IPRPD
International Journal of Arts, Humanities and Social Sciences
ISSN 2693-2547 (Print), 2693-2555 (Online)
Volume 07; Issue no 07: July 2026
DOI: 10.56734/ijahss.v7n7a1

AN EQUITY-CENTERED CTE OPPORTUNITY FRAMEWORK: REIMAGINING BLACK STUDENTS' PATHWAYS FROM ACCESS TO MOBILITY

Nathaniel B. McClain, Ed.D.[1]

[1]*Assistant Professor, Department of Education, University of Michigan-Flint*

Abstract

Career and Technical Education (CTE) has reemerged as a strategy for advancing college and career readiness, workforce preparation, credential attainment, and economic mobility. However, for Black students, the promise of contemporary CTE must be understood alongside the historical legacy of vocational tracking and the continuing racialized distribution of educational and labor-market opportunity. This conceptual article develops an Equity-Centered CTE Opportunity Framework to examine how Black students experience opportunity across the secondary CTE pathway. Drawing from literature on contemporary CTE, opportunity to learn, vocational tracking, program quality, credential value, and workforce outcomes, the framework organizes CTE opportunity into six interconnected domains: structural opportunity, educational opportunity, relational opportunity, career opportunity, credential opportunity, and mobility opportunity. The article argues that CTE outcomes are not produced by student participation alone, but by the quality, sequencing, and distribution of opportunities students encounter across the pathway. By centering Black students' experiences, the framework provides researchers, policymakers, and practitioners with a tool for assessing whether CTE systems expand educational and economic opportunity or reproduce racialized stratification.

Keywords

Career And Technical Education, Black Students, Opportunity Structures, Equity, Industry Credentials, Workforce Mobility, Conceptual Framework

Introduction

Career and Technical Education (CTE) has reemerged as a central strategy in national conversations about college and career readiness, workforce preparation, credential attainment, and economic mobility. Once associated primarily with vocational tracks for students presumed not to be college bound, contemporary CTE is increasingly framed as a pathway that can connect academic learning, technical skill development, postsecondary education, industry credentials, and labor-market opportunity. This renewed attention reflects a broader concern that traditional college-for-all approaches have not fully addressed students' need for meaningful preparation for both education and work (Dougherty, 2023; Stevens, 2019).

For Black students, however, the contemporary promise of CTE must be examined in relation to the racialized history of vocational education and the continuing distribution of educational and labor-market opportunity. Carruthers et al. (2026) note that The central equity question is not simply whether Black students participate in CTE. A more important question is how opportunity is structured across the full pathway: whether students can enter rigorous programs, receive high-quality instruction, cultivate supportive relationships, participate in work-based learning, earn credentials with recognized value, and convert those experiences into postsecondary success, workforce entry, and long-term mobility.

This question matters because access and participation are necessary but incomplete measures of equity. A student may enroll in CTE and still lack access to high-return fields, modern equipment, qualified instructors, accurate advising, employer networks, or credentials that are transferrable beyond high school. Using nationally representative data from U.S. high schools, Carruthers et al. (2026) found that Black students are disproportionately concentrated in CTE career clusters associated with approximately 1%–4% lower earnings than those pursued by White students, with Hispanic students exhibiting similar patterns (0%–4% lower projected earnings). Similarly,

credential attainment may appear to signal success while masking variation in credential value, alignment with college programs, and employer recognition. As Bettencourt et al. (2022) noted, college and career preparation are often treated as separate choices even when students experience them as interconnected aspirations that require coordinated institutional support.

Existing CTE scholarship has contributed important evidence about access, participation, program quality, credentials, postsecondary enrollment, employment, and earnings. Yet these dimensions are often examined separately. Reviews of CTE outcomes clarify the promise of high-quality programs (Dougherty, 2023; Stevens, 2019), while equity-oriented scholarship demonstrates how tracking, program distribution, and pathway placement continue to shape opportunity (Fletcher, 2022; Kim et al., 2021). What remains needed is a pathway-level framework that explains how structural, educational, relational, career, credential, and mobility opportunities interact over time for Black students.

This conceptual article asks: How can an equity-centered opportunity framework help explain Black students' experiences across the CTE pathway from access and participation to credential attainment, workforce entry, and long-term mobility? In response, the article proposes an Equity-Centered CTE Opportunity Framework that examines six interconnected domains: structural, educational, relational, career, credential, and mobility opportunity. The framework argues that CTE equity cannot be understood through access, participation, or credential completion alone. Rather, it must be examined as a pathway-level process in which opportunities accumulate, interact, and shape whether CTE expands or constrains educational and economic mobility for Black students.

Centering Black students' lived experiences is essential to this argument. Many studies include Black students as one subgroup within broader analyses of CTE participation or labor-market outcomes (Leu & Arbeit, 2020; Arneson et al., 2020). Those analyses are valuable, but they may not capture how Black students interpret CTE in relation to family aspirations, school guidance, racialized expectations, community opportunity, and the historical memory of vocational tracking. A framework centered on Black students illuminates the pathway-level dynamics that can be obscured when equity is reduced to aggregate access, completion, or credential counts.

CTE, Vocational Tracking, and the Problem of Opportunity

Contemporary CTE is now widely positioned as a college-and-career readiness strategy rather than a narrow occupational track. In its modern form, CTE is expected to integrate academic coursework, technical skill development, career exploration, work-based learning, industry-recognized credentials, and postsecondary alignment. Fletcher (2022) described this shift as a movement toward preparing students for both college and careers, including high-wage, high-demand, and high-skill occupations. This transformation matters because CTE is no longer best understood as a single course-taking experience. It is an institutional opportunity structure that organizes students' access to future educational and economic possibilities.

High-quality CTE programs typically include coherent programs of study, rigorous academic and technical instruction, current equipment and facilities, employer partnerships, work-based learning, dual enrollment or articulated credit, and credentials connected to industry and postsecondary pathways. These features are significant because they can make CTE simultaneously educational, relational, career-oriented, and credential-oriented. When implemented well, CTE can strengthen engagement, skill development, and academic relevance while helping students understand how high school connects to college and work (Dougherty, 2023; Plasman et al., 2025).

At the same time, contemporary CTE carries the historical burden of vocational tracking. The history of vocational education in the United States is also a history of how schools have sorted students by race, class, gender, perceived ability, and presumed social future. Scholarship on vocational tracking cautions that career-oriented education has too often directed Black and economically disadvantaged students toward lower-status pathways while limiting access to college-preparatory coursework and broader forms of mobility (Giani, 2019; Hodge et al., 2020; Kim et al., 2021).

This historical legacy does not mean that CTE is inherently limiting. It means that CTE must be examined carefully as a structure through which opportunity can either be redistributed or reproduced. Modern reforms may use the language of college and career readiness while still leaving Black students in schools with fewer high-quality programs, limited access to high-wage fields, weaker advising, or less postsecondary alignment. Studies of CTE high schools and programs of choice show that desirable CTE opportunities can become stratified when families differ in information, access to application processes, transportation, or knowledge about program quality (Ansel et al., 2022).

Therefore, the equity challenge is not simply to expand CTE seats. The challenge is to ensure that Black students have access to pathways that are rigorous, well-resourced, culturally responsive, credential-bearing, connected to postsecondary options, and linked to meaningful labor-market opportunity. Contemporary CTE can help repair the historical harms of tracking only if it intentionally connects access to quality, support, credentials, and mobility. This is why the present article treats CTE as an opportunity structure rather than merely a program option.

The contemporary policy environment reinforces this opportunity perspective. Perkins V and related state reforms emphasize programs of study, academic and technical skill attainment, accountability, postsecondary connections, and work-based learning. These priorities create important structural conditions for opportunity, but they do not guarantee that Black students experience opportunity equitably. A policy can require programs of study while implementation still varies by school, district wealth, teacher availability, employer partnerships, transportation, and local labor-market conditions. While policy design establishes the conditions for opportunity, students' lived experiences determine how those conditions are encountered and navigated.

Labor-market alignment further demonstrates the need for caution. CTE is often justified as a bridge between K–12 schooling, postsecondary education, and workforce demand. Yet alignment with available jobs is not the same as alignment with mobility. A pathway may connect to a large local employment sector while still leading to low wages, limited advancement, or weak postsecondary transfer. Carruthers et al. (2024) showed that CTE is only partially aligned with local labor markets, and Carruthers et al. (2026) emphasized that pathways differ in potential pay. For Black students, the equity question must therefore move from whether programs are aligned with jobs to whether they are aligned with economically meaningful futures.

Why Access and Participation Are Insufficient Equity Measures

A pathway-level framework is needed because access alone does not reveal whether Black students enter high-quality or high-return CTE opportunities. Bennett's (2025) opportunity-to-learn perspective is useful here because it shifts attention from isolated outcomes to the cumulative conditions that enable or constrain achievement and life chances. In CTE, those conditions include program availability, funding, transportation, admissions criteria, scheduling, school location, and the distribution of high-opportunity pathways across districts and communities. Without attention to these conditions, participation data may obscure the ways opportunity is structured before students ever choose a program.

Empirical research illustrates this concern. Jacob and Ricks (2023) found that CTE access and participation are shaped by race, income, gender, school-level supply, and program availability. Furey (2025) further demonstrated that access to different types of CTE programs can vary by district income, with college-focused CTE more common in higher-income districts. These findings suggest that formal access to CTE may not mean access to the same kinds of opportunity. Black students may be offered CTE, but not necessarily the programs most strongly connected to college preparation, high-wage fields, or long-term mobility.

Participation is also insufficient because CTE pathways vary in field of study, labor-market alignment, and economic return. Carruthers et al. (2024) showed that CTE alignment with local labor markets is partial rather than automatic, and Carruthers et al. (2026) emphasized that students' pathway choices may foreshadow differences in potential pay. Ecton and Dougherty (2023) similarly found substantial heterogeneity in high school CTE outcomes by field, student background, and institutional context. These findings complicate broad claims that CTE participation is beneficial for all students in the same way.

Credentials are also incomplete indicators unless their value is examined. CTE systems often count credential attainment as a marker of success, but credentials differ in employer recognition, portability, stackability, cost, postsecondary alignment, and connection to high-wage work. Stevens (2019) emphasized that CTE can support employment and earnings, but also noted barriers related to program quality, funding, and completion. Anderson et al. (2021) showed that racial and ethnic equity gaps persist in postsecondary CTE completion and earnings, demonstrating that credentials and program participation do not automatically become mobility.

Workforce entry must likewise be interpreted through a racial equity lens. Howard et al. (2024) found that CTE participation was associated with lower dropout rates, but the employment benefits were not equally distributed by race. Their findings raise the possibility that CTE may increase engagement while still channeling some students toward lower-wage occupations or away from four-year college pathways. LaForest (2023) and Yoon and Dougherty (2025) also suggest that some CTE models strengthen direct labor-market outcomes while creating tradeoffs for four-year college enrollment. These tradeoffs are not inherently negative, but they must be made transparent and equitable.

Taken together, this literature shows that CTE equity cannot be measured at one point in the pathway. Access matters, but it must be connected to program quality. Participation matters, but it must be connected to advising, belonging, and work-based learning. Credentials matter, but they must be connected to recognized value and postsecondary options. Workforce entry matters, but it must be connected to earnings, advancement, and racialized labor-market conditions. A framework is needed to examine how these domains interact and accumulate in Black students' CTE experiences.

Access measures often tell stakeholders who is present in CTE, but they do not reveal the opportunity quality of that presence. A school may report racially diverse CTE enrollment while Black students remain underrepresented in pathways linked to high-wage sectors or overrepresented in programs with limited labor-market returns. Likewise, a district may increase seats in CTE without addressing transportation, scheduling,

program prerequisites, or informational barriers that make some pathways easier for advantaged students to use. These conditions show why structural access must be examined alongside program quality and pathway outcomes.

Participation measures can also obscure relational and instructional inequities. Students who enroll in CTE need adults who help them understand program expectations, credential requirements, college options, and career tradeoffs. They also need teachers who provide rigorous, culturally responsive instruction and institutions that monitor whether students are progressing toward completion. Without those supports, participation may become a weak indicator of opportunity. Students may be present in a pathway without receiving the guidance, affirmation, or preparation needed to convert that pathway into future options.

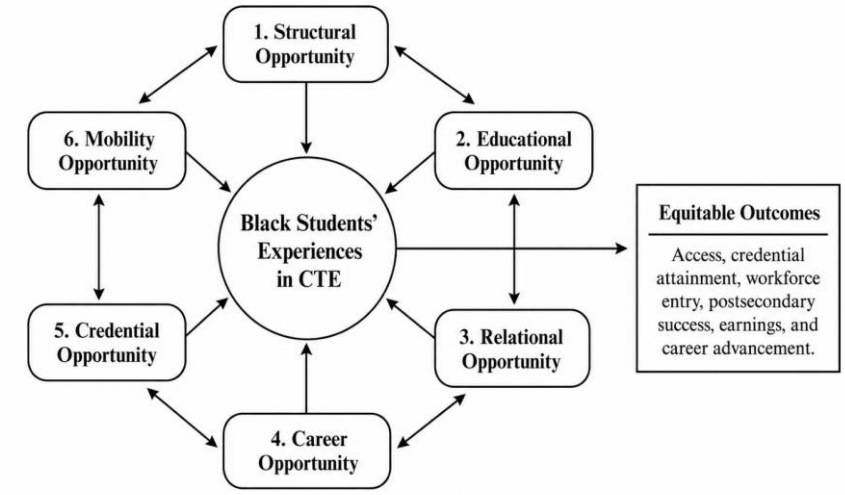
Credential measures require similar scrutiny. A credential can function as a gateway to employment or further education, but it can also be a symbolic marker with limited value. The difference depends on whether the credential is recognized by employers, portable across settings, stackable into higher credentials, connected to postsecondary programs, and aligned with a field that offers wages and advancement. For Black students, credential opportunity must be understood not simply as earning a certificate, but as earning credentials that can be used in labor markets and educational systems that have historically produced unequal returns.

A pathway-level framework is therefore needed because each equity indicator depends on the others. Access without quality can reproduce tracking. Quality without support can leave students isolated. Support without high-opportunity pathways can affirm students while still limiting mobility. Credentials without value can create a false sense of completion. Workforce entry without advancement can produce short-term employment but not long-term economic mobility. The framework proposed below is designed to hold these relationships together and make them visible for research, policy, and practice.

The Equity-Centered CTE Opportunity Framework

The Equity-Centered CTE Opportunity Framework conceptualizes Black students' CTE experiences as shaped by six interconnected domains: structural, educational, relational, career, credential, and mobility opportunity. Although these domains are analytically distinct, students experience them as cumulative and interactive. Together, they shape whether CTE functions as a pathway to educational and economic mobility or as a mechanism for reproducing racialized stratification.

Figure 1 *Equity-Centered CTE Opportunity Framework*



Note: The framework illustrates how six interconnected opportunity domains shape Black students' experiences across the CTE pathway and influence equitable outcomes.

Structural Opportunity

Structural opportunity refers to the policy, funding, access, transportation, admissions, scheduling, and accountability conditions that determine whether Black students can enter high-quality CTE pathways. In this domain, equity begins before enrollment. Black students cannot benefit from high-quality health science, information technology, engineering, advanced manufacturing, education, or skilled-trades pathways if those pathways are unavailable, inaccessible, at capacity, or located in places students cannot reasonably reach.

Structural opportunity also requires attention to information and institutional design. Formal access may be insufficient if families do not receive clear information about program options, if prerequisites limit entry, if schedules conflict with graduation requirements, or if students must choose between CTE and advanced academic coursework. Jacob and Ricks (2023) and Furey (2025) demonstrate why these conditions matter. CTE participation

reflects not only student preference, but program availability, school location, and district-level resources. Researchers and practitioners should therefore examine who has access to which pathways, under what conditions, and with what barriers to entry.

Indicators of structural opportunity include the geographic distribution of programs, the proportion of Black students with access to high-wage and college-aligned pathways, the transparency of admissions criteria, the availability of transportation, and the relationship between CTE scheduling and graduation requirements. A structural analysis should also examine whether districts rely on competitive admissions processes that advantage students with stronger prior academic preparation, family knowledge, or access to application support. When these conditions are ignored, CTE can appear open while remaining unevenly usable.

Educational Opportunity

Educational opportunity refers to the quality of teaching, curriculum, facilities, instructional rigor, teacher preparation, and academic-technical integration students experience once they enter CTE. This domain asks whether Black students receive instruction from qualified CTE educators, whether curriculum is aligned with industry and postsecondary expectations, whether equipment reflects current workplace technologies, and whether coursework integrates mathematics, literacy, science, problem-solving, and technical skill development. CTE equity depends on what students learn and how they are taught, not simply whether they are enrolled.

This domain is especially important because CTE programs vary widely in quality. A pathway may appear to provide opportunity while lacking current equipment, challenging coursework, culturally responsive pedagogy, or connection to high-wage sectors. Fletcher (2026) argued that high-quality CTE in urban schools must combine strong programmatic features with culturally responsive instruction. In this framework, educational opportunity means Black students are not placed into watered-down versions of career preparation. They receive rigorous, affirming, and future-oriented learning experiences that prepare them for credentials, postsecondary education, employment, and leadership.

Indicators of educational opportunity include teacher certification and stability, access to current technology and facilities, curriculum alignment with industry standards, integration of academic and technical content, and evidence that students are prepared for credential exams and postsecondary coursework. This domain should also include culturally responsive pedagogy because learning quality is not only technical. Black students should encounter instruction that recognizes their communities, challenges deficit narratives, and positions them as capable of innovation, leadership, and advanced learning.

Relational Opportunity

Relational opportunity refers to the counseling, mentoring, family engagement, adult advocacy, peer relationships, and culturally affirming supports that help Black students develop a sense of belonging and successfully navigate CTE pathways. This domain asks whether students receive accurate advising about pathway options, whether counselors explain how credentials connect to college and careers, whether mentors and role models are available, whether families are included in decision-making, and whether students experience belonging in technical learning spaces. Relationships are not add-ons to CTE; they are part of the pathway through which opportunity becomes usable.

Relational opportunity matters because Black students' experiences in CTE are shaped by adult expectations, institutional messages, and racial climate. Counseling can open opportunity when it provides accurate information about high-wage pathways, postsecondary alignment, and credential value. It can constrain opportunity when students are steered into lower-status programs or away from advanced academic and technical coursework. Hines et al. (2026) emphasized the role of school counselors and school psychologists in supporting Black students through antiracist and affirming practice, while Byrd et al. (2026) showed that school racial climate shapes belonging. Researchers and practitioners should therefore ask whether Black students are being guided toward opportunity, affirmed within it, and supported through completion.

Indicators of relational opportunity include counselor caseloads, frequency and quality of advising, access to mentors, family outreach, student sense of belonging, teacher expectations, and whether Black students report being encouraged toward rigorous and high-opportunity pathways. Relational opportunity also includes adult advocacy when barriers arise. Students may need help navigating schedule conflicts, transportation challenges, credential exam fees, workplace placement concerns, or college transition requirements. The framework asks whether institutions anticipate these needs rather than leaving students to solve them alone.

Career Opportunity

Career opportunity refers to access to career exploration, work-based learning, internships, apprenticeships, job shadowing, employer partnerships, career and technical student organizations, and professional networks. This domain asks whether Black students have opportunities to explore multiple fields, interact with employers, participate in meaningful workplace experiences, develop employability skills, and build networks connected to high-demand and high-wage sectors. Career opportunity is the domain through which CTE moves beyond

classroom instruction and connects students to occupational knowledge, workplace norms, and possible professional identities.

For Black students, career opportunity is also a matter of network access. Many high-wage fields are shaped by informal relationships, employer expectations, and professional norms that are not equally available to all students. Work-based learning can expand opportunity when it provides supervised, developmentally appropriate, and meaningful experiences connected to real pathways. It can reproduce inequity when placements are unpaid, inaccessible by transportation, disconnected from students' goals, or concentrated in lower-wage fields. Plasman and Linares-Ramirez (2025) emphasized that work-based learning helps students accumulate human, social, and cultural capital. Schools and employers should ensure that Black students receive access to career experiences that expand options rather than confirm existing labor-market stratification.

Indicators of career opportunity include the availability and quality of internships, apprenticeships, job shadowing, employer mentoring, workplace visits, career and technical student organizations, and career exploration across multiple fields. This domain should also examine whether placements are paid or otherwise financially accessible, whether students can reach them safely, whether employer partners are trained to work with youth, and whether experiences are connected to students' goals. Career opportunity is strongest when students are not simply observing work, but building knowledge, confidence, relationships, and a sense that they can belong in high-opportunity fields.

Credential Opportunity

Credential opportunity refers to students' access to industry-recognized credentials, credential exam preparation, dual enrollment, articulated credit, postsecondary alignment, and stackable pathways. This domain asks whether Black students can earn credentials that have recognized value beyond the classroom, whether those credentials are transferrable across employers and institutions, whether they align with high-demand fields, and whether students receive support to complete credential requirements. Credential opportunity is central because contemporary CTE increasingly relies on credentials as evidence that students have developed career-relevant competencies.

However, credential attainment is only equitable if the credentials have real value beyond high school. Some credentials may increase access to employment, apprenticeship, community college programs, or further training. Others may have limited labor-market recognition or weak connection to postsecondary pathways. Anderson et al. (2021) and Stevens (2019) remind the field that completion and credentialing do not automatically erase racial inequities in earnings or employment. In this framework, credential opportunity means Black students earn credentials that expand choices, support transition, and remain meaningful across educational and labor-market settings.

Indicators of credential opportunity include credential pass rates, exam preparation, exam costs, employer recognition, transferability, stackability, dual enrollment credit, articulated credit, and alignment with postsecondary programs. This domain should also examine whether Black students are disproportionately offered credentials with limited labor-market value or whether they have equitable access to credentials connected to high-demand and high-wage pathways. Credential transparency is essential. Students and families should know what a credential does, what it does not do, and how it fits within a longer educational or career pathway.

Mobility Opportunity

Mobility opportunity refers to whether CTE participation leads to employment, earnings, postsecondary success, career advancement, occupational mobility, and improved quality of life. This is the outcome-facing domain of the framework, but it is not separate from the earlier domains. Mobility is shaped by the cumulative strength of structural access, educational quality, relational support, career exposure, and credential value. A student's ability to benefit from CTE after high school depends on what opportunities were available earlier in the pathway and whether those opportunities connected to meaningful next steps.

This domain responds directly to research showing that CTE benefits are unevenly distributed. If Black students participate in CTE but are concentrated in lower-return fields, earn credentials with limited value, lose access to four-year college pathways, or enter labor markets where racial discrimination reduces returns, then CTE has not fulfilled its equity promise. Howard et al. (2024) and LaForest (2023) demonstrate why the ultimate equity test is not participation alone, but whether CTE expands future options. Mobility opportunity asks whether CTE contributes to family-sustaining wages, postsecondary credentials, career advancement, and long-term educational and economic mobility.

Indicators of mobility opportunity include postsecondary enrollment, persistence, credential completion after high school, employment, earnings, job quality, apprenticeship entry, career advancement, and student perceptions of whether CTE expanded their life chances. Mobility should be measured over time because immediate employment may not fully capture long-term outcomes. A pathway that produces quick labor-market entry but limits postsecondary options may have different equity implications than a pathway that supports both employment and further education. The framework therefore treats mobility as both an outcome and an evaluative question: Did CTE expand Black students' future choices?

Interactions Among the Six Domains

The six domains are separated for analytic clarity, but students experience them as interconnected. Structural opportunity shapes whether students can enter high-quality pathways. Educational opportunity shapes whether they develop academic and technical competencies. Relational opportunity shapes whether they receive the guidance, affirmation, and advocacy needed to persist. Career opportunity shapes whether they gain exposure to workplaces and networks. Credential opportunity shapes whether learning becomes externally recognized. Mobility opportunity reflects whether these earlier domains combine to expand students' futures.

The framework therefore treats CTE equity as cumulative. A weakness in one domain can limit the value of another. For example, a high-quality curriculum may not produce equitable outcomes if Black students lack transportation to the program or advising about credential requirements. A credential may have limited value if it is not recognized by employers or connected to postsecondary pathways. A work-based learning placement may fail to advance mobility if it is disconnected from high-wage fields or marked by racialized expectations. Conversely, when all domains are intentionally aligned, CTE can become a powerful structure for educational and economic opportunity.

This interactional view also helps avoid deficit explanations of Black students' CTE outcomes. When outcomes are weak, the framework directs attention to opportunity conditions rather than student motivation alone. It asks whether programs were available, instruction was rigorous, relationships were supportive, career networks were accessible, credentials had value, and mobility pathways were open. In doing so, the framework provides a language for examining institutional responsibility and identifying where CTE systems can be redesigned.

The framework's central proposition is that equitable mobility is more likely when the six domains are strong and aligned. Structural opportunity opens the door; educational opportunity provides rigorous preparation; relational opportunity helps students navigate and persist; career opportunity connects students to workplaces and networks; credential opportunity creates recognized evidence of skill; and mobility opportunity assesses whether the pathway leads to meaningful outcomes. The domains do not function in a simple linear sequence because students may move back and forth among them. Still, the model highlights the cumulative nature of opportunity, recognizing that conditions encountered early in the pathway shape later possibilities.

This pathway logic also creates a diagnostic approach. When Black students are underrepresented in high-wage pathways, the framework directs attention to structural access and advising. When credential completion is low, it asks about instruction, exam preparation, costs, and support. When employment outcomes are weak, it asks about pathway placement, credential value, employer partnerships, and labor-market discrimination. When four-year college attendance declines, it asks whether students received transparent guidance about tradeoffs and whether pathways preserved postsecondary options. The framework therefore helps identify where opportunity breaks down rather than treating inequitable outcomes as inevitable.

The Framework as a Testable Model

The Equity-Centered CTE Opportunity Framework is intended not only as a descriptive model but also as a guide for future empirical research, local program review, and equity-centered systems improvement. Qualitative studies can use the framework to examine how Black students describe access, advising, belonging, instructional quality, work-based learning, credential preparation, and transition planning. Interviews, focus groups, case studies, and ethnographies can reveal dimensions of opportunity and constraint that administrative data alone may not capture.

Quantitative studies can use the framework to test relationships among program availability, pathway placement, course completion, credential attainment, postsecondary enrollment, employment, earnings, and advancement. Longitudinal data can help researchers examine whether structural opportunity predicts access, whether educational and relational opportunity predict persistence and completion, whether career and credential opportunity predict transition, and whether the combined strength of the domains predicts mobility. Mixed-methods studies can then connect statistical patterns with Black students' lived experiences, providing a fuller account of how opportunity accumulates across the pathway.

The framework can also guide local program review. Districts, CTE centers, and schools can examine each pathway by asking six questions: Who has access? What is the quality of instruction? What relationships and supports are available? What career experiences and networks are provided? What credentials can students earn, and what are they worth? What happens after students complete the program? These questions shift CTE evaluation from compliance-oriented participation counts toward equity-centered opportunity analysis.

Because the framework is centered on Black students' experiences, it also invites research and practice that treat students as knowledge holders. Students can explain how they learned about CTE, who encouraged or discouraged them, what they understood about credential value, whether they felt supported in classrooms and workplaces, and how they interpreted their future options. These accounts are not merely anecdotal; they are evidence of how opportunity structures operate. When combined with administrative data, they can help explain why the same formal pathway may produce different outcomes for different groups of students.

Implications for Research, Policy, and Practice

The Equity-Centered CTE Opportunity Framework shifts the central question from whether Black students participate in CTE to how they experience opportunity across the full pathway. This shift has implications for research, policy, and practice because it requires stakeholders to examine the conditions that make access meaningful and mobility possible.

Research Implications

For researchers, the framework offers a pathway-level model for studying Black students' experiences in CTE. Future studies should move beyond single indicators such as enrollment or completion and examine how opportunity accumulates across structural, educational, relational, career, credential, and mobility domains. Qualitative research should center Black students' lived experiences with advising, program climate, teacher expectations, employer placements, credential requirements, and sense of belonging. Quantitative research should use disaggregated longitudinal data to examine access, pathway placement, credential completion, postsecondary transition, employment, and earnings by race and program area.

Mixed-methods research may be especially valuable because it can connect administrative outcome patterns with students' explanations of how those patterns are produced. For example, statewide data may reveal disparities in high-wage pathway access, while interviews may show how transportation, prerequisites, counseling, family information, or school climate shaped those outcomes. In this way, the framework can help researchers identify not only whether inequities exist, but how they emerge across the pathway.

Research should also examine the relationship among domains rather than studying them in isolation. For example, a study of credential attainment should consider whether students had equitable access to rigorous instruction, exam preparation, advising, and credential fees. A study of work-based learning should examine whether placements are connected to high-opportunity sectors and whether students experience belonging and adult advocacy in workplace settings. A study of earnings should consider pathway placement, credential value, postsecondary transitions, and racialized labor-market barriers. These connections are where the framework makes its strongest contribution.

Policy Implications

For policymakers, state agencies, districts, and CTE leaders, the framework underscores the need to design CTE systems around meaningful opportunity rather than participation alone. States and districts should disaggregate CTE participation, concentration, completion, credential attainment, dual enrollment, work-based learning, postsecondary enrollment, employment, and earnings by race, gender, socioeconomic status, disability status, geography, and program area. Without this level of analysis, inequities may remain hidden beneath aggregate participation rates or overall credential counts.

Policy should also examine pathway sorting and credential value. Expansion may increase the number of CTE seats while leaving Black students concentrated in lower-return pathways or excluded from high-wage, high-demand, STEM-related, or college-aligned programs. Accountability systems should therefore ask whether Black students have access to high-quality programs, whether credentials are recognized and portable, whether work-based learning is equitably distributed, and whether CTE participation expands postsecondary and workforce options. The data should be used for improvement rather than blame, with the goal of identifying where systems can remove barriers and redistribute opportunity.

Policy leaders should also avoid treating local labor-market demand as automatically equitable. Workforce alignment should include wage quality, advancement potential, credential portability, and postsecondary transferability. If states encourage districts to align CTE with regional employment needs, they should also ask whether those needs lead students into family-sustaining careers. For Black students, equity-centered workforce policy must connect preparation to opportunity, not simply to available jobs.

Practice Implications

For practitioners, the framework can function as a practical diagnostic tool. School leaders, counselors, CTE directors, teachers, postsecondary partners, and employers should examine whether Black students are entering high-quality, high-opportunity pathways and whether they receive the supports needed to persist and advance. This includes strengthening advising, mentoring, culturally responsive instruction, family engagement, work-based learning, credential transparency, and postsecondary transition planning.

Practitioners should also make pathway tradeoffs visible to students and families. Students need clear information about credential value, college alignment, wage potential, apprenticeship options, employer recognition, and long-term career growth. Advising should not present CTE and college as mutually exclusive choices. Instead, it should help Black students identify pathways that preserve future options and connect technical preparation to postsecondary success, workforce entry, and advancement.

Structured college and career preparation activities should be embedded in CTE rather than treated as optional extras. College visits, career fairs, counseling, exam preparation, internships, and guided college and career searches can help students interpret the meaning of pathway choices and connect CTE participation to next steps (Xing et al., 2019). Employers should be active partners in this work by providing meaningful, supervised, and equitable experiences that expand students' networks and opportunities.

At the classroom and school level, the framework encourages practitioners to ask practical equity questions during everyday decision-making. When recruiting students, staff should ask whether Black students and families receive clear information about all pathways. When advising students, counselors should ask whether students understand both immediate and long-term options. When planning instruction, teachers should ask whether academic and technical rigor are paired with culturally responsive pedagogy. When developing employer partnerships, leaders should ask whether placements are meaningful, supervised, and connected to advancement. These questions make equity operational rather than aspirational.

Postsecondary partners and employers also have responsibilities within the framework. Community and technical colleges should ensure that high school pathways connect to programs, credits, supports, and credentials students can use after graduation. Employers should move beyond advisory participation and help create internships, mentorships, workplace visits, mock interviews, equipment support, curriculum feedback, and hiring pipelines. When partners treat Black students as future professionals rather than temporary trainees, career opportunity and mobility opportunity become more attainable.

Conclusion

CTE has the potential to connect Black students to rigorous learning, technical skill development, industry credentials, postsecondary education, workforce entry, and economic mobility. Yet that potential cannot be evaluated through access or participation alone. Given the historical legacy of vocational tracking and the continuing racialized distribution of educational and labor-market opportunity, equity in CTE must be examined across the full pathway.

The Equity-Centered CTE Opportunity Framework responds to this need by conceptualizing Black students' CTE experiences across six interconnected domains: structural opportunity, educational opportunity, relational opportunity, career opportunity, credential opportunity, and mobility opportunity. The framework shows that outcomes are produced through the quality, sequencing, and distribution of opportunities students encounter over time. It also provides researchers, policymakers, and practitioners with a practical tool for examining where opportunity is expanded, where it is constrained, and where systems must be redesigned.

The framework also clarifies the stakes of future CTE reform. Reforms that expand access but ignore quality may reproduce the very tracking patterns they seek to disrupt. Reforms that increase credentials but ignore credential value may produce completion without mobility. Reforms that emphasize labor-market alignment but ignore wages, advancement, and postsecondary options may prepare students for work without expanding opportunity. An equity-centered approach requires systems to hold all six domains together.

If CTE is to fulfill its promise for Black students, schools and systems must intentionally connect access, quality, support, credentials, and mobility. CTE can become a pathway to educational and economic justice when Black students are not merely included in programs, but are supported in pathways that affirm their strengths, expand their choices, and lead to meaningful long-term opportunity.

References

Anderson, T., Briggs, A., Spaulding, S., Zamani-Gallaher, E., & López, D. (2021). *Racial and ethnic equity gaps in postsecondary career and technical education: Considerations for online learning*. Urban Institute. https://www.urban.org/research/publication/racial-and-ethnic-equity-gaps-postsecondary-career-and-technical-education

Ansel, D., Dougherty, S., Ecton, W., Holden, K., & Theobald, R. (2022). Student interest and equitable access to career and technical education high schools of choice. *Journal of School Choice, 16*(4), 588–622. https://doi.org/10.1080/15582159.2022.2039427

Arneson, A., Hodara, M., & Klein, S. (2020). *Career and technical education in Oregon: Exploring who participates in high school and the outcomes they achieve*. Regional Educational Laboratory Northwest, Education Northwest. https://files.eric.ed.gov/fulltext/ED607349.pdf

Bennett, R. E. (2025). Rethinking equity and assessment through opportunity to learn. *Assessment in Education: Principles, Policy & Practice, 32*(1), 5–32. https://doi.org/10.1080/0969594X.2025.2462549

Bettencourt, G. M., George Mwangi, C. A., Green, K. L., & Morales, D. M. (2022). But, do I need a college degree?: Understanding perceptions of college and career readiness among students enrolled in a career and technical high school. *Innovative Higher Education, 47*(3), 453–470. https://doi.org/10.1007/s10755-021-09585-3

Byrd, C. M., Sas, A., Halls-Gordon, R., Cerda-Smith, J., Jackman-Ryan, S., & Patterson, J. (2026). How school racial climate creates opportunity structures for belonging: A systematic review with meta-analysis. *Educational Psychology Review, 38*(1), Article 34. https://doi.org/10.1007/s10648-025-10078-4

Carruthers, C. K., Dougherty, S. M., Goldring, T., Kreisman, D., Theobald, R., Urban, C., & Villero, J. (2024). Career and technical education alignment across five states. *AERA Open, 10*. https://doi.org/10.1177/23328584241276504

Carruthers, C. K., Dougherty, S. M., Goldring, T., Kreisman, D., Theobald, R., Urban, C., & Villero, J. (2026). Who takes high-earning CTE pathways? *Southern Economic Journal*. Advance online publication. https://doi.org/10.1002/soej.70044

Dougherty, S. M. (2023). Putting evidence on CTE to work. *Phi Delta Kappan, 104*(6), 6–11. https://doi.org/10.1177/00317217231161520

Ecton, W. G., & Dougherty, S. M. (2023). Heterogeneity in high school career and technical education outcomes. *Educational Evaluation and Policy Analysis, 45*(1), 157–181. https://doi.org/10.3102/01623737221103842

Fletcher, E. C., Jr. (2022). Access to and equity in rigorous career and technical education programs: Trends, issues, and future directions in the field. *Career and Technical Education Research, 47*(3), 17–27. https://doi.org/10.5328/cter47.3.17

Fletcher, E. C., Jr. (2026). Making a case to establish high-quality career and technical education and culturally responsive programs for students in urban schools. *Urban Education*. Advance online publication. https://doi.org/10.1177/00420859261433921

Furey, J. (2025). College or career ready, but not both? Heterogeneity of career and technical education (CTE) programs and income-based inequality in access and participation. *AERA Open, 11*. https://doi.org/10.1177/23328584251334378

Giani, M. S. (2019). Does vocational still imply tracking? Examining the evolution of career and technical education curricular policy in Texas. *Educational Policy, 33*(7), 1002–1046. https://doi.org/10.1177/0895904817745375

Hines, E. M., Vega, D., Harris, P. C., Mayes, R. D., & Moore, J. L., III. (2026). School counselors and school psychologists as collaborators for Black students pursuing career and technical education: An antiracist approach. *Urban Education*. Advance online publication. https://doi.org/10.1177/00420859261433919

Hodge, E., Dougherty, S., & Burris, C. (2020). *Tracking and the future of career and technical education: How efforts to connect school and work can avoid the past mistakes of vocational education*. National Education Policy Center. https://nepc.colorado.edu/publication/cte

Howard, K. E., Howard, N. R., Havard, D. D., & Wall, A. F. (2024). Career and technical education's unequal dividends for high school students: The stratification of a new generation. *Urban Education, 59*(5), 1586–1618. https://doi.org/10.1177/00420859211073890

Jacob, B. A., & Ricks, M. D. (2023). *Why choose career technical education? Disentangling student preferences from program availability* (NBER Working Paper No. 31756). National Bureau of Economic Research. https://doi.org/10.3386/w31756

Kim, E. H., Flack, C. B., Parham, K., & Wohlstetter, P. (2021). Equity in secondary career and technical education in the United States: A theoretical framework and systematic literature review. *Review of Educational Research, 91*(3), 356–396. https://doi.org/10.3102/0034654321995243

LaForest, M. (2023). The effects of high school career and technical education on employment, wages, and educational attainment. *Journal of Human Capital, 17*(1), 39–71. https://doi.org/10.1086/722309

Leu, K. B., & Arbeit, C. A. (2020). Differences in high school CTE coursetaking by gender and race/ethnicity. *Career and Technical Education Research, 45*(1), 33–62. https://doi.org/10.5328/cter45.1.33

Plasman, J. S., & Linares-Ramirez, N. (2025). Work-based learning for all: Changes in internship and cooperative education participation over time. *Journal of Career and Technical Education, 40*(2). https://doi.org/10.21061/jcte.488

Plasman, J. S., Stein, M. L., Durham, R. E., & Smith-Onyewu, Z. (2025). CTE mechanisms: The effects of career and technical education center admissions offers in Baltimore. *Educational Evaluation and Policy Analysis, 47*(3), 682–702. https://doi.org/10.3102/01623737241239299

Stevens, A. H. (2019). What works in career and technical education (CTE)? A review of evidence and suggested policy directions. In M. S. Kearney & A. Ganz (Eds.), *Expanding economic opportunity for more Americans: Bipartisan policies to increase work, wages, and skills* (pp. 40–54). Aspen Economic Strategy Group. https://www.economicstrategygroup.org/publication/what-works-in-career-and-technical-education-cte-a-review-of-evidence-and-suggested-policy-directions/

Xing, X., Huerta, M., & Garza, T. (2019). College and career preparation activities and their influence on post-high school education and work attainment. *Journal of Career and Technical Education, 34*(1), 8–28. https://doi.org/10.21061/jcte.v34i1.a1

Yoon, Y., & Dougherty, S. M. (2025). *Does expanding access to high quality technical education induce participation and improve outcomes?* (EdWorkingPaper No. 25-1312). Annenberg Institute at Brown University. https://doi.org/10.26300/x8hk-xj77