning Postsecondary Students Longitudinal Survey 2012/17. We provide further details about this survey later in the brief.

[18] 2016 National Postsecondary Student Aid Survey, accessed March 4, 2021, available at https://nces.ed.gov/surveys/npsas/.

[19] See also Ryan Smith, "Advancing Racial Equity in Career and Technical Education Enrollment," Center for American Progress, August 28, 2019.

[20] Natalie Spievack, Jorge González, and Steven Brown, "Latinx Unemployment Is Highest of All Racial and Ethnic Groups for First Time on Record," *Urban Wire* (blog), Urban Institute, May 8, 2020, https://www.urban.org/urban-wire/latinx-unemployment-highest-all-racial-and-ethnic-groups-first-time-record; "Equity and Inclusion," *Urban Wire* (blog), Urban Institute, https://www.urban.org/features/covid-19-policies-protect-people-and-communities#chapter-2.

[21] See National Center for Education Statistics, table 306.20; Nick Anderson and Danielle Douglas-Gabriel, "Community colleges at a crossroads: Enrollment is plummeting, but political clout is growing," *Washington Post*, March 2, 2021, https://www.washingtonpost.com/local/education/community-colleges-biden-covid/2021/03/01/7b30a18e-75df-11eb-9537-496158cc5fd9_story.html.

[22] "COVID-19: Stay Informed with the Latest Enrollment Information," National Student Clearinghouse Research Center, accessed March 4, 2021, https://nscresearchcenter.org/stay-informed/.

[23] Data from the Beginning Postsecondary Students Longitudinal Survey, unless otherwise cited, come from inquiries of the National Center for Education Statistics' PowerStat tool.

[24] Though the results are based on a linear regression to produce estimates, this is best understood as a comparison of means conditioned on a small set of control variables.

[25] The earnings gaps between white students and Black students not conditional on highest degree eventually earned are 10 percent higher overall and 28 percent higher when looking at students who started in an online CTE course or program. Between white and Latinx students, the gaps are 5 percent higher overall and 12 percent higher among students who started in an online CTE course or program. These larger earnings gaps when not controlling for highest degree reflect a combination of differences in degree attainment and differences in labor market payoffs between racial and ethnic groups.

[26] "Educational Leaders Equity-Centered Transformation Spark Grants Initiative Program," Office of Community College Research and Leadership, accessed February 26, 2021. OCCCRL cites Decuir and Dixson (2004) and Gorski (2016) in informing this definition.

[27] "Educational Leaders Equity-Centered Transformation Spark Grants Initiative Program," Office of Community College Research and Leadership.

[28] "CUE's Racial Equity Tools," Center for Urban Education, accessed February 1, 2021.

[29] Eboni Zamani-Gallaher, "Unpacking Equity and Access," YouTube video, 18:36, posted by the National Institute for the Study of Transfer Students, https://www.youtube.com/watch?app=desktop&v=iB6nHqTjC6E&ab_channel=NISTS.

[30] See the National Digital Inclusion Alliance for information on and resources pertaining to digital equity.

[31] Within education policy scholarship addressing equity, Welton and La Londe (2013) found that often "equity minded" and "equity conscious" are used synonymously. Though they overlap, they are not interchangeable.

[32] See for example strategies from the Columbia University Center for Teaching and Learning at https://ctl.columbia.edu/resources-and-technology/teaching-with-technology/teaching-online/inclusive-teaching/.

[33] "Consciously Designing an Online Environment for Every Learner's Needs," *The EvoLLLution* (blog), August 20, 2020. Also, see a sample equity rubric from Peralta Community College District at https://web.peralta.edu/de/equity-initiative/equity/.

[34] "Consciously Designing an Online Environment for Every Learner's Needs," *The EvoLLLution* (blog); Ray Schroeder, "Thoughts on Creating an Inclusive Environment in Online Classes," Inside Higher Ed, August 26, 2020.

[35] Mark Lieberman, "Introducing a New(-ish) Learning Mode: Blendflex/Hyflex," Inside Higher Ed, January 24, 2018. For a history of the hybrid-flexible (Hyflex) approach, which evolved into today's Blendflex model, see Beatty (2019).

[36] Learn more about CTE TEACH at https://www.cteonline.org/cteteach.

[37] "Jobspeaker Announces Partnership with Central Valley Community Colleges," Newswire, updated September 27, 2018, https://www.newswire.com/news/jobspeaker-announces-partnership-with-central-valley-community-colleges-20656659.

[38] "CUE's Racial Equity Tools," Center for Urban Education.

[39] Some college programs (rather than institutions) have primary recruitment/enrollment responsibility, especially in open-access community colleges.

[40] For example, see Taylor and coauthors' 2010 article "Diversifying the Faculty."

[41] See George D. Kuh's "High-Impact Educational Practices."

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