



Facilitating Career and Technical Education Programs and Pathway Participation for Students with Disabilities in Utah

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Executive Summary

As part of an ongoing research-practice partnership with the Utah State Board of Education (USBE), the Utah Education Policy Center (UEPC) conducted a study of facilitators and barriers to the representation of students with disabilities in Career and Technical Education (CTE). The study sought to understand how facilitators and barriers differed among exemplar and improvement sites. The findings and recommendations complement the USBE's 2024-2029 Strategic Plan for Utah's Secondary Career and Technical Education, which outlines the goals of Awareness and Outreach, Industry Alignment, Postsecondary Alignment, and Durable Skills. In addition, this research supports an understanding of how LEAs are ensuring students with disabilities are aware of and have access to educational opportunities, including those that prepare them for employment or career preparation (USBE Special Education Rules, 2023).

Research Questions

This study employed both qualitative and quantitative methods to answer the following questions:

1. What were the differences in perceptions, practices, and/or beliefs among practitioners in LEAs whose students with disabilities were equally (or over-) represented in Career and Technical Education pathways compared to those in which students with disabilities were underrepresented?
2. What are the facilitators and barriers for students with disabilities engaging in Career and Technical Education pathways?
3. What are the key opportunities that LEAs can address to support the increase in participation of students with disabilities in CTE pathways?

Methods

Comparing CTE concentration and completion rates from 2021 to 2023 between students with disabilities and the general student population, the UEPC identified LEAs with the greatest and lowest representation of students with disabilities engaging in CTE programs for participation in this study (referred to as “exemplar” and “improvement” sites, respectively). LEA leaders (e.g., principals, directors) and educational practitioners (e.g., teachers) of CTE and Special Education (SPED) departments were invited to participate in interviews, surveys, and focus groups to share their perceptions of the facilitators and barriers to engaging students with disabilities in CTE programs (e.g., courses) and pathways within their LEAs. The research team conducted descriptive and comparative statistical analyses, including t-tests and ANOVA, on educator survey responses to assess perceptions, barriers, facilitators, and practices supporting students with disabilities in CTE pathways. Transcripts from interviews and focus groups were structurally coded using deductive and open-coding strategies followed by thematic categorization to identify key patterns and differences across participant groups. The team enhanced trustworthiness and credibility by triangulating multiple data sources, engaging in peer debriefing, and systematically seeking both corroborating and disconfirming evidence to validate emerging themes.

Key Findings

Several key findings emerged from this study. Many of the findings are notable as both a facilitator and a barrier, depending on their presence or lack of presence in the practices of schools and educators. First, we share key findings from the survey analysis, followed by those themes identified from the qualitative analysis.

- **Perceptions.** Overall perception ratings were high (averages between 3.4 and 4.3 on a 5-point scale), with no significant differences between exemplar and improvement sites. Educators across both exemplar and improvement sites agreed that students with disabilities belong in CTE and can succeed when provided with appropriate supports. Counselors and administrators tended to be more optimistic than teachers.
- **Facilitators.** The highest-rated facilitators of CTE participation were empowering students with disabilities to self-advocate, promoting an inclusive CTE culture, and providing staff professional learning on CTE pathways and accommodations. Other items in the moderate range included communicating CTE opportunities aligned to student goals, engaging parents or advocates, integrating CTE into Individualized Education Programs (IEPs), guided college and career readiness (CCR)/post-school planning, early communication, and supports such as scheduling, sequencing, and facility tours.
- **Barriers.** Even the highest-rated factors that hindered CTE participation were reported to be only minor or moderate barriers. These included students' uncertainty about post-high school plans, limited classroom support staff, parents' or guardians' limited awareness of CTE benefits, and teachers' uncertainty about how to advocate for resources or provide accommodations. Systemic challenges such as scheduling constraints, unmet prerequisites, transportation, and limited funding were also reported.
- **Group differences.** While perceptions of inclusion did not differ between exemplar and improvement sites, some differences emerged for specific facilitators and barriers. Respondents from improvement sites rated items such as scheduling, Americans with Disabilities Act (ADA) compliance, and staff capacity building as higher facilitators than those from exemplar sites, possibly reflecting sensitivity to unmet needs or active improvement efforts. By role, SPED teachers rated some barriers more strongly than administrators or CTE teachers, reflecting their closer work with students.

There are three strategic opportunities—**Raising CTE Awareness, Ensuring CTE Access and Inclusion, and Building Capacity and Collaborative Practices**—that schools and LEAs have used to increase the participation of students with disabilities in CTE programs and pathways. Within each of these strategic opportunities, there were both facilitators and barriers to their efforts.

- **Raising CTE Awareness:** Key facilitators included communication, outreach, and exposure to CTE programming and career and transition planning. Key barriers included limited and inconsistently available CTE information and competing priorities and career decision factors (e.g., work).
- **Ensuring CTE Access and Inclusion:** Key facilitators included providing classroom supports along with implementation of IEP accommodations, strategic course offerings and scheduling, and dedicated resources (e.g., time, staff support). Key barriers included course and pathway requirements, limited course scheduling/availability, misalignment of expectations and placement or support practices, and difficulties implementing IEP accommodations.
- **Building Capacity and Collaborative Practices:** Key facilitators included building knowledge and awareness through professional learning, using data to identify and address gaps, scaling and modeling effective practices, and fostering collaborations and partnerships. Key barriers were similar to those in the other two opportunities.

Figure 1. Opportunities to Expand Students with Disabilities' Participation and Engagement in CTE



Recommendations

To continue to improve support for students with disabilities' participation and engagement in CTE, there are three primary recommendations based on the key findings from this study. Specific details are provided in the Recommendations section of the report.

- **Develop materials and resources to raise and maintain awareness and exposure to CTE opportunities.** This recommendation includes the following strategies: early exploratory exposure, experiential opportunities, family communication, and systematic practice integration.
- **Evaluate and prioritize access and inclusion opportunities through coordinated collaboration and content-specific flexibility.** This recommendation includes the following strategies: scheduling protocols, dual enrollment/concurrent enrollment, integrated course designs, transportation, and internships and apprenticeships.
- **Build capacity through collaboration, professional learning, and shared resource strategies.** This recommendation includes the following strategies: role-specific and collaborative professional learning, co-teaching/co-planning, communities of practice, external partnerships, and evaluating resource allocations and use.

Following this report, the UEPC will provide a technical assistance guide to support LEA efforts to increase participation of students with disabilities in CTE programs and pathways.

Introduction

As part of an ongoing research-practice partnership (RPP) with the Utah State Board of Education (USBE), the Utah Education Policy Center (UEPC) conducted a study of facilitators and barriers to the participation and engagement of students with disabilities in Career and Technical Education (CTE) programs and pathways. Specifically, this study employed qualitative and quantitative methods to address the following primary research questions.

1. What were the differences in perceptions, practices, and/or beliefs among practitioners in LEAs whose students with disabilities were equally (or over-) represented in Career and Technical Education pathways compared to those in which students with disabilities were underrepresented?
2. What are the facilitators and barriers for students with disabilities engaging in Career and Technical Education pathways?
3. What are the key opportunities that LEAs can address to support the increase in participation of students with disabilities in CTE pathways?

This current research extends previous research generated from the USBE-UEPC RPP on supporting educational opportunities for students with disabilities¹. This study identified factors influencing students with disabilities' CTE participation and provided insights into actions that could be used to advance participation and engagement of students with disabilities in CTE. Ultimately, the findings from this study underscore that there is no universal approach to improving CTE outcomes for students with disabilities and that solutions must be contextually relevant and rooted in the unique needs of local schools and learners.

Report Organization

Following this introduction, the report provides background information and previous research on the value of CTE for post-school success for students with disabilities. Next, we describe the research study methods in detail. Then, we provide a description of the study findings, including information on the range of barriers faced and facilitators employed to mitigate or overcome these challenges. We also address the differences identified by educators, including an overview of how perceptions differed by role and site type. The findings are framed around key thematic insights. These insights include three primary actions to increasing the CTE participation and engagement of students with disabilities. These three actions are: raising CTE awareness, ensuring CTE access and inclusion, and building capacity and collaborative practices. The report concludes with key recommendations for local education agencies (LEAs) to further increase the participation and engagement of students with disabilities in CTE pathways in their schools.

¹ See other studies that are part of the research-practice partnership (e.g., Acree, Rorrer, & Altermatt, 2025; Acree, Altermatt, Rorrer, Barton, Auletto, & Ni, 2023; Auletto et al., 2020; Barnett, Altermatt, Acree & Rorrer, 2024; Ni et al., 2017a; Ni et al., 2017b; Ni & Rorrer, 2018; Rorrer et al., 2020; Yildiz, Altermatt, & Rorrer, 2024).

Background Research

In this section, we provide a brief overview of both CTE research and state and federal rules and regulations regarding the inclusion of students with disabilities in CTE. We first outline policies for supporting CTE access for students with disabilities, and then share some of the persistent barriers students with disabilities have faced engaging in CTE. We also provide an overview of research about the value of CTE for students with disabilities' post-school success before sharing some promising practices to facilitate students with disabilities' engagement in CTE. As noted in this background research, variability in how CTE participation, education, and employment are defined across studies and changes in course classifications over time complicate direct comparisons. However, the collective evidence consistently indicates secondary CTE engagement supports positive post-school outcomes for students with disabilities (NTACT, 2018; Theobald et al., 2021; Kreisman & Stange, 2020; Lombardi et al., 2018).

Federal and State Policies Guiding Access to Career and Technical Education for Students with Disabilities

Federal and state laws explicitly protect the rights of students with disabilities, including their access to educational opportunities. The Individuals with Disabilities Act (IDEA), which originally passed in 1975 and was reauthorized in 2004, mandates that all students with disabilities receive a free and appropriate public education (FAPE) (C.F.R. § 300.101) in the Least Restrictive Environment (LRE) (34 C.F.R. § 300.114). IDEA requires schools to develop an Individualized Education Program (IEP) designed to meet the unique educational needs and learning goals of students with disabilities. IEPs are developed collaboratively by a team that includes the student's parents or guardians, special and general education teachers, a representative of the LEA and, when appropriate, the student. The IEP outlines annual measurable goals and provides specifications about the specialized instruction, educational supports, services, and progress monitoring needed to achieve those goals.

There are other federal policies that support students with disabilities. Section 504 of the Rehabilitation Act of 1973 also mandates equal access to educational programs and services for students who do not require specialized instruction but need accommodations. The Strengthening Career and Technical Education for the 21st Century Act of 2018 (Section 134(c)(2)(E)), which amended the Carl D Perkins Career and Technical Education Act of 2006, ensures that students with disabilities have equitable access to CTE courses, programs, and programs of study, and allows states to use Perkins funds to provide accommodations and support services for students with disabilities participating in CTE.

By the time a student turns 16 (or earlier if deemed appropriate by the IEP Team), their IEP should also address their post-secondary services and goals, including goals related to training (vocational education), education, employment, and, where appropriate, independent living (34 CFR § 300.320(b)(1)). The Workforce Innovation and Opportunity Act (WIOA) of 2014 provides additional support for post-school services for students with

disabilities. WIOA requires state Vocational Rehabilitation agencies to provide pre-employment post-school services to eligible students with disabilities between the ages of 14 and 21.

In Utah, USBE Special Education Rules align with IDEA and federal regulations to ensure students with disabilities have access to FAPE and are included in CTE opportunities. The state requires all students to complete one CTE credit to graduate high school. Post-school planning for students with disabilities is integrated into a student's IEP. Moreover, Utah integrates students with disabilities' post-school planning into their College and Career Readiness Planning (CCRP) process, which applies to students who are 14 or older.

CTE: A Pathway to Postsecondary Opportunities

Although student employment is shaped by students' preferred fields of study and the availability of full-time work in these fields (Daviso et al., 2010; Flexer et al., 2011), evidence indicates that students with disabilities were more likely to attain employment one year after high school if they participated in CTE (Baer et al., 2003; Harvey, 2002; Jeon et al., 2010). In part, students with disabilities participating in CTE develop valuable skills for the workplace, explore career options through work-based learning opportunities, and receive post-school planning services to realize their postsecondary goals (Mazzotti et al., 2021; Mazzotti et al., 2016; Test et al., 2009). Moreover, concentration in CTE courses in high school was also a strong predictor of students with disabilities graduating and being employed after high school (Theobald et al., 2019), especially for students who attended a regional vocational technical school such as a CTE Center (Dougherty et al., 2018).

Previous research also demonstrates that these employment outcomes are influenced by race, gender, and socioeconomic status, as well as the student's type and level of disability (Daviso et al., 2016; Flexer et al., 2011; Rabren et al., 2014). Controlling for the effects of race, gender, and other factors known to be associated with post-school outcomes (e.g., earning a high school diploma), students with specific learning disabilities (SLD) or intellectual disabilities (ID) who participated in CTE programs were more likely to be employed than those who did not (Flexer et al., 2011; Rabren et al., 2014). Furthermore, students with SLD who concentrated (i.e., took more than four CTE courses) in an occupation-specific CTE program were more likely to have attained competitive employment one year after exiting high school, though only about a third (36.8%) of students with SLD completed this concentration (Wagner et al., 2016). Similarly, students with emotional disturbance (ED) concentrating in an occupation-specific CTE program were more likely to have attained competitive employment within two years of exiting high school, though this represented only about a quarter (25.6%) of students with ED (Wagner et al., 2016).

Promising Practices and Supports

There are multiple in-school supports (e.g., post-school planning, participation in vocational education, access to a network of trained professionals) that have been identified to promote

post-school success for students with disabilities. For example, Park and Bouck (2018) found that almost every student with ID received post-school planning and almost half participated in vocational education (i.e., CTE), with severity of ID being the strongest predictor of the student's employment status post-school. They also noted that job readiness and placement support predicted paid employment in students with mild ID, while job skill training predicted employment for students with moderate to severe ID. When discussing their findings, Flexer and colleagues (2011) noted that providing stronger post-school supports for African American students with ID in these districts may have supported their successful attainment of competitive employment post-school. In fact, previous research found that students with accommodations specified in their post-school plans were more likely to receive disability-related supports along with supports generally available to CTE students (Newman et al., 2016).

Furthermore, students with disabilities who access a network of trained professionals for support are more likely to successfully transition to post-school employment (Trainor et al., 2019). Specifically, a student-centered team of professionals (e.g., CTE and SPED teachers as well as high school and vocational rehabilitation counselors) can help students navigate the challenges of accessing educational supports, as well as securing employment for adults with disabilities (Barton-Arwood et al., 2016; Wehman et al., 2014).

Barriers to CTE for Students with Disabilities

Despite evidence of the benefits of CTE participation, students with disabilities continue to be underrepresented in CTE pathways (Lombardi et al., 2018). There are many reasons for their limited participation. For instance, state and federal policies may negatively, and sometimes inadvertently, impact high school CTE enrollment (Chadd & Drage, 2006). Students' choices to pursue CTE courses, concentrations, and pathways may also be impacted by negative perceptions among students, family, and educators who may not understand the value of CTE. Even when educators have positive inclinations towards CTE, they may instead encourage students to attend a four-year college (Tucker & Hughes, 2020).

Complications with curriculum integration and limited collaboration between general academic courses and CTE courses can further diminish students' exposure to CTE content (Cannon, Kitchel, et al., 2013; Cannon, Tenuto, et al., 2013; Handy & Braley, 2012; Kitchel, 2015). Several studies have noted that secondary educators did not perceive regular communication between CTE and SPED as a norm in their educational settings (Eisenman et al., 2003; Lee et al., 2016; Schmalzried & Harvey, 2014). These challenges may be further exacerbated by the lack of a formal system for preparing and certifying U.S. State Directors of CTE (Clark & Cole, 2015), along with wide variability in how CTE programs are implemented and how CTE administrators are supported nationally (ACTE, 2021).

Overall, this brief research synthesis demonstrates the potential value that concentrating in or completing a CTE pathway can have for students with disabilities. The benefits of CTE

engagement include both post-secondary education and employment opportunities, although schools must address the attitudinal, structural, and systemic barriers students with disabilities face while leveraging promising practices to effectively support the implementation of CTE programming for these students.

Research Design

This study, which is part of a research-practice partnership between the UEPC and the USBE, was designed to explore the factors that influence the representation of students with disabilities in Utah's secondary CTE pathways. The research questions included:

1. What were the differences in perceptions, practices, and/or beliefs among practitioners in LEAs whose students with disabilities were equally (or over-) represented in Career and Technical Education pathways compared to those in which students with disabilities were underrepresented?
2. What are the facilitators and barriers for students receiving special education services to participate in Career and Technical Education pathways?
3. What are the key opportunities that LEAs can address to support the increase in participation of students with disabilities in CTE pathways?

The UEPC collected and analyzed qualitative and survey data from a sample of local education agencies (LEAs) selected for variation in the representation of students with disabilities in CTE. In consultation with USBE, the UEPC identified LEAs that had students with disabilities concentrating in or completing CTE pathways at greater rates than general education students, as well as LEAs where students with disabilities were concentrating in or completing CTE pathways at lower rates than general education students. The purpose of collecting data from LEAs that had both higher and lower concentrations of students with disabilities than those in general education was to identify common facilitators and barriers to inclusive CTE access and participation, with attention to both policy and practice differences across LEAs.

This methods section is organized into four parts. We begin by describing the sampling approach used to select participating LEAs, followed by an overview of the data sources, including surveys, interviews, and IEP reviews. Next, we outline the procedures for data collection and analysis. The section concludes with considerations for ensuring trustworthiness and alignment with ethical research practices.

Selecting Utah School Districts for Study Participation

To answer the research questions, the Utah Education Policy Center (UEPC) consulted with the Utah State Board of Education (USBE) to identify districts where students with disabilities were over- and under-represented in CTE pathways across the state of Utah. To do this, the UEPC research team examined the average CTE concentration and completion rates across the 2021-2023 academic years. Concentration and completion rates were compared between students with disabilities and their general education peers across LEAs. Rates of

concentration and completion were highly correlated with each other ($r = .88$), indicating that either metric could be used to identify representation disparities across districts.

For each LEA, the research team constructed confidence intervals around the rate of participation in CTE by students with disabilities, the rate of participation in CTE by their general education peers, and the difference (gap) between the rates of participation in CTE by students with disabilities and general education students (the “rate gap”). These confidence intervals are wider when the number of students is small and they are narrower when the number of students is large, reflecting how the level of confidence in an estimate increases with the number of observations.

To identify the exemplar LEAs (those where the CTE completion rate for students with disabilities was high in both absolute terms and relative to the completion rate for general education students), the research team identified LEAs with the smallest gap between general and SPED CTE completion rates and placed them in ascending order by the upper limit of the rate gap. This approach identifies LEAs where the percentage of students with disabilities completing CTE is either higher than the percentage of general education students completing CTE or where the difference between groups is as small as possible. To maintain a threshold of adequacy for exemplar sites, LEAs were excluded from consideration as exemplars when the lower limit of the confidence interval for the SPED CTE completer rate fell below the state average (10%). It is important to note here that three LEAs were excluded because they were missing data on either general education students (e.g., the Utah School for the Deaf and Blind) or SPED students (e.g., Winter Sports School).

In determining the LEAs with the greatest opportunity to improve their SPED CTE completer rates, the research team focused on identifying those with the largest gap between general education and SPED CTE completer rates. To ensure a conservative approach, the team arranged the LEAs in descending order based on the lower limit of the confidence intervals around the gap. This ordering ensured that LEAs with disparities that were both wide and reliable were prioritized as sites with an ability to improve. Furthermore, to verify that the actual SPED completer rates of the bottom 10 LEAs were on the lower end, only those LEAs with an upper limit of the actual SPED CTE completer rate below 20% were included in the selection process. We employed different cutoff rates for exemplar and improvement sites due to variations in the distributions of lower and upper limits of confidence intervals for students with disabilities’ actual completer rates. A similar process was employed for examining concentration rates and gaps between general education and SPED students, and a few districts were added to the exemplar or improvement site lists based on concentration rate gaps between these student populations.

Table 1 and Table 2 include information on the CTE completer rates for SPED and general education populations across the LEAs selected for participation in this study, as well as the lower or upper confidence intervals for the rate gaps. A few LEAs were added to the exemplar

and improvement lists because of their extraordinarily high or low rates of CTE *concentration*. These are noted with a * in the table to indicate the different criterion used for their inclusion in this study. For purposes of this study, LEAs were not identified by name and were instead given the designation of a number following either their District or Charter designation.

Table 1. Exemplar LEAs Based on Completion Rate Gaps between General Education and SPED student populations

LEA Name	Completer Rate (GenEd)	Completer Rate (SPED)	Rate Gap (GenEd-SPED)	Rate Gap (Upper CI limit)
District 1	0.35	0.49	-0.13	0.00
District 2	0.21	0.18	0.04	0.07
Charter 1	0.20	0.23	-0.03	0.10
District 3	0.32	0.27	0.05	0.15
District 4	0.32	0.23	0.09	0.18
District 5	0.29	0.23	0.06	0.18
District 6	0.39	0.25	0.14	0.19
District 7	0.41	0.38	0.03	0.20
Charter 2	0.35	0.50	-0.15	0.23
District 8	0.55	0.37	0.18	0.27
District 19*	0.68	1	-0.31	-0.12

*Note: This District was included as an exemplar based on concentration rate gaps and the values in the cells in this row represent concentration rather than completion rates.

Table 2. Improvement LEAs Based on Concentration or Completion Rate Gaps

LEA Name	Completer Rate (GenEd)	Completer Rate (SPED)	Rate Gap (GenEd-SPED)	Rate Gap (Lower CI limit)
District 9	0.36	0.14	0.22	
District 11	0.15	0.01	0.15	
District 13	0.29	0.12	0.17	
District 15	0.14	0.05	0.09	
District 17	0.14	0.07	0.07	
District 20*	0.58	0.42	0.16	
District 22*	0.54	0.42	0.12	

*Note: These Districts were included as improvement sites based on concentration rate gaps and the values in the cells represent concentration rather than completion rates.

Site Recruitment

In collaboration with Dr. Leah Voorhies, who was Assistant Superintendent of Student Support and State Director of Special Education at the time of this study, the UEPC worked with USBE's transition team to recruit sites for this study. Site selection was completed in two phases. In phase one, USBE's transition team members contacted Special Education Directors within the 25 LEAs identified for this study (11 in the exemplar set and 14 in the improvement set), who consulted with CTE Directors and coordinators to gauge interest in participating in the study. Using a co-constructed study information and invitation letter, superintendents/directors of the 25 LEAs were emailed and their permission for study participation was requested. Of the 25 superintendents initially contacted, 23 (92%) agreed to include their LEA in phase one of the study. Phase one, as noted below in the data collection section, involved interviewing SPED and CTE Directors.

During phase two, the UEPC again collaborated with USBE's transition team to contact the initial 23 participating LEA superintendents to obtain permission to contact high school principals for phase two. Of the 23 superintendents contacted, 20 LEA superintendents (86.96%) agreed to include their LEA in phase two of the study, which involved surveying and conducting focus groups with high school staff. High school principals among participating LEAs were contacted to gain their permission and identify staff for inclusion in phase two of the study. Of the 82 high school principals contacted within districts that provided

superintendent approval, 25 principals (38%) agreed to participate and provided contact information for staff to survey. For more detailed information about school recruitment efforts, please refer to the Appendix.

Data Collection

Given the research questions, the research team collected data using semi-structured interviews with SPED and CTE Directors or their designees, a survey administered to school administrators and educational practitioners, and semi-structured focus groups with CTE and SPED teachers. The initial interview was part of phase one of this study and informed the survey and focus groups planned for phase two.

Table 3 provides an overview of the data collection methods and the number of responses per LEA. Although superintendent approvals were given for 23 Districts in phase one and 20 Districts in phase two, ultimately only 19 Districts had participants in the study. It is notable that there were higher levels of participation in all data collection methods among the improvement schools compared to the exemplar schools.

Table 3. Overview of Data Collection Methods and Response Amounts

District Type District Type District Type	District Number	Phase 1			Phase 2				
	District Number	LEA Leader Interviews			Special Education CTE Survey				Focus Group Participants
	District Number	Role 1 (CTE)	Role 2 (SPED)	Role 3 (Other Admin)	Role 1 (SPED Teachers and Support)	Role 2 (CTE Teachers and Coordinators)	Role 3 (Counselors and Administrators)	Role 4 (Other or No Role Selected)	Focus Groups Participants
Exemplar Schools	Charter 1	—	1	—	—	—	—	—	—
Exemplar Schools	District 2	—	1	—	—	—	—	—	—
Exemplar Schools	District 3	1	1	—	3	3	2	—	—
Exemplar Schools	District 4	1	1	—	—	—	—	—	—
Exemplar Schools	District 5	1	1	—	—	—	—	—	—
Exemplar Schools	District 6	1	2	—	3	8	4	—	—
Exemplar Schools	District 8	1	1	—	2	—	—	—	—
Total	7 LEAs	5	8	—	8	11	6	—	—
Improvement Schools	District 9	—	2	—	—	—	—	—	—
Improvement Schools	District 10	1	1	—	14	19	11	2	3
Improvement Schools	District 12	—	1	—	—	—	—	—	—
Improvement Schools	District 13	1	1	—	—	1	—	—	—
Improvement Schools	District 14	1	1	1	9	11	7	2	1
Improvement Schools	District 15	1	1	—	—	—	—	—	—
Improvement Schools	District 16	1	1	—	—	—	—	—	—
Improvement Schools	District 17	2	—	—	4	17	5	—	1
Improvement Schools	District 18	1	1	—	—	—	—	—	—
Improvement Schools	District 21	—	—	—	3	7	9	2	—
Improvement Schools	District 22	1	1	—	4	6	2	—	2
Improvement Schools	District 23	1	1	1	—	—	—	—	—
Total	12 LEAs	10	11	2	34	61	34	6	7

*Note: Districts with no study participants were not included in the table.

Semi-Structured Interviews and Focus Groups

During phase one of this study, UEPC coordinated with USBE to identify and invite via email SPED Directors and CTE Directors from each LEA to participate in interviews to share their perceptions of the norms, barriers, and facilitators for students with disabilities engaging in CTE in their LEAs. These district administrators at times designated, invited, or suggested others to participate in these interviews. In total, 36 out of the 55 (65.45%) individuals invited by the UEPC participated in an interview. Interviews ranged from 20 to 60 minutes and were conducted over Zoom from May 2024 to October 2024. Most interviewees were either CTE or Special Education Directors, and five were added to interviews or suggested by administrators to participate because of their role or expertise on the topic of supporting students with disabilities engaging in CTE.

UEPC staff facilitated interviews using a semi-structured interview protocol. The semi-structured interview protocol included questions about the following items.

- The LEA's norms, values, and expectations with respect to students with disabilities participating in CTE
- Information about the CTE courses and pathways offered to students in their LEA and how that information is communicated to students with disabilities and their families,
- The systemic barriers they perceived students with disabilities face when engaging in CTE opportunities offered in their LEA
- The systemic facilitators schools offer students with disabilities to support their engagement in CTE
- Successful strategies as well as opportunities for improving rates of CTE participation and completion for students with disabilities in their LEA

During the second phase of this study, the UEPC research team invited counselors, CTE staff, and SPED staff who completed the survey to participate in an interview/focus group to expand on their responses and share more about their perceptions of the facilitators and barriers to increasing engagement in CTE for students with disabilities. In total, seven educators who completed the survey participated in a 30 to 45-minute interview. Participants all worked at improvement sites. Five (71.43%) worked in CTE either as a teacher or coordinator, and two (28.57%) worked in SPED as a teacher or case manager. Focus groups were conducted over Zoom from March 2025 to April 2025.

A semi-structured interview/focus group protocol was developed to guide conversations and included questions about the following topics.

- Involvement with CTE at their school
- Approaches their school has taken to encourage students with disabilities to engage in CTE
- Most common barriers they perceived students with disabilities face when engaging in CTE

- Most effective strategies they have implemented to overcome barriers or facilitate students with disabilities engaging in CTE
- How practitioners collaborate both within and outside the school to support students with disabilities participating in CTE
- Needed improvements to better serve students with disabilities engaging in CTE at their school

Special Education CTE Survey Development and Administration

During phase two of this study, the UEPC research team developed and administered a survey to high school administrators (e.g., principals and assistant principals) and practitioners (i.e., counselors, CTE teachers, and SPED teachers) to share their perspectives on the perceptions, barriers, and facilitators for students with disabilities engaging in CTE courses and pathways in their schools. The survey was informed by the following sources.

- An analysis of data and preliminary findings from the first phase of this study,
- Principles meant to guide CTE programs in Utah (USBE, 2025)
- Meaningful inclusion of students with disabilities in educational systems in Utah (USBE, 2024)
- Previous research (e.g., Advance CTE, 2020; American School Counselor Association, 2022; Barnett et al., 2024; CAST, 2024, Kahn & Lewis, 2014; DeMatthews et al., 2019; Nagro et al., 2023)

Prior to survey administration, the UEPC research team gathered feedback on survey drafts from USBE's transition team, the National Technical Assistance Center on Transition Collaborative (NTACT:C), and from piloting the survey internally. Survey respondents were asked to select the role(s) that best described their position during the 2023-2024 school year and were then asked questions to gauge their perceptions in the following areas.

- The norms, values, and expectations held by school staff about students with disabilities participating in CTE
- Ways in which teachers, counselors, and administrators incorporate best practices to support students with disabilities engaging in CTE at their school
- Barriers students with disabilities face engaging in CTE at their school
- Facilitators for encouraging students with disabilities to engage in CTE

In total, 173 out of the 650 (26.6%) individuals invited by the UEPC completed the survey, which was administered via Qualtrics from March 2025 to April 2025 and took approximately 10 minutes to complete.

Data Analysis

Here we summarize how the three primary data sources were analyzed. We begin with a description of the analysis plan for surveys and follow with a description of how the interviews and focus groups were analyzed.

To analyze survey data, the research team conducted descriptive and comparative analyses of educator responses related to perceptions, barriers, facilitators, and practices that support students with disabilities in accessing and completing CTE pathways. Descriptive statistics, including mean scores for each item, were calculated across several subdomains: perceptions and beliefs, barriers, facilitators, and role-specific practices (e.g., for teachers, counselors, and administrators). For items on a Likert scale, responses marked as “I am not sure” were treated as missing and excluded from analysis. Open-ended survey responses were summarized separately and integrated with the other qualitative findings. Generic responses (e.g., “n/a”, “none”, “not sure”) were excluded to focus on more meaningful insights.

In addition to overall summaries, comparisons were made across (1) site type (exemplar vs. improvement) and (2) main role of the respondent (e.g., SPED, CTE, others). T-tests were used to compare group means between exemplar and improvement sites, and ANOVA was used to test for differences across role groups. P-values were reported to indicate statistical significance of differences.

All interview and focus group transcripts were audio-recorded, stored securely, transcribed by a third party, and uploaded to Atlas.ti for qualitative coding and analysis. The research team used structural coding (Saldaña, 2021) as an initial analytic strategy. This approach permitted the application of deductive codes informed by key findings from previous research to address the research. Within the initial structured and deductive codes, the team open-coded comments to further illuminate dimensions of our findings and identify findings that did not align with the existing structure.

The research team grouped related codes into categories thematically. In addition, the team sought to understand the commonalities and differences experienced within and between groups (e.g., Exemplar and Improvement sites, LEA leaders and teachers) to further nuance the thematic findings that emerged from the analysis. This process allowed the team to remain open to emerging insights from study participants through an iterative process of analysis, sensemaking, and seeking confirming and disconfirming evidence to strengthen the credibility and trustworthiness of the findings.

Trustworthiness

To gain a comprehensive understanding of the challenges and opportunities for students with disabilities to concentrate in and complete CTE pathways (and the differences between the perceptions of these challenges and opportunities by educator role or site type), the research team engaged in triangulation and peer debriefing to increase the trustworthiness of the themes that emerged from the study (Creswell & Miller, 2000). Throughout the triangulation process, the research team used both corroborating and disconfirming evidence to refine and validate the major and minor themes that emerged from the analysis. The research team engaged in debriefing sessions following interviews, focus groups, and

analyses of transcripts and survey data to examine the consistency of findings across data sources and to identify divergent or outlier perspectives. This systematic process of triangulating multiple data sources and examining negative cases enhanced the credibility and trustworthiness of the findings.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, while previous research has shown that concentration in *occupationally specific* CTE courses is a stronger predictor for employment post high school than participation in CTE generally (Theobald et al., 2019; Wagner et al., 2016), course-level data disaggregated for students receiving SPED services was not available. As a result, there could not be an examination of differences based on CTE course concentration.

Second, the sampling of LEAs was not stratified by the distribution of students across disability categories. This is a study limitation because the type of disability may influence CTE enrollment patterns (Theobald et al., 2019). Without being able to adjust the analysis for these differences, comparisons across sites may not reflect important variation in student populations.

Third, not all participants had direct knowledge of or daily engagement with students with disabilities. This, at times, limited the ability to explore deeply detailed examples of systemic barriers and opportunities across LEA contexts. Moreover, while the study design included a range of educators across the exemplar and improvement sites, participation for improvement site educators in surveys and focus groups were higher than for exemplar sites. This circumstance limits the quantitative comparisons between site types. Similarly, qualitative data from across groups were limited in number and scope in exemplar sites, which further reduced the ability to include the breadth of educator experiences across LEAs. Given the sample, statistical comparisons and differences in exemplar and improvement sites should be interpreted cautiously.

Finally, while the study sought to distinguish between exemplar and improvement site strategies, the limited participation of exemplar sites combined with strong similarities in perceptions and experiences of those who participated in the study made it difficult to distinguish exemplar and improvement sites. While improvement site leaders often described promising practices, the data were insufficient to determine the consistency and effectiveness of those strategies across the types of sites. As a result, the analysis and findings emphasize strategies perceived as effective by LEA leaders.

Findings

This section presents findings from both quantitative survey data and qualitative interviews and focus groups related to the inclusion of students with disabilities in Career and Technical Education. We address the three primary research questions.

1. What were the differences in perceptions, practices, and/or beliefs among practitioners in LEAs whose students with disabilities were equally (or over-) represented in Career and Technical Education pathways compared to those in which students with disabilities were underrepresented?
2. What are the facilitators and barriers for students with disabilities engaging in Career and Technical Education pathways?
3. What are the key opportunities that LEAs can address to support the increase in participation of students with disabilities in CTE pathways?

We begin with a brief overview of educator perceptions about the inclusion of students with disabilities in CTE programs to contextualize LEA efforts. Next, we introduce the survey results for facilitators and barriers to student participation in CTE. While we conducted interviews with LEA leaders before administering the survey, here we present the survey findings first to provide a broad overview of educator perceptions about the systemic facilitators and barriers to engaging students with disabilities in CTE. As part of this discussion, we also offer how results varied by site and by the roles of those who participated in the survey. Specifically, we note where there are statistically significant differences, as these findings indicate patterns that are unlikely to be due to chance and may signal meaningful distinctions.

Next, we expand the discussion to include results of the qualitative analysis of interview and focus group data from the study. To situate these findings, we organize them around the key points where LEAs can support the participation of students with disabilities in CTE pathways (See Figure 4). These points include raising awareness, ensuring access and inclusion, and building capacity and collaboration efforts. Within each point, we describe the key facilitators and barriers to participation of students with disabilities in CTE.

As noted in the limitations section, differences between exemplar and improvement sites were sometimes not discernible. Thus, the promising practices and strategies described by LEA leaders and teachers are included in the report to describe the range of potential facilitators and barriers that can shape a student with disabilities' experiences as they engage in CTE courses and programs while in high school regardless of LEA site type. We integrate the findings through synthesizing the overarching themes that crosscut the key entry points for LEAs to increase the participation of students with disabilities engaging in CTE pathways.

Survey Findings

A total of 173 educators completed the survey. To facilitate analysis and protect respondent confidentiality, we grouped participants into three broad professional role categories based on their self-reported job titles:

- **CTE roles** (n = 80; 46%): This group included 77 CTE teachers and 3 CTE coordinators.
- **SPED roles** (n = 48; 28%): This group included 46 SPED teachers and 2 speech-language professionals. Of the SPED teachers, 25 also indicated they served as case managers, highlighting the overlapping nature of their responsibilities.
- **Other roles** (n = 45; 26%): This category included 32 school counselors, 12 administrators, and 1 school psychologist.

As shown in Table 4, most respondents (85%) were from improvement sites—districts identified as having lower representation of students with disabilities in CTE as compared to general education students. Across all roles, most responses came from educators at improvement sites, but all three groups included voices from both site types.

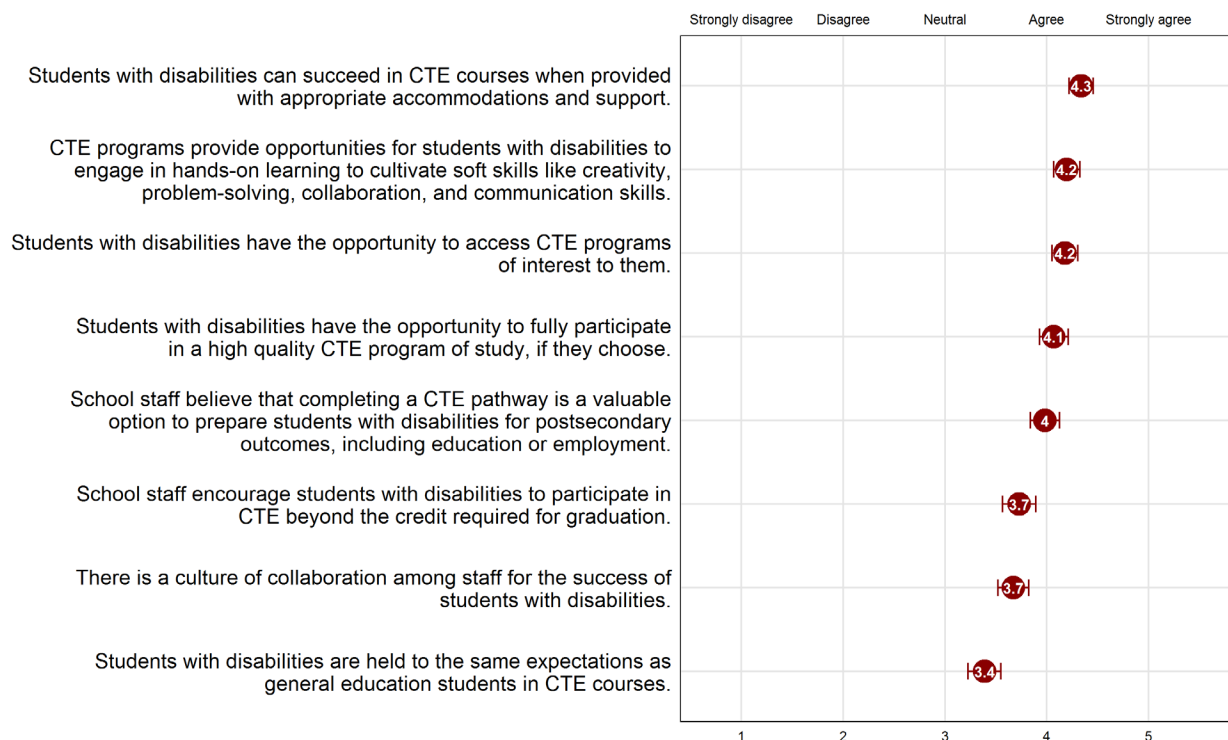
Table 4. Survey Respondents by Role and Study Site Type

Role Categories	Exemplar Site	Improvement Site	Total
CTE	11	69	80 (46.2%)
SPED	8	40	48 (27.8%)
Other	7	38	45 (26%)
Total	26 (15%)	147 (85%)	100% (173)

Educators Share Common Beliefs about the Importance of Inclusion of Students with Disabilities in CTE

Educators in exemplar and improvement sites generally expressed strong agreement that students with disabilities belong in CTE programs and that these students can succeed when appropriate supports are provided. In fact, no significant differences existed between exemplar and improvement sites for general perceptions and beliefs about inclusion. For example, Figure 2 demonstrates that the mean scores for all perception and belief survey items ranged from approximately 3.4 to 4.3 on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree), indicating general agreement with statements supporting the inclusion of students with disabilities in CTE settings. The highest-rated items emphasized educators' belief that students with disabilities can succeed in CTE courses when provided with appropriate accommodations and support, and that CTE programs offer valuable opportunities to develop soft skills such as problem-solving and communication.

Figure 2. Mean Values with Confidence Intervals for Overall Educator Perceptions and Beliefs about Students with Disabilities Inclusion in CTE



When examined by educator role, several perception items showed statistically significant differences, as shown in Table 5. For instance, school counselors, administrators, and school psychologists (represented by the “Other” category) tended to rate access and encouragement more favorably than SPED teachers and CTE teachers. These differences in perception may be shaped by the varying proximity that individuals have to students, including direct contact with or provision of services directly or indirectly to students with disabilities. For example, administrators provide leadership at the school and may emphasize school-level policy without direct contact or service delivery to students, while teachers work directly with students and may be more attuned to limitations or implementation gaps in CTE opportunities.

Table 5. Differences in Perceptions Ratings by Role

Item Text (1=Strongly Disagree; 5=Strongly Agree)	SPED	CTE	Other	p_value
Students with disabilities have the opportunity to access CTE programs of interest to them.	3.96	4.19	4.39	$p < .05$
Students with disabilities have the opportunity to fully participate in a high quality CTE program of study, if they choose.	3.73	4.1	4.39	$p < .01$
School staff encourage students with disabilities to participate in CTE beyond the credit required for graduation.	3.47	3.68	4.1	$p < .05$
Students with disabilities are held to the same expectations as general education students in CTE courses.	3.73	3.07	3.58	$p < .001$

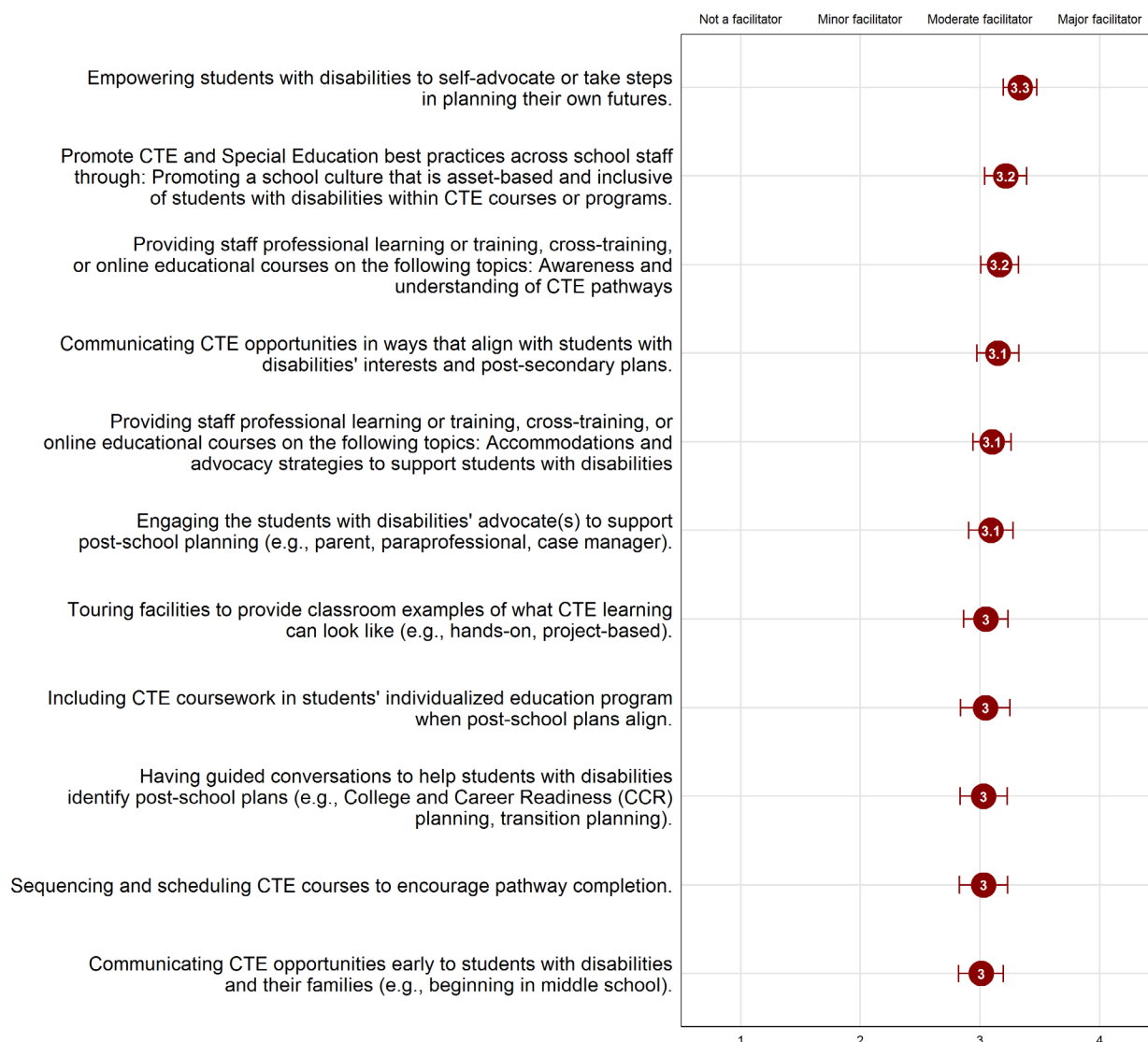
*Note: Only perception items showing statically significant differences by role are included in this table.

Facilitators of CTE Participation by Students with Disabilities

Educators were asked to rate 32 potential facilitators that would support the participation of students with disabilities in CTE. These items were developed based on interviews with school and district staff and were rated on a 4-point scale (1 = Not a facilitator, 2=Minor facilitator, 3=Moderate facilitator, and 4 = Major facilitator). Figure 2 presents all items with an average rating above "moderate facilitator" ($n = 11$, $\bar{x} > 3$).

Highly rated facilitators focused on **empowering students**, such as encouraging self-advocacy and promoting CCR planning aligned with students' interests. Many respondents emphasized **schoolwide practices** like promoting inclusive CTE cultures, communicating opportunities effectively, and involving families in planning. Additionally, educators rated **professional learning** as a key facilitator, especially when training related to CTE pathways, accommodations, and instructional strategies. Logistical practices like touring facilities or integrating CTE into IEPs reflected practical ways educators aimed to increase participation.

Figure 3. Items Perceived as Moderate to Major Facilitators



As shown in Appendix B: Complete List of Facilitator Items, a group of items received lower mean scores, indicating that these practices were viewed as minor to low moderate facilitators for increasing CTE participation among students with disabilities. Examples include scheduling and availability of course sections, technology use in CTE classes, transportation availability, IEP engagement by educators, and staff professional training related to community resources to support career and postsecondary transition.

Differences in Facilitator Ratings by Site Type

As shown in Table 6, site differences emerged within some facilitator items. Respondents from improvement sites rated several practices — such as scheduling and course sequencing improvements, ADA-compliant classroom design, and promotion of inclusive best practices among staff — *higher* than respondents from exemplar sites. This may be surprising because

one might expect improvement sites to give lower ratings of facilitators than exemplar sites. However, the higher ratings may reflect sensitivities toward unmet needs, ongoing improvement efforts, or aspirational goals in districts identified as needing greater inclusion in CTE rather than indicating fully implemented practices.

Table 6. Differences in Ratings of Facilitators by Site Type

Item Text (1=Not a facilitator; 4=Major facilitator)	Exemplar	Improvement	Difference	p-value
Sequencing and scheduling CTE courses to encourage pathway completion.	2.33	3.15	-0.81	0.02
Increasing the availability of CTE course sections taught for popular courses or those required for pathway completion.	2.31	3.09	-0.78	0.01
Providing CTE courses that also fulfill core credit requirements (e.g., math credit for welding).	2.38	3.04	-0.67	0.03
Ensuring classroom spaces are ADA compliant and accessible to students with disabilities.	2.38	3.01	-0.63	0.03
Building capacity of teachers to support students with disabilities in the classroom (e.g., pay for a prep teacher, utilize peer tutors or co-teaching to support students in-class and reduce extra help needed outside of the classroom, etc.).	2.13	2.97	-0.83	0.01

*Note: Only facilitator items showing statically significant differences by site are included in this table.

Differences in Facilitator Ratings by Educator Role

As shown in Table 7, four facilitator items revealed meaningful differences in how educators experienced or perceived practices supporting students with disabilities in CTE. SPED teachers and administrators rated more positively the use of guided conversations and individualized communication to help students plan for post-secondary goals, likely due to their central roles in IEP and post-school planning. In contrast, CTE teachers rated these practices lower, which may indicate less frequent involvement in those processes or uncertainty about their role. CTE teachers rated the use of classroom technology to support accessibility higher than their peers, perhaps reflecting the technology-rich nature of many CTE environments. Finally, SPED teachers expressed stronger agreement that schools promoted best practices by encouraging staff to participate in IEP meetings, emphasizing the importance of cross-departmental collaboration for better serving students with disabilities. These differences underscore the importance of strengthening role-specific engagement and communication, particularly to ensure that CTE educators are fully included in the broader system of support for students with disabilities.

Table 7. Differences in Facilitator Ratings by Educator Role

Item Text (1=Not a facilitator; 4=Major facilitator)	SPED	CTE	Other	p_value
Having guided conversations to help students with disabilities identify post-school plans (e.g., CCR planning, post-school planning).	3.24	2.6	3.33	0.0
Communicating CTE opportunities in ways that align with students with disabilities' interests and post-secondary plans.	3.19	2.89	3.48	0.02
Using technology in the classroom to increase accessibility for students with disabilities.	2.83	3.17	2.57	0.03
Promote CTE and Special Education best practices across school staff through: - Encouraging school staff to participate in IEP meetings for the students with disabilities they serve.	3.34	2.83	2.88	0.04

*Note: Only facilitator items showing statistically significant differences by educator role are included in this table.

Barriers that Hinder CTE Participation by Students with Disabilities

Educators were asked to rate the extent to which potential barriers impact the ability of students with disabilities to participate in CTE. These items, derived from earlier interviews and a review of literature conducted as part of this study, were rated on a 4-point scale (1 = Not a barrier, 4 = Major barrier). Figure 4 shows the 17 items with average ratings above 2.0, indicating that, even among the highest-rated barriers, respondents generally viewed them as only minor to moderate.

The top-rated barriers included students' uncertainty about post-high school plans, lack of classroom support staff (e.g., paraeducators, peer tutors, co-teachers), and limited parent or guardian awareness of the benefits of CTE. Teachers' uncertainty about how to advocate for resources (e.g., time, transportation) and provide accommodations (e.g., IEP-designated supports) also highlighted. Other items with average ratings above 2.0 reflected structural and systemic challenges such as scheduling constraints tied to academic requirements, unmet prerequisites, transportation barriers, and insufficient funding to expand course offerings or improve facilities.

Figure 4. Items Perceived as Minor to Moderate Barriers



As shown in Appendix C: Complete List of Barrier Items, several potential barriers to inclusion were perceived as less of a barrier, suggesting they are not broadly perceived as primary barrier by educators. These included structural concerns like staff turnover among CTE instructors, scheduling conflicts with extracurricular activities, and limited course availability

at a student’s school. Several items related to counselor engagement—such as not participating in IEP meetings or CCR planning—also received low average ratings. Additionally, the notion that courses fill up before students with disabilities can enroll was rated as a minimal concern.

Differences in Barrier Ratings by Site Type

As shown in Table 8, only one barrier item differed significantly: respondents from improvement sites more often noted that transportation challenges limit students’ access to offsite CTE programming. This suggests that transportation remains a pressing and persistent barrier for improvement sites, potentially limiting access to CTE experiences for students with disabilities compared to those who are at exemplar sites.

Table 8. Site Differences in Barrier Ratings

Item Text (1=Not a barrier; 4=Major barrier)	Exemplar	Improvement	Difference	p-value
Transportation challenges prevent students with disabilities from accessing offsite CTE programming.	1.76	2.33	-0.56	0.03

Differences in Barrier Ratings by Educator Role

As shown in Table 9, many barrier items showed significant differences across educator roles, revealing important patterns in how challenges to CTE inclusion are perceived. Across nearly all items, SPED teachers consistently reported higher levels of perceived barriers than administrators or CTE teachers, although it is important to note that most items were not even rated as moderate barriers. These included issues related to course alignment with students' goals, scheduling conflicts, unmet prerequisites, limited course offerings, and overcrowded classes. SPED teachers also rated structural challenges—such as inadequate staffing, limited counselor involvement, and a lack of accommodations—more severely. These perspectives likely reflect their close work with students who face these barriers firsthand. CTE teachers also rated many barriers higher than administrators, especially in areas related to their own uncertainty about providing accommodations or advocating for classroom supports. In contrast, administrators generally rated barriers lower, which may indicate greater distance from the day-to-day instructional realities. These findings point to a clear perceptual gap between those who design systems and those who implement them, underscoring the need for more integrated planning and communication across roles.

Table 9. Educator Role Differences in Barrier Ratings

Item Text (1=Not a barrier; 4=Major barrier)	SPED	CTE	Other	p_value
Students with disabilities perceive CTE courses do not align with their career goals or post-secondary plans school plans.	2.41	2.13	1.62	<0.01
Parents and/or guardians of students with disabilities are uncertain about the benefits of completing CTE courses and programs.	2.85	2.68	2.21	0.03
The number of required courses needed to graduate can limit schedule availability for students with disabilities to take elective CTE courses.	2.62	2.14	1.95	0.01
Additional academic requirements limit students with disabilities' ability to take elective CTE courses (e.g., credit recovery, one-on-one academic support).	2.77	2.35	2.11	0.01
Participation in extracurricular activities or other electives conflicts with students with disabilities' ability to schedule elective CTE courses.	1.77	1.77	1.35	0.02
Students with disabilities have not taken the pre-requisite course(s) required.	2.37	2.06	1.68	0.01
Courses of interest to students with disabilities are not offered at the high school they attend.	2.0	1.72	1.38	0.01
CTE courses of interest fill up before students with disabilities have a chance to enroll in the course.	2.16	1.45	1.32	<0.01
Physical barriers limit students with disabilities' access or full participation in CTE classes (e.g., elevator access, lack of modified desks or equipment, etc.).	1.61	2.13	1.57	0.01
School staff are not aware of CTE programs, course offerings, and/or pathways available to students with disabilities.	2.08	2.02	1.58	0.03
Staff lack training to effectively guide students with disabilities in exploring and enrolling in CTE pathways.	2.35	2.3	1.62	<0.01
There are not enough staff to provide support in CTE classrooms (e.g., peer tutors, paraeducators, co-teachers, etc.).	2.94	2.73	2.06	<0.01
There are insufficient CTE teachers to provide course instruction for a wide range of offerings.	1.9	2.02	1.44	0.03
Counselors are not involved in students' IEP meetings.	2.18	1.63	1.36	<0.01
Counselors do not participate in students with disabilities' College and Career Readiness or course planning.	1.76	1.64	1.1	<0.01
CTE teachers are uncertain how to provide appropriate accommodations so that students with disabilities can fully participate in their course.	2.63	2.48	1.93	0.01
CTE teachers are uncertain about how to advocate for additional classroom resources to support students with disabilities' full participation in their course.	2.79	2.61	1.96	<0.01

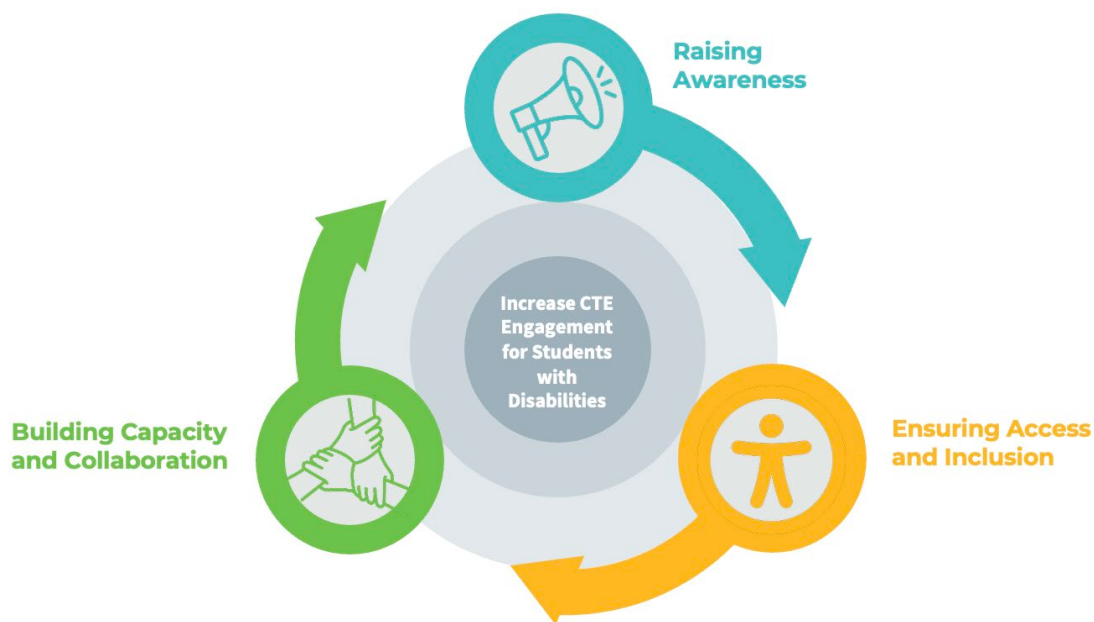
Qualitative Findings

In this section, we present findings on the key facilitators and barriers that shape the experiences of students with disabilities deciding to engage in CTE programs. We primarily report findings from the interviews and focus groups with educators across the exemplar and improvement sites that participated in this study. To support triangulation and provide depth, we integrate relevant survey findings from the previous section as corroborating or contrasting evidence.

Framing Opportunities to Support CTE Participation and Engagement of Students with Disabilities

This study sought to understand how schools and educators support meaningful participation and engagement of students with disabilities in CTE. In the previous section, we reviewed the quantitative findings. Here we present the qualitative findings. Our qualitative analysis of data identified three strategic opportunities—Raising Awareness, Ensuring Access and Inclusion, and Building Capacity and Collaboration—that schools and LEAs have used to increase the participation of students with disabilities in CTE programs and pathways. These three strategic opportunities are illustrated in Figure 5. In the remainder of the report, each of these themes is explored with findings organized by facilitators and barriers that influence efforts to engage students with disabilities in CTE.

Figure 5. Opportunities to Expand Students with Disabilities’ Participation and Engagement in CTE



Raising CTE Awareness to Increase Participation and Engagement

Raising CTE awareness was the first opportunity to support students with disabilities participation and engagement with CTE courses and pathways. In this section, we synthesize the facilitators and barriers for improving awareness of CTE programs and pathways, including effective recruitment strategies for increasing CTE engagement among students with disabilities. Data used to illustrate the findings primarily come from the interviews and focus groups. As noted in the introduction to the qualitative findings, we use survey results as corroborating and contrasting evidence. We use examples from the interviews and focus groups to illustrate the themes and subthemes. While we are able to highlight both promising ways school staff have raised CTE awareness for students with disabilities and their families and barriers to doing so, we emphasize that each school context was unique, and multiple approaches may be effective depending on local needs and circumstances.

Facilitators to Raising CTE Awareness for Students with Disabilities

In interviews and focus groups, educators described several intentional facilitators to raise awareness of CTE opportunities among students with disabilities and their families. Their strategies focused primarily on outreach and exposure to CTE opportunities, deliberate exposure and connections to CTE programming, and opportunities to increase alignment between post-graduation plans (e.g., post-school planning practices that centered students with disabilities' interests and postsecondary goals) and CTE participation. These findings aligned with high-rated facilitators from survey results (see Figure 3) that focused on student-centered practices, including encouraging self-advocacy, communicating CTE opportunities, and promoting CCR and post-school planning aligned with students' interests.

Communication, Outreach, and Exposure to CTE Programming to Raise Awareness

Intentional, early communication and marketing, outreach, and exposure to CTE offerings through newsletters, informational website pages, classroom presentations, tours of CTE facilities, and CTE promotional events (e.g., family night) were used to raise awareness, answer questions, and address concerns about CTE programs and pathways.

Interviewees noted that providing CTE marketing and communications prior to high school was important for raising awareness of CTE opportunities, as it offers students with disabilities ample time to plan for completing a CTE pathway before exiting high school.

We start, actually, more in the seventh grade, with our CCA [College Career Awareness] class, which all of the kids also have to take, even the kids with disabilities ... We're really trying to promote that kids start taking CTE classes in ninth grade. It seems like some schools [are] like, "Hurry and get your graduation requirements done, then start taking those other classes." It's important for them to start in ninth grade so that they can finish out the pathway, or have better access to getting to those classes that they'll need. (Exemplar Site CTE Director)

A few LEA leaders described the importance of using concentration and completion language to raise awareness and understanding of how to complete CTE pathways. One example shared by a CTE Director at an exemplar site highlighted how CTE teachers support students by orienting them to the sequence of courses needed to concentrate or complete a pathway.

[At] each of the schools, the teachers are starting to really track their pathway completers and concentrators, and they talk about it a lot in their classes, just with all the students. The first day of class, when they're going through their syllabus, they're talking about, "Well, this is the first class in the pathway, or this is the second class in the pathway," and they're outlining that pathway for all of the students, so that they know what the next step would be if they like this and they wanted to continue on. (Exemplar Site CTE Director)

In addition to communications and marketing, study participants indicated that providing opportunities for students to observe and experience CTE firsthand reinforced the hands-on and experiential nature of CTE coursework. Exposure to CTE in this way transformed abstract possibilities into concrete understandings of what CTE looks and feels like during high school. For instance, some sites organized tours of CTE facilities so that students could gain exposure to equipment used and observe CTE projects in progress.

Kids love going in the classroom. For us, that's really [where], we have gotten growth ... and that's not really the norm because our population isn't increasing. So, our kids are taking more CTE classes ... And because of that, we've been able to expand and offer more classes ... [T]hey have no clue what unmanned aerial systems is, but I get them in a classroom and show them these kids are flying drones out behind the school. All of a sudden, that sounds really fun. And so really that experience of interacting and going through, we feel like that's probably our biggest bang for the buck, are those [CTE] tours. (Improvement Site CTE Director)

Some educators explored other opportunities to augment onsite tours. For instance, to facilitate understanding CTE pathways and opportunities in their district, a post-school transition specialist at an improvement site created a Canvas module so students, parents, and school staff could walk through the steps of understanding, selecting, and scheduling CTE courses.

We took all of the things that we knew, and we put them in these micro-credentialed canvas modules ... to walk through a teacher, a counselor, a Gen Ed teacher, a parent who's helping their student through the basics of how do I find ... [and] pick a pathway? How do I request these on my course schedule? ... [T]he counselors also don't create your schedule. You create your own schedule, or the computer creates your schedule ... these modules walk through the highlights of YouScience and also walk through the district website on how we empower parents and students to make these decisions that impact their future. (Improvement Site SPED Transition Specialist)

Another form of early exposure to CTE programs and pathways was connecting potential students to existing students. For example, a SPED director at an exemplar site describes how their CTE ambassador program connects students with individuals in their field of interest. Students share their excitement and advocate for pathway completion while also building skills and showcasing their talents. Although these examples were highlighted in interviews and focus groups as important facilitators, survey respondents rated them only between minor and moderate facilitators (Item #28: $\bar{x} = 2.7$; see Appendix B).

[K]ids get connected to their teacher and to that field and what they're interested in. We have an ambassador program where a student applies to be an ambassador for our school in a particular CTE [pathway] ... and they become an advocate for the CTE pathways. And many of my special ed kids have been part of that, and they end up with a scholarship to go to school, to further their career at the end of that ambassador program. ... They do a big showcase at the end ... For example, the film ambassador writes and directs their own film and then you have all these underclassmen that are involved in producing the film and get the recognition of being part of the film crew, which helps them understand what it's really like to be in the career and to want to be the ambassador. You get a lot of school and community buy-in (Exemplar Site SPED Director)

Taken together, these activities demonstrated the importance of engaging students through communication, outreach and exposure to CTE programming to increase awareness of CTE programs and pathways.

Career and Post-school Planning to Raise Awareness

While communication, outreach, and exposure helped students with disabilities learn more about CTE programs and pathways, career and post-school planning ensured those opportunities were connected to individualized goals for life after high school. Educators at participating schools used post-school planning as a facilitator for CTE participation. As illustrated in Table 7, the value of specific strategies (e.g., aligning CTE communications with students' interests) was rated higher by SPED staff than their general education peers. Post-school planning allowed for matching CTE programs and pathways to student goals. This provided an opportunity for students with disabilities to envision their futures and make strategic choices about ways to engage in CTE, including seeing how developing particular skills could allow them to advocate for themselves.

LEA leaders at both exemplar and improvement sites emphasized the importance of CCR planning and IEP meetings for tailoring conversations to the student's goals and interests.

I think just the individual meetings with the counselors and the students, and the IEP meetings with the special ed teachers, I think those really are the most successful because they're more directed individually. We're helping the kids figure out what careers they might be interested in after high school, so it's more targeted individually to those students and their parents. I think that's probably the most successful, because it's just more personal. (Exemplar Site CTE Director)

Here we share an example of how a SPED Director at an improvement site planned to improve CTE rates in their LEA through integrating CCR and post-school planning with professional learning about CTE pathways.

Whatever was discussed with the family and the counselor as part of scheduling was also brought with them to the IEP meeting so that there was fluidity and consistency between a plan made with a high school counselor and a transition plan associated with an IEP. And [then] all members of those teams would be familiar and could speak to the pathways and the program. (Improvement Site SPED Director)

In fact, having CTE coursework included in a student's post-school plan can be a deciding factor in whether the CTE coursework is prioritized in the student's schedule and secondary plans.

If ... it [CTE] is in their transition plan that, that is what they want to study, that is what they want to complete and work on in their post high school years, we find ways around that. If it's not in there, it's not as much of an emphasis. (Improvement Site School Administrator)

LEA leaders in interviews noted that tools such as YouScience² and Major Clarity,³ which help students identify goals after graduation, supported tailoring interventions and CTE opportunities through collaboration with counselors (e.g., CCRPs) and SPED teachers (e.g., IEPs) to align students' plans with their post-school passions. A CTE Director at an improvement site described their plan for utilizing YouScience to help identify students' interest and encourage their exploration of CTE career pathways.

We're going to have every CCA [College Career Awareness] teacher give the YouScience aptitude and interest survey, and ... they will be not only documenting what their results were, but within CCA, exploring the career pathways and choosing one or two pathways that they're interested in exploring. And [then] ... every student will be required to choose a career pathway. And the counselor would then ... [with] the family and the student ... scope it out from year to year, starting in 9th grade, doing that pre-planning and setting goals ... [T]hat same process will happen every year [if they want to change their career pathway]. (Improvement Site CTE Director)

Notably, this item received a lower mean score (Item #29: $\bar{x} = 2.67$; see Appendix B) indicating this may not be widely viewed as impactful. In focus groups, some teachers continued to encourage connections with teachers and CTE coordinators instead of relying on YouScience assessments alone.

² YouScience is a CCR Platform that offers opportunities for students to take aptitude and career assessments and work with educators to plan their post-high school goals: <https://www.youscience.com/>.

³ Major Clarity is another College and Career Readiness Platform that offers opportunities for students to take personality and learning style assessments to help guide students through exploring courses and careers that align with their strengths and supports post-high school goal planning: <https://majorclarity.com/>.

I'm going to be honest, most of our students just click through it [YouScience assessments] and they're like, "Cool." ... But our district has pushed YouScience on us a lot ... I think [what helps is] connections with teachers, but also connections with administration, with our CTE coordinator. (Improvement Site SPED Teacher)

While these facilitators may play a crucial role in raising awareness of CTE opportunities for students with disabilities, barriers can still limit the reach and effectiveness of these efforts.

Barriers to Raising CTE Awareness

There were numerous barriers to increasing awareness of CTE programs and pathways for students with disabilities highlighted during interviews and focus groups. For instance, participants highlighted that limited and inconsistently available information about CTE programs and pathways for students with disabilities and their families can be a barrier to CTE participation, including when staff do not have sufficient depth of information. Beyond informational gaps, participants shared that perceptions about student readiness and competing academic demands for students may further limit participation in CTE. Here we discuss these subthemes. It is important to note that LEA leaders and educators described most of the challenges around raising awareness about CTE opportunities at improvement sites. Generally, participants who shared barriers challenges also discussed ways that they've tried to mitigate them in practice.

Limited and Inconsistently Available CTE Information

As noted in the survey responses, participants generally perceived staff awareness about CTE opportunities as a minor barrier to increasing the participation of students with disabilities in CTE (Item #18: $\bar{x} = 1.91$; see Appendix C). However, participants in interviews and focus groups noted that when educators are not fully aware of the range of CTE pathways, there can be missed opportunities to inform and guide students with disabilities toward relevant programs.

I think just having our case managers better understand what [CTE opportunities are] really available to students with disabilities and how inclusive it can be [is needed] ... We want to increase access to quality counselors and quality opportunities for students with disabilities. Those are the things we can really move the data on. (Improvement Site SPED Director)

Even when educators are aware and share opportunities with students with disabilities and their families, there can be an expectation that the student or parent is responsible for taking the next steps to accessing the CTE opportunities.

Information on CTE is given to students and parents at the IEP meetings and possibilities are discussed about what general programs they have, leaving the ball in the "parents' court" to go home and get online and research what opportunities are there ... (Improvement Site Speech Therapist)

Even when staff are knowledgeable, schools can fall short in proactively communicating these opportunities to students and their families. For example, improvement site leaders noted changing preferences of ways to receive information as one challenge their District has yet to overcome to effectively market CTE opportunities to students and their families.

Well, we're obviously not very good at marketing because we just haven't been able to find the magic solution that helps tell the story. To me, it's the biggest barrier that we have... that's keeping them [students] from accessing CTE programming? It's awareness. And I quite frankly don't know what more to do. We keep trying different things, but yet we still just keep running up on the same problem. So, we keep trying. (Improvement Site, CTE Director)

Competing Priorities and Career Decision Factors

Beyond informational gaps, competing priorities and career decision factors can further limit students with disabilities' participation in CTE. Here we noted that there were differences in the survey responses and the participant data from interviews and focus groups. For example, survey participants rated "*Students with disabilities perceive CTE courses do not align with their career or postsecondary plans*" as a minor barrier (Item #15: $\bar{x}$ = 2.06; see Appendix C). Yet, in interviews and focus groups, participants sometimes cited the misalignment between CTE opportunities and a students' post-secondary opportunities. A SPED teacher at an improvement site discussed her process for helping students with disabilities identify a realistic job opportunity they're interested in pursuing after high school.

I think the biggest change that we see is we can't be an NBA player when we're not even on the school basketball team. So it's like, "Okay, what's Plan B?" ... So we do a list and we go through all the plans until we get a realistic job for them. So I think one kid, he was like, "I want to be a pro wrestler." And we were like, "Okay, what is Plan B?" And he is like, "Oh, I want to sell houses." "Great, you want to be a realtor. Let's set you up in business management or our money classes." So we can kind of make their schedule for them according to the transition plan. (Improvement Site SPED Teacher)

Participants indicated that many students express a strong desire to graduate early, which can complicate concentrating or completing a CTE pathway given that only one CTE credit is required for graduation.

I think the biggest thing for me barrier wise is ... everyone's in a hurry to graduate at this point. And I think getting them to recognize that CTE can actually give them a different look at stuff instead of just hurrying to get done. And that's across the board. But a lot of my special needs students, they're like, "Hey, what's the requirement? I want to get done. I want to get out." (Improvement Site CTE Coordinator)

Similar to the desire to graduate early, some educators noted that some students leave school prematurely to enter the workforce. Participants noted that this situation can deter student participation in CTE, especially when labor market demands and immediate financial opportunities present themselves.

We [CTE] are being driven largely by industry ... [There's] a horrible shortage of skilled labor, to the point where we have a disproportionate number of kiddos who are Latino male who don't graduate. It's not that they're choosing not to go to school, it's that they're being recruited to go into skilled labor to make a whole lot more than they would going the traditional route, at least initially. (Improvement Site School Administrator)

Ensuring CTE Access and Inclusion for Students with Disabilities to Increase Participation and Engagement

A second primary theme for increasing participation and engagement of students with disabilities is ensuring that CTE programs are both accessible and inclusive. A school culture that emphasizes access and inclusion in CTE for all students, is among the first facilitators to increased CTE participation of students with disabilities. Participants identified strategic course offerings, integrated accommodations, and targeted classroom supports as facilitators to improve access and inclusion in CTE. Participants also highlighted barriers such as limited course offerings, access to CTE classrooms at a students' home school, and logistical challenges accessing offsite CTE programming. Course placement practices and difficulties implementing accommodations can further limit students' abilities to complete CTE programs and pathways. Data used to illustrate the findings primarily come from the interviews and focus groups. As noted in the introduction to the qualitative findings, we use survey results as corroborating and contrasting evidence. We use examples from the interviews and focus groups to illustrate the themes and subthemes.

Facilitators to Ensuring CTE Access and Inclusion

In interviews and focus groups, educators described several intentional strategies they used to ensure access and inclusion of students with disabilities to support their CTE participation and engagement. First, participants called attention to classroom supports, particularly those that integrated student IEP accommodations, goals, and plans for post-school success. LEA leaders identified facilitators to ensure access and enrollment in CTE for students with disabilities, including strategic and coordinated scheduling along with implementation of planning efforts to align students' goals, supports, and CTE opportunities. These facilitators also aligned with highly rated facilitators from survey responses such as sequencing and scheduling CTE courses to encourage pathway completion (see Figure 3), although significant differences by site (see Table 6) and educator roles (see Table 7) suggests this practice may reflect ongoing improvement efforts and educator involvement in said efforts. Importantly, LEA leaders and survey respondents noted the importance of promoting a school culture that is asset-based and inclusive of students with disabilities in CTE, which was also a highly rated facilitator in survey findings (see Figure 3).

Providing Classroom Supports While Integrating IEP Accommodations, Goals, and Plans for Post-School Success Fostered by a Culture of Inclusion

The most frequently mentioned facilitator to increase engagement of students with disabilities in CTE were classroom supports. Access and inclusion for students with disabilities in CTE courses and pathways were often linked explicitly to the students' IEP goals and post-school plans. Across both exemplar and improvement sites, LEA leaders and educators described the importance of aligning plans for students' CTE participation with their accommodations (e.g., classroom-based supports, safety supports, physical accommodations, inclusive instructional practices) and post-school plans to ensure meaningful and safe engagement of students in CTE programs.

So our norms are, we explore that [participation in CTE] a lot, especially through the transition part of the IEP. We always are looking at those classes, looking for the interests of things that we can guide them to. We're lucky enough to have a technical college close, and so we're able to work on getting some preliminary skills in our high school CTE classes, and then, also taking advantage of the technical college. (Exemplar Site SPED Director)

To ensure integration of the IEP designated accommodations, goals, and post-school plans, study participants emphasized the need to create a culture of inclusion and implement best practices in the classroom, which was also a highly rated facilitator in survey findings (see Figure 3). Several CTE teachers and LEA leaders provided examples of success stories for the students with disabilities they served and emphasized the importance of bringing an asset mindset when working with students with disabilities and encouraging them to see the progress they've made and that "they can do hard things."

I think showing them their progress starting at the beginning of the year and being like, "You've read at a 10th grade level, now you're reading at a 12th grade level." Seeing that range, that really proves to them, "Oh, I can do hard things." You're like, "Yes, you can." Or getting all As. I feel like progress, visual progress for our students is huge. (Improvement Site SPED Teacher)

In addition, participants highlighted the need to work with parents and school staff to understand effective inclusion strategies and limit substituted requirements that may otherwise be offered for students with disabilities to meet core CTE requirements. Examples were offered by LEA leaders and CTE teachers about how teachers were creating meaningful engagement opportunities and a sense of belonging for students with disabilities in their classrooms, including finding ways for them to work in groups to leverage their strengths and providing students with disabilities a sense of accomplishment in the classroom.

I think the CTE teachers that I've had the pleasure of working with really want the student to feel like they belong in the class and they have a sense of accomplishment and that they are doing the same things that everyone else is doing. It's very mild if there is an accommodation that's made that would make it an adjustment on what they're actually completing in the class. (Improvement Site, School Administrator)

And what I'm finding is a lot of students, [including] students with disabilities, when they're put in the situation to do, they're learning at a much higher level When they do it then the cognitive recognition connects, and that's where I make a lot of the connections in my pathway ... I randomize groups or I mix ability group and have kids teach each other and then ask each other questions, and so some of my kids that are experts, regardless of if they are a student with a disability or not, become the mentors for the students who are having a little bit more of a challenge learning and then I fill in any gaps ... So student to student interactions, engagement strategies, hands-on experiences, and then connecting theory to practice are all things that I've seen be successful. (Improvement Site CTE Teacher)

Similar to promoting effective inclusion and engagement strategies, school staff can also play a vital role in helping students develop self-advocacy skills within their coursework. Consistent with the most highly rated facilitator in survey findings (see Figure 3), the following example highlights the value of students learning how to advocate for their learning needs and successful completion of their CTE pathways.

Another thing that we're really working on, in doing the career development credential, we created just a spin-off of a course that CTE offered, and added elements within that that we felt were relevant to the population of students that we were working with. As far as advocating disclosure, disability, some of those important issues that they're going to have to deal with post-secondary. And so we've created a 14-week course that we offer, we're counting that as a 0.25 credit. So we're tracking that as well to see how many of our students are participating in that. And then along with the career development credential, the other 0.25 of that is that work-based learning opportunity. So our students being able to work with their work-based learning coordinators, being able to communicate with them and get some of that job experience that we want for them. (Exemplar Site SPED Secondary Supervisor)

In addition, several respondents also emphasized the importance of accessible and streamlined IEP/504 documentation, noting that clear guidance makes it easier for general educators to implement accommodations effectively. In focus groups with CTE teachers, a few noted how having IEP summaries of current accommodations for the student and adjusting makeup work for a student's IEP facilitates their ability to find course-appropriate accommodations and support the students' mastery of the course concepts for successful completion.

Our special education department this year has been focusing on trying to make sure that anything that's in their 504 or IEP isn't just a holdover from a junior high class or an elementary school class. Making sure that they're clear, they're concise, [and] they're specific in what the accommodations are. (Improvement Site CTE Teacher)

A CTE Director at an improvement site talked about how they encourage teachers to use technology to support students with disabilities' engagement and learning, which also aligned with survey findings as CTE educators rated this facilitator higher ($\bar{x} = 3.17$) than SPED ($\bar{x} = 2.83$) or other school staff ($\bar{x} = 2.57$, $p < .03$, see Table 7).

We've also started using more technology in the classroom, which closes the gap with some students with disabilities ... [I]n our health science classes, we now have more VR like zSpace, which is a little more tactile ... [A] lot of the research around technology when it comes to VR is very positive for students with disabilities. (Improvement Site CTE Director)

Strategic Course Offerings and Scheduling to Facilitate Program Participation and Pathway Completion

Sequencing and scheduling practices emerged as a critical facilitator for increasing student access and CTE pathway completion. This was rated as a moderate facilitator in survey findings ($\bar{x} = 3.0$, see Figure 3), although these practices were more highly rated by educators at improvement sites ($\bar{x} = 3.15$) and significantly different than exemplar site survey ratings ($\bar{x} = 2.33$, $p < .02$, see Table 6). LEA leaders described working towards students taking pre-requisites and required CTE courses before scheduling students in classes needed for pathway completion, although this was considered a below moderate facilitator in survey ratings (Item #18: $\bar{x} = 2.93$; see Appendix B).

One of the goals that we talked about with the CTE director in our meeting was sometimes kids get excited and they're doing concentrator classes rather than beginner classes, and they haven't done the beginning requirement. So the goal this year is to make sure that those beginning classes ... the kids get them. Because they're ... only offered a couple times a year versus the other classes ... So that's a goal for this year, for sure. (Exemplar Site SPED Director)

Other sites prioritized pathway courses. For instance, a CTE teacher at a magnet school further explained the value of the Pathway Model, which prioritizes scheduling courses to complete a CTE pathway. This approach was seen as particularly beneficial given that students with disabilities are often pulled from CTE courses to meet other graduation credit requirements, which can disrupt pathway completion.

At our school, the students select their pathway and we basically schedule them in the inverse way that most schools schedule ... We schedule their pathway [first]. They have to take all of these classes in their pathway, and then we make sure to provide opportunities in the open periods for them to fill in English, math, science, social studies, et cetera. So having the pathway selection and the students basically self-selecting what their interest is, that's been a way to engage students with disabilities [in CTE]. (Improvement Site CTE Teacher)

Many participants noted that student completion of CTE coursework while still in high school can be easier than after graduation. In some cases, school staff worked with local colleges to bypass entrance exams for students with disabilities interested in taking college-level CTE courses while in high school.

Sometimes the CTE courses at this technical college, ... They have to do that entrance exam and their math and their reading sometimes is not at a level where they can pass that entrance exam, but would be very successful in the class itself ... And if we can bypass that

entrance test, [while they're in high school], which we have been able to, [they can take the course]. (Improvement Site SPED Director)

Scheduling CTE courses aligned with postsecondary goals in students' post-school plans was also a moderately rated facilitator based on survey ratings ($\bar{x} = 3.0$, see Figure 3). LEA leaders sometimes sought different ways to schedule students with disabilities in CTE opportunities. For instance, LEA leaders discussed how they utilized courses like Directed Studies to create space in students with disabilities' schedules to enroll in CTE courses of interest, although this was considered a below moderate facilitator in survey ratings (Item #18: $\bar{x} = 2.93$; see Appendix B).

I will say one thing that we've ran into just this year with the current schedule [is] special education service minutes. If they have a lot of minutes on their IEPs, sometimes that course is only at this specific time, and the CTE course is at that same time ... Rather than them being in a math class, we could have them sign up for a directed studies course so then that way they're getting their minutes there. And you have a little bit more flexibility with schedule[ing], because directed studies is offered a lot more [often] than ... math and language arts, [which] are a block schedule (Exemplar Site SPED Director)

Tracking students' progress toward pathway completion and communicating that progress with counselors and SPED staff was a promising practice shared by a SPED Director at another exemplar site, although again, survey findings suggested this strategy was perceived more useful by educators at improvement sites ($\bar{x} = 3.15$) and was significantly different from ratings by educators from exemplar sites ($\bar{x} = 2.33$, $p < .02$, see Table 6).

Our registrar tracks the pathways and consciously knows what kids still need to complete their pathways. Counselors have access to that. I have access to that. So, as we're scheduling students and ... at registration, at PCCRs where we do that career guidance, comp guidance stuff, it's purposely tracked to discuss with the whole student body as they register ... So, I think that purposeful tracking has helped with completion. (Exemplar Site SPED Director)

Dedicated Resources

To effectively implement accommodations and meet students' diverse needs, dedicated resources are needed to implement individualized supports and provide professional learning that equips staff with the knowledge, skills, and abilities to foster access and inclusion in CTE courses for students with disabilities. Despite the recognition of the need for additional resource, LEA leaders in the study described finding solutions for expanding access to CTE courses despite experiencing limited resources, including reallocating funds or resources to diversify the range of available CTE classes. As noted previously, LEA leaders rotated course offerings.

LEA leaders reported stretching their resources to support students with disabilities in CTE by using Perkins or CTE funds for SPED supports and securing grants. Notably, state-provided

grants were perceived as essential for facilitating research-informed innovations in LEAs where funding shortfalls would otherwise preclude such interventions.

[P]lease, please, please keep supporting grants that districts can access for training. Without this grant, we would've been at a complete standstill. So, this grant allowed us to [invite] teachers ... [and] [t]hey were paid. They were able to come up with a transition plan for their school. They were able to plan how they were going to roll this [transition to post-secondary] course out, what it would look like. They were able to preview some of the things that were available, look at evidence-based curriculum. And without that grant, we could not have done that.” (Improvement Site, Transition Specialist)

They also reported reallocating funding to offer a wider range of CTE courses to improve access to CTE courses. Those at improvement sites rated the facilitator “increasing the availability of CTE course sections taught for popular courses or those required for pathway completion” higher (and the finding was statistically significant) than those at exemplar sites. However, a few exemplar site LEA leaders in interviews also cited this practice as an important strategy to increase CTE offerings with limited teachers. In a small exemplar district, a CTE Director discussed how shifting resources and rotating course offerings supported concentration opportunities across all 35 pathways.

In [our] district, ... we only have three full pathways that we offer, but we do ... offer partial pathways where kids can be at least a concentrator in ... almost all the 35 national pathways ... [W]e also rotate our classes out within a 3 to 5-year period to maximize our pathways. So, we're trying to do the best we can with what we have there. (Exemplar Site CTE Director)

LEA leaders discussed how they assessed physical spaces to determine the need to update facilities and equipment, although at times financial limitations precluded their ability to address issues. Educators at improvement sites rated this facilitator higher ($\bar{x} = 3.01$) than exemplar sites ($\bar{x} = 2.38$, $p < .03$, see Table 6), although LEA leaders at exemplar sites shared examples as well. Here, a SPED director described how they try to remove physical barriers to improve access in CTE.

I think the first one I would like to address is just the physical barriers in a wood shop and in a welding shop, in a classroom when sometimes we're putting more desks than we should, and we have students that have physical challenges. And so that is of course the first thing that we make sure that there are not physical barriers to students being able to access the equipment and be able to participate fully ... I think these are the physical barriers ... that we are really trying to address in our district. (Exemplar Site CTE Director)

Similarly, to increase the accessibility of courses, some LEAs provided transportation to off-site CTE programs. Notably, transportation was the only barrier item that differed significantly between educators at exemplar and improvement sites according to ratings from survey findings (see Table 8). Transportation also required additional transportation

time and other sometimes burdensome logistics for students with disabilities to participate in CTE programming.

[I]f we're going to do that [provide capstone opportunities for juniors and seniors with industry partners], we have to provide transportation from the high schools to these sites ... Because I knew who was going to be excluded. Even still, they're excluding themselves just because it's one more ball for them to juggle, our high-impacted kids. We do see a higher representation of those at-risk groups in CAPS just because of the transportation that we're providing ... When we talk about special education, it goes without saying, we have a disproportionate number of kiddos that are in at-risk populations - socioeconomically, and of color. (Improvement Site High School Administrator)

Staff going above and beyond what was expected to accommodate students were described by educators at both exemplar and improvement sites. Some CTE teachers proffered specific accommodations (e.g., shortening assignments, no penalty for late assignments) over others (e.g., more time for completing assignments) to support CTE course completion, while LEA leaders highlighted ways their teachers worked with students to support their success.

[The CTE teachers] are amazing, and they go above and beyond. We had one of his [CTE] teachers working during his prep time to accommodate a student that couldn't be around the general population for a reason, and for a time, and he did that. He gave up his prep time to help that student succeed. Every one of his [CTE] teachers are like that, they would do anything for any of those kids, and it shows. ... [K]ids feel needed, wanted, and that they can be successful, no matter what life has given them. (Exemplar Site SPED Director)

While these facilitators play a critical role in promoting access and inclusion for students with disabilities in CTE, districts must also contend with a range of barriers that can complicate or limit these efforts.

Barriers to CTE Access and Inclusion

Despite efforts by many LEAs to expand access for and inclusion of students with disabilities to participate in CTE, numerous barriers persist. These barriers, such as course scheduling and availability, misalignment between expectations and placement practices, implementing accommodations, and resource constraints may further limit access and inclusion in CTE for students with disabilities. The findings that follow provide an overview of these persistent barriers to access and inclusion of students with disabilities in CTE reported by LEA leaders and educators in the study.

Course and Pathway Pre-Requirements

LEA leaders described challenges supporting students with disabilities who may not be able to meet academic requirements, pass pre-requisites and/or safety exams, which were top rated barriers in survey findings as well (see Figure 3). For LEAs where students have to complete an application to take CTE courses at CTE Centers or magnet schools in their District, the application or eligibility process may deter students from applying or being

included in particular CTE courses or pathways. As a SPED teacher from an improvement site noted during focus groups, “Most of the barriers would be a lot of belief systems [like] “I can do school.” She continued to describe how skill-based application requirements can further limit the applicant pool.

One of the barriers is each of the kids for the pathway have to put together a video as part of their application process and present why they want to be part of pathway and answer some questions through that, and depending on their skill level, if they've had opportunities to learn those kind of skills sometimes just like some of their other academic skills, they're not going to come across as strong for that process. (Improvement Site SPED Teacher)

Students’ disabilities may at times impact their ability to complete credentials or pathway requirements. School staff may need to thoughtfully guide students through choosing a pathway where they can meaningfully build skills and experience success.

I think the concept of being able to meet a standard is so critical. If you have a student who's trying to apply for a program, but they have a third-grade reading level, and the program requires a 10th grade reading level, they're not going to be successful, even with accommodations most of the time ... which is why it has to be a team decision with the IEP on what fits and what does that look like ... As we expand our understanding of universal design and how to provide appropriate accommodations, that really is the key is to being able to empower students, families, and teachers to be able to create successful learning environments where everyone can thrive. (Improvement Site Transition Specialist)

Safety tests and concerns from CTE teachers about safety in the classroom were frequently mentioned as a barrier, especially for students with more severe disabilities engaging in woodshop or welding classes with dangerous equipment.

I think one of the spots that is hard with some of the CTE [courses] is ... the safety tests and the competency that they absolutely have to pass, in order to be safely in the shop. It's a little tricky right there, navigating that, but with some PLCs [professional learning communities] and things, I feel like we're able to navigate that ... [and] we have good participation ... in those courses, because it seems to be what our kids are best at is some hands-on more technical education type careers, and courses. (Exemplar Site SPED Director)

[F]or me as a shop teacher, ... I find that most of my students with special needs do pretty well. I have a couple of students this semester that ... their handicap or special need is significantly more than what most students are ... [they] have a student aid that comes into class with them each day, and they need quite a bit more guidance and supervision in the shop ... I have 22 kids in that class, and so trying to balance, making sure that they have the supervision and instruction and guidance that they need versus the other students in my class, that's been a challenge, to be perfectly honest. (Improvement Site CTE teacher)

In addition to challenges posed by course and pathway pre-requirements and safety concerns, scheduling limitations can further restrict students' ability to access and inclusion in CTE programs and pathways.

Limited Course Scheduling and Availability

Often, as reported earlier, participants cited CTAE course scheduling and availability as a facilitator for increasing participation of students with disabilities in CTE. Yet, course scheduling was one of the most common challenges described across exemplar and improvement sites as a barrier to participation for students with disabilities. Several survey items alluded to limited course scheduling and availability issues, with additional academic requirements limiting students with disabilities' ability to take elective CTE courses (Item #5: $\bar{x} = 2.5$). This, along with the number of required courses needed to graduate (Item #11: $\bar{x} = 2.2$), and limited availability of internships, apprenticeships, or other work-based learning opportunities for students with disabilities (Item #17: $\bar{x} = 2.0$, see Appendix C) were rated as the top barriers.

Interviewees cited several factors that complicate scheduling CTE courses for students with disabilities. First, CTE courses are electives, which as LEA leaders explained meant that priority was often given to scheduling courses needed to meet academic requirements for graduation (e.g., core classes).

Oftentimes when we're talking about students with disabilities, it's a juggling act with trying to get in all their core classes and their special ed time in their schedule during the day. I think that is often a barrier - trying to make sure that all of their needs are being met. (Improvement Site SPED Director)

A SPED Director at an improvement site described how they sometimes substitute core credits for CTE courses to support CTE pathway completion, which had a mean rating slightly below moderate (Item #15: $\bar{x} = 2.94$, see Appendix B) in survey findings.

Since they do have an IEP, we can say that ... Because there's a lot of math in agriculture, we're going to count that for their senior year math credit, which will free up another class. So, we do put in their IEP substitutions for credits, which then opens up more electives and stuff like that. (Improvement Site SPED Director)

Difficulties Accessing CTE Courses and Offsite CTE Facilities

Despite laws requiring students with disabilities to be able to access and fully participate in all classrooms, several LEA leaders, CTE teachers, and SPED teachers noted issues with students with disabilities accessing CTE classes, facilities, and course equipment. In surveys, several respondents identified issues students with disabilities face accessing CTE coursework, which included a lack of funding for equipment and facilities that can enhance the experience of students with disabilities in CTE classrooms. Here we provide an example from a CTE teacher at an improvement site to describe how outdated equipment, and facilities impacted a student in a wheelchair accessing a CTE course of interest to her.

When I had the little girl with a wheelchair, my lab is not accessible for her. I have set lab tables and it was built in 1992. And the lab table that supposedly is ADA is at the very back of the lab, and in order to get to it, we couldn't get a wheelchair down either side of the lab to get to that ADA lab table. So I had to try and make a lab table upfront for her so that she could use it. But then that made it so she couldn't get to any of the lab equipment. So that was frustrating for both her and I, because she had one of those big electronic wheelchairs, not just a small wheelchair ... And I don't know how to fix that because the lab tables are built in. So that would be something that would be a big construction thing. And as far as things like that, she also needed a big touch screen, and this other boy would have done better with a big touch screen that he could highlight the fingerprint minutiae on and he could do things with touching it rather than trying to type into it. And I do have some smaller iPads, but he couldn't enlarge it enough that he could do it because he didn't have the fine motor skills.
(Improvement Site CTE Teacher)

Accessing offsite CTE facilities posed additional challenges for students with disabilities. While survey findings indicated educator ratings differed significantly between exemplar and improvement, barriers to accessing offsite CTE programming were also shared by LEA leaders at some exemplar sites.

Some of those pathways that are only available at the CTE Center. Students, the barriers there are they have to get up earlier, they have to catch a bus earlier, and that's a deterrent for some of those students. They don't want to do that. (Exemplar SPED Director)

The distance between a student with disabilities' home school and the offsite CTE location, whether a CTE Center or local college, was regularly mentioned in interviews with LEA leaders as the primary challenge with accessing CTE programming for students with disabilities. State-funded transportation was perceived as an important facilitator to ensure students with disabilities in geographically challenged districts access offsite CTE coursework.

Something I would like to see ... [is] that the state provide transportation to students who have socio-economic and special education challenges to be able to participate in attending [local colleges]. We do not have a campus that shares the same area, like [another district] does ... We are more challenged here because we are landlocked ... we just can't do some of the things that other districts do ... It creates those barriers for special needs students, and for students of social economic challenge, they can't provide their own transportation. It's more difficult. Anytime you make something harder, you're going to get less response from those people that already have other challenges. It really will only serve those children who they have more supports coming from home. (Improvement Site School Administrator)

A CTE Coordinator at an improvement site, who had a cautionary tale about how solving one issue can create another one, summarized how solving their district's transportation issue created a scheduling issue for students to access CTE Center course offerings.

Transportation for us is an issue, and that is one of the reasons that [our CTE Center] was created. We used to offer programs at schools and kids would have to drive to those schools. And today, many of our kids don't have automobiles ... They don't see themselves ever driving and therefore they don't take driver's ed. And so the [CTE Center] was created to allow students to travel to programs and we bus. So, we bus before school, we bus right before lunch, we bus outright during lunch and then right before school ends. So, kids have to attend two periods at the [CTE Center]. I think sometimes that can be a barrier because they don't have those periods open. (Improvement Site CTE Coordinator)

Alongside scheduling obstacles, misalignment of expectations and course placement practices can also create significant barriers to students' successful engagement in CTE programs.

Misalignment of Expectations and Placement and Support Practices

Parent and school staff perceptions about what students with disabilities can accomplish were discussed by LEA leaders as barriers that can also hinder their inclusion in CTE programs and pathways. A SPED Director described how parents with unrealistic expectations for their child with disabilities can create challenges for school staff as they seek to find appropriate CTE course placement for the student.

[With respect to] a pretty intense group, your intellectual disability, traumatic brain injury, maybe severe autism. That's a group that we're looking probably more at exposure opportunities and see if we can translate into a job that is more likely to be something they could complete and still be safe to themselves and to others. And so that becomes the challenge because sometimes you get parents that think their kid can do more than they can, and others that are sitting like, "They're going to cut their hand off." ... So somewhere in the middle [is] that grouping of how to help support them. But that's also where they get the wows and fascination of too, of like, "Oh, that's really cool ..." It at least starts to put something into their interest and educate them. So, I don't want to say that their disabilities limit them, but sometimes unfortunately, there are pretty disabling conditions that keep people from doing things. (Exemplar Site SPED Director)

Parents' resistance to school improvement initiatives can also pose challenges despite evidence of their effectiveness. Here a SPED teacher at an improvement site explained the importance of school administrator support when faced with parent and district complaints about co-teaching rather than pulling students out of class to receive specialized instruction supports.

Low expectations about what students with disabilities can achieve in advanced CTE classes along with school staff concerns with how well students with disabilities will do in non-traditional SPED settings can limit their opportunities for pathway inclusion and completion.

What we found is special ed students were consistently being placed in the beginning class, so they might take one three times. And so, we really have worked with counselors to monitor

that ... We need kids to be able to take a sequence of courses that lead to a concentration or completion in a pathway. (Improvement Site CTE Coordinator)

[W]hen kids are in their neighborhood schools and they're thinking about applying [to the magnet school], they're talking to their special ed teachers and their belief systems about ... "Oh my gosh, they don't have pull-out classes. Oh my gosh, they're co-teaching. I don't know if you're ready." We don't have a traditional SPED setting where they can leave and go to somewhere where it feels more comfortable. (Improvement Site SPED Teacher)

Beyond the influence of parent and school staff expectations, educators also described difficulties they faced implementing accommodations to support access and inclusion in CTE classrooms.

Difficulties Implementing Accommodations

In focus groups and interviews, educators described challenges related to meeting student IEP accommodation requirements, particularly when multiple students required accommodations at the same time and the school had limited availability of staff (e.g., paraeducators), other additional supports in the classroom, or appropriate training. In interviews, not having enough extra help in the classroom was the most common barrier described with respect to implementing accommodations and was also the second-highest-rated barrier in survey findings ($\bar{x} = 2.6$; see Figure 3).

Funding isn't the bigger concern. Sometimes it's staffing. It's like having the [qualified] bodies available to make it happen. ... You've got a new class and sometimes you don't know the kid's going to need the support until they're in the class a day or two and it's like, "Okay, I need somebody in there now." It's not so much I don't have the money to pay somebody to go in there, I just don't have the body to make it happen. (Exemplar Site SPED Director)

A CTE Director at an improvement site also shared how additional challenges can arise when CTE teachers coming from industry lack pedagogical training, which may preclude their understanding of how to accommodate students with disabilities in their classroom.

I think one of the unique challenges today is that half your [CTE] teachers that you're hiring are not teachers. They're coming from industry. And so there is a need to skill up, educate educators on pedagogy, being able to teach all students, especially students with disabilities. (Improvement Site CTE Director)

In focus groups with CTE and SPED teachers, a few CTE teachers talked about how the type of accommodation provided can impact student persistence in their class. Here, a CTE teacher at an improvement site explains how providing extra time instead of reducing a students' workload can negatively impact the student and can lead to dropping the course.

[T]he thing that they keep wanting to do is give the kids more time instead of reducing the amount of stuff that they do ... And I would say don't give them more time, because all they

do is get behind. Give them less to do, but give them a specific amount to do. But it has to be due at the same time that the regular kids get stuff done so they stay up with the regular kids. Because if they don't, they just get farther and farther behind, and then they get frustrated and then they quit. (Improvement Site CTE Teacher)

Coordination between departments may facilitate accommodations being written in student's IEPs or 504 documents to better align with the specific CTE course expectations.

[A] lot of our teachers here are really good about accommodating students with disabilities, and they ... help us rewrite the accommodation so it fits their class. Our health department here is amazing so if any student wants to go into medical, they have helped us so much and really you have seen kids thrive in that area ... We have a [CTE teacher] here, he is amazing. he teaches medical anatomy. It was my first year teaching, and I had a student taking his class, and I was like, "I have no idea what I'm doing. Are these accommodations okay?" And he was like, "Yeah, but let's change this so they're suitable at a college level." And he wrote it for me. I was like, "You are amazing." And my student is successful, she's in college right now ... doing something with biology. (Improvement Site SPED Teacher)

However, some CTE teachers at CTE Centers/magnet schools discussed challenges coordinating with the SPED departments at student's home schools and a lack of SPED supports provided to students with disabilities at their location.

I think the [CTE Center] presents a lot of problems because I don't think the special education departments in the separate high schools, I don't know if they just don't know how to contact us, but I've personally never received any contact from any of the special education departments in any of the home high schools that my students come from. A lot of the time it's them advocating for themselves or me just looking at their stuff, but their file holders and stuff, I'm usually the one reaching out to them for help if anything. (Improvement Site CTE Teacher)

The paraeducators generally don't bus over with the students. So generally if we have them, it's just the student and we don't at the [CTE Center], we don't have the extra staff for people to be coming into the classroom all the time to help us. (Improvement Site CTE Teacher)

Resource Constraints

Earlier we noted that dedicated resources can support both access and inclusion of students with disabilities in participating in CTE programs and pathways. In contrast, resource constraints can also be a barrier to access and inclusion. In interviews with LEA leaders and educators, funding allocations for staffing and educating students were a primary concern across CTE and SPED departments.

Special education is historically underfunded, and I think CTE has some similar challenges with reliance on grants and some of the funding that way. And so, I know one of the pieces that always becomes challenging for both SPED and CTE is even when we're just talking about employee compensation and hiring and things like that, when there's a negotiated increase in

salary, yet there's no increase in the SPED budget or the CTE budget, we take a hit and maybe a deficit becomes even larger because we're at a pretty static funding stream with not a lot of increases and prices for things are going up, prices for employees are going up, all of those things. So, there is just that, feels like a constant weight of do more with less. And I would say that affects both of our departments. (Improvement Site CTE Director)

Educators interviewed regularly expressed how they valued access and inclusion of students with disabilities in all classrooms, including CTE. Funding constraints, especially with improvement sites, were often described, however, as the reason LEAs had shortcomings with respect to providing access and inclusion for students with disabilities in CTE.

But honestly, the funding prohibits everything. The funding is terrible. The state's whole push right now is meaningful inclusion, which I think is extremely important and necessary, and especially in CTE, but with the funding deficits that we have, the lack of funding, my teachers at the secondary schools where CTE really is stationed have over 40 students on their caseload for special education. (Improvement Site SPED Director)

The financial pressures to provide opportunities for students with disabilities to meaningfully participate in CTE was especially challenging when considering providing educational supports for students with multiple or more severe disabilities.

But when you talk about those students specifically that have more severe and profound disabilities, a lot of these students will be with us until 22. That program ... is taking up a huge chunk of our funding to support those students. And it's coming at the expense of students with more mild, moderate disabilities. So, when we talk about supporting kids in their classes such as CTE, there aren't resources to do that. We're kind of trying to support everyone the best we can, but the students with more pressing needs are taking the majority of the funding. (Exemplar SPED Director)

Utah's funding formula for SPED was described by a SPED Director at an improvement site as inadequate to address the challenges they were facing in their LEA.

I love Utah, but on educational funding, don't even get me started. Our superintendent's from Wyoming and every single time we have to talk about something, he goes, "Well, in Wyoming, they reimburse 100%." And so, we get 0%. Right now, our district is not supported by any other program but our SPED funding. And so, funding is always a barrier ... And it's hard to navigate what priorities trump other priorities because they're all priorities. (Improvement Site SPED Director)

As noted earlier, staffing, which is a resource issue, can present challenges for meaningful access and inclusion. Participants across exemplar and improvement sites indicated that support was needed to hire staff to reduce caseloads for counselors and case managers and improve services provided to students with disabilities. While needs varied greatly across sites, many LEA leaders indicated their desire to hire additional staff, including counselors, CCR staff, CTE staff assistants, CTE teachers, SPED teachers, case managers, transitional

specialists, and work-based learning and CTE coordinators. In addition, the loss of federal resources, restrictions on the use federal dollars, limited state spending per pupil, and cuts to CTE funding further impacted LEA budgets and the availability of resources to support students with disabilities in their CTE participation.

These resource constraints shifted what teachers could provide to meaningfully include students with disabilities in their classrooms, especially in more rigorous CTE courses. In the following example, a SPED Director at an exemplar site explains how teachers provide the best support they can with what resources they have, and how best practices like co-teaching are practically impossible in CTE courses due to these resource constraints.

Because of the rigors of the class, these teachers, their time providing that specially design instruction is really just trying to make sure the kids can pass and get these assignments done and pass the class. It's like they're carrying tier one ... to make sure they get that credit ... and that's just your core classes ... When you branch out and you start talking about CTE classes - I'm sorry, but there's just no resources. We cannot fund special ed teachers co-teaching in a CTE class. So, it's really hard to provide that level of support in some of those classes that maybe are a little bit more academically demanding. (Exemplar Site SPED Director)

As noted in the survey findings, co-teaching was perceived as a below moderate facilitator (Item #22: $\bar{x} = 2.85$; see Appendix B) despite it being a best practice in research literature. However, the following example from a SPED Director at an improvement site highlights the tension that constrained resources places on the feasibility of co-teaching models. In this example, the Director describes how co-teaching could help support all kids but the limited resources coupled with the way SPED supports are written in IEPs limits the practical ability for LEAs to support co-teaching.

When you start looking at our more highly impacted students, sometimes they have additional supports written in. They require behavioral supports, and so they might have... Their entire day would have an adult with them, and then that adult would join them in that CTE class. The problem that I have... Not that it's a problem. But when it's written like that, it's really just for that student. We're still not getting that co-teaching. We're not getting that supports for all the kids. I'm trying to be creative as I problem solve with the district of how can we find ways to just straight-up co-teach, be there for all the kids. (Improvement Site SPED Director)

Ensuring access and inclusion for students with disabilities in CTE requires intentional action at multiple levels, from fostering an inclusive school culture to addressing practical and logistical barriers. To better address systemic challenges and leverage opportunities to more effectively support students with disabilities requires building capacity and collaboration.

Building Capacity to Increase CTE Participation and Engagement among Students with Disabilities

Building capacity involves equipping educators with the knowledge and skills to support students with disabilities in understanding, accessing, and succeeding in CTE opportunities available to them in high school. Another important aspect of building capacity is creating structured opportunities for collaboration among school departments and extending partnerships to colleges, vocational rehabilitation, and community organizations to build a network of support for students with disabilities engaging in CTE.

Facilitators that advanced capacity building and collaboration included building knowledge and awareness of school staff and leaders, using data to inform strategies, scaling and modeling effective practices, and fostering purposeful partnerships. However, barriers like communication gaps, competing priorities, professional learning needs, and resource constraints discussed in earlier sections impeded building capacity and collaboration in schools and across school communities as well. Examples are provided that emphasize strategies improvement and exemplar sites have used to build capacity and collaboration.

Data used to illustrate the findings primarily come from the interviews and focus groups. As noted in the introduction to the qualitative findings, we use survey results as corroborating and contrasting evidence. We use examples from the interviews and focus groups to illustrate the themes and subthemes.

Facilitators for Building Capacity

Building capacity and fostering collaboration within schools and districts are essential to improving CTE outcomes, especially for students with disabilities. Facilitators for building capacity and fostering collaboration are organized into four areas: building knowledge and awareness of school staff and leaders, using data to identify and address gaps, scaling and modeling effective practices, and fostering collaborations and partnerships. Each theme represents a critical area where deliberate action can promote more access, engagement, and completion of CTE programs.

Building Knowledge and Awareness of School Staff and Leaders through Professional Learning

Strengthening the knowledge base and awareness of school staff and leaders lays the foundation for increasing participation of students with disabilities in CTE programming and pathways. Professional learning consistently emerged in survey responses and in interviews with LEA leaders as an essential facilitator by equipping staff with training on CTE pathways, accommodations, and effective instructional strategies for supporting students with disabilities (see Figure 3). In particular, ensuring that SPED staff were aware of CTE course and pathway offerings and how inclusive those offerings can be was perceived as important

cross-training to emphasize the value of CTE for student advocates involved in their post-school plans.

I think one of the most effective things we have done ... We had all of the secondary special education teachers, all of the secondary counselors, and then the district staff associated with each of those departments, meet before school started. We actually met at the [local technical college], and we had the head counselors at the time walk everyone through the CTE pathways programs, the options, the classes that were held not only at the high school, but also on the [tech] campus. And then talked about how [it could] be a collaborative effort, [that we] not necessarily function in silos. (Improvement Site SPED Director)

Professional learning for both CTE teachers and other instructional support staff to equipped with the knowledge, skills, and abilities to implement supports and advocate for accommodations to support meaningful inclusion of students with disabilities in CTE classrooms was identified as essential. Here, a SPED Director at an improvement site described their inclusive approach to professional learning for school staff.

We've done a lot of training and work with our principals and our instructional coaches, but then we've also designated time and done a lot of PD (professional development) and job embedded coaching for our teachers. (Exemplar Site SPED Director)

While professional learning on accommodations was rated as a top facilitator in the survey findings, professional learning for embedded coaching was ranked lower.

Participants noted that attending conferences or trainings beyond what was offered within the LEA was a fruitful opportunity to learn about best practices. Some LEA leaders also described how attending professional learning events at a national conference generated ideas to better support students with disabilities in CTE. At an exemplar LEA, a SPED Director discussed how the CTE Director revised a well-known national program to help high school students build the soft skills they need for succeeding in the workforce.

One of the big concerns at our school is the soft skills with work ... To keep your job, you've got to have good attendance, you've got to have good accountability. Your appearance has to look okay, you got to be pleasant to work with, those kind of things. So we have what's called the A game, we do every week. Our CTE director has a program that he picked up at a national convention that's been revised to help high school students ... So every classroom every week teaches one of those soft skills. ... [O]ne class chose ... "Quality service," ... [and] they decided to do quilts for the warming shelter here. That became their project to learn those skills and to be accountable. (Exemplar Site SPED Director)

After considering ways to lay the groundwork for building capacity and fostering collaboration through providing professional learning opportunities for staff and community members, leveraging data to uncover and address gaps in CTE awareness, inclusion, and completion among students with disabilities is an important next step in building capacity.

Using Data to Identify and Address Gaps

LEA leaders discussed several ways they monitored data to identify and address gaps in CTE enrollment, concentration, and completion patterns across student populations. Participants also discussed the ways in which they utilize data to inform decision-making regarding resource decisions such as CTE course offerings and hiring. At one improvement site, leaders were able to demonstrate a 20% increase in CTE enrollment in schools where the “No Limits” framework was being implemented. Generally, CTE Directors relied more heavily on CTE enrollment and Perkins local needs assessment data to help drive decision-making in CTE course offerings and the need for staff hiring. Leaders also discussed how they monitored the concentration of students with disabilities in CTE courses and pathways, examining course requests and drop rates to identify barriers. Remaining aware of industry trends and local employment needs as well as examining rates of CTE concentration and completion were important strategies to right-fit course offerings with in-demand employment opportunities.

It [CTE enrollment, access, and completion data] drives a lot of the courses and the pathways that we offer ... We also look at trends within the community. We look at high wage, high demand ... and sometimes we will run courses because of that. We want to make sure that we're following what's trending in industry. We don't want the kids to complete a pathway, and it's really not as meaningful as it could be ... We do a needs assessment every year of that, of where we're at and what we're doing in each area, how many completers we have, how many concentrators we have, and so that helps drive us in hiring and offering of courses. (Improvement Site, CTE Director)

A few LEA leaders emphasized how they were utilizing research-informed strategies to make decisions about how to allocate limited resources to maximize their impact. Data-informed decision-making was also used to identify and address issues with CTE course and pathway completion. Here a SPED Director at an exemplar site described how they monitored attendance data and conducted outreach to improve attendance rates.

[If students are] a pathway completer, there's close to 90% guarantee they're going to graduate. It's huge. And we also know that if the kid will show up and engage, if they'll attend, they will pass. It's when they don't attend for whatever reason that they struggle to make that happen. So that's how I use it [attendance data]. We have people that go visit the homes, do outreach. I have a secretary that calls, checks on them. Obviously, the classroom teachers do too. (Exemplar site, SPED Director)

Actively monitoring SPED student data emerged as a promising practice because it equipped LEA leaders with the knowledge and information they needed to develop interventions and test their efficacy at addressing challenges the LEA was facing. Some LEA leaders also used data to develop their CTE marketing strategies in line with the preferences of parents and students or had conversations about placement practices for students with disabilities in CTE when LEA leaders noticed over- or under-representation of students with disabilities enrolled in or completing courses. Receiving federal dollars through Perkins provided an important source of data for LEA leaders to interpret and understand CTE trends.

[I]t's part of our Perkins –because we get federal dollars, we do get really good data. I know where the gaps are ... And that is something that I've even talked to administration about [and] teachers about ... Why do you think this is happening? How do you think we could better reach these students? And sometimes, it's not the places that I would expect to see it. But yes, we do have data and we do look at that, especially around enrollment and when we start talking about recruiting and connecting with kids, this is something that we look at [with special populations]. (Exemplar Site CTE Director)

While LEA leaders at both exemplar and improvement sites reviewed data to inform their decision-making, this practice appeared to be more prevalent at improvement sites, which may indicate increased awareness and desire to understand the effects of their interventions. At an improvement site, an interviewee shared how they designed a data-informed intervention that paired a CTE tour with a pre/posttest to measure its success at supporting students' understanding and engagement in CTE. This provided some evidence that the event seemed to expand students' awareness of CTE opportunities in their high school.

We did a survey [with students] ... and some [survey respondents] even included [CTE] completers. Ninety-nine percent of the students could not tell you what a [CTE] pathway was or what it looked like. What we found to be the most impactful [was] an in-school field trip ... There's a pre-test, there's a post-test, and there's a debrief. And students have the opportunity ... to schedule with the counselor to change their schedule ... My favorite phrase from one student was, "I didn't even know we had this in our school." (Improvement Site Transition Specialist)

In addition, LEA leaders discussed ways they monitored students with disabilities' progress post-graduation through the Post-School Outcomes (PSO) survey to provide additional insights with respect to the effectiveness of current intervention strategies and the need for developing new practices to better support the students they serve. At one improvement site, their PSO survey data identified low engagement rates of students with disabilities post-high school, which led the SPED Director to reassess how they supported their students. This led to identifying the need to provide professional learning to SPED teachers on how to write an effective post-school plan.

Now, this past year, this last year when we did our [Post-School Outcomes] survey, we lead the state as a mid-sized district. 93% of our students after one year of graduating from high school, students with IEPs, they are either employed competitively or they're in some higher training or program or they are doing other [volunteer] things ... How did we get there? ... One, we recognized that many of our special ed teachers had some misunderstanding about the empowerment when it comes to writing an effective transition plan and what that transition plan had to have. So, we engaged in some training through the Utah State Board of Education, modules they have on transition planning ... Your CTE director and your special ed director have to be able to just be honest with one another and communicate the things that are working and the gaps that are there. (Improvement Site SPED Director)

Effective strategies grounded in data-driven interventions and research-informed practices can then be scaled up from individual schools to the district level, where modeling and supporting best practices has the potential to also influence schools in return, fostering a dynamic, two-way exchange of continuous improvement across the entire LEA.

Scaling and Modeling Effective Practices

Scaling successful models for improving CTE concentration and completion rates for students with disabilities from the school to the district level was perceived as an effective strategy for increasing CTE concentration and completion rates for students with disabilities. At one improvement site, excitement for the potential to scale a successful model one high school had implemented through superintendency support was perceived as essential for improving concentration and completion rates for students engaging in CTE in their LEA.

We have one high school who their CCRPs [College and Career Readiness Plans] are directly aligned to [CTE] pathways into the concurrent enrollment general ed certificate. We will be in the next year taking what they have done and moving it to all of the high schools ... We're trying to make a district-wide systemic system that everyone uses best practices. And the nice part is that we have huge support from our superintendency. ... Our superintendency meets with every counseling team, including our coordinator, our CTE coordinator at the end of the year, and they have conversations about goals they've achieved and how many kids were concentrators and how many kids were completers. And I really think that that's going to help this momentum of getting this model [implemented]. (Improvement Site CTE Coordinator)

Demonstrating the impact of scaling effective practices, one CTE Director at an improvement site shared how their internship program grew from a local initiative to become a statewide leader in work placement, illustrating how sustained effort and strategic expansion can transform a program into a model of success for others to follow. However, data on how the SPED students compare with the general population of students who complete the internship program was not proffered.

We have an internship program that we built from the ground-up starting about seven years ago. That program not only leads the state, but we think it's been probably identified as one of the top five programs in the nation ... We have a 50% success rate. And when I say success rate, we have 96% of our kids complete their internship, but we have over 50% of our kids get job offers when they're done with [their internship]. (Improvement Site CTE Director)

Scaling effective change often begins with strong district leadership that works collaboratively to embed inclusive practices within school culture. As one SPED Director shared, this top-down commitment to championing access for all students is essential for creating sustainable opportunities for including students with disabilities in CTE.

Any situation where students with disabilities are underrepresented in programs or struggling is never a special ed issue. It is really an LEA issue. And I'm fortunate to have a [CTE] director and a superintendent who really believes, stands behind the idea of creating more equitable opportunities for all our students, and especially those students that are often marginalized. So our plan ... is really about getting the leadership on board and working together. And then we model that with those that we work with, and then they start working together. And that will result, I'm confident, will result in more students with disabilities having greater opportunities. (Improvement Site SPED Director)

Effective implementation also hinges on committed administrative leadership at the school level, where principals and administrators actively advocate for inclusive practices and defend innovative approaches despite challenges. School-level administrative support was essential to facilitating school change efforts to co-teach students with disabilities at an improvement site when historically these students were being pulled out of class for support.

That's the biggest difference is having an administrative leadership team that buys into it and will stay in the struggle with you and advocate for it. I know my administrators are advocating at the district level, and we've gotten a lot of pushback from the district on, "Well, where are your pullout classes? You need more support labs, you need more of this. This is what SPED is. You have to do this. This is special ed law." And having two administrators that came back and say, "No, look at what we're doing. Look at the numbers ... our kids are being successful. We don't have kids failing out of math classes." And so they've been willing to stand up for it, and I think that that's one of the big things is getting leadership to believe in it too. (Improvement Site Special Education Teacher)

The effectiveness of scaling may also hinge on the context and circumstances within an LEA. While an LEA leader at one exemplar site shared how they now require two CTE credits to graduate high school to improve their concentration and completion rates, an LEA leader at another exemplar site cautioned the use of policymaking to “force” outcomes given the need for flexibility in the course-taking journey of students with disabilities to align with their specific IEP goals and post-school planning.

The students with disabilities can take any class they want to, and they encourage the kids to participate in the CTE courses. They know that these are classes that are going to help them with careers in the future. I think their goal is to get as many kids with disabilities in CTE classes as they can. Actually, the state requirement for CTE is only one graduation credit, but [our LEA] has bumped it up to two, so all kids in the district have to take two credits, including the special ed kids. (Exemplar Site CTE Director)

I guess you could always write that you have to do these things, but I don't know sometimes if that really changes behavior or if it just puts it off, and then they don't get it done and then it's a barrier to their graduation effort. So I think you always have to be careful with forcing too much because what might be intended to be good, ends up actually dropping something else. (Exemplar site SPED Director)

Beyond scaling effective practices within schools and LEAs, fostering strong collaborations was identified as essential to creating authentic, well-supported pathways that prepare students for success in CTE and beyond high school.

Fostering Collaborations and Partnerships

Participants reported that internal and external collaborations play a critical role in supporting students with disabilities in CTE. LEA leaders, for instance, highlighted several ways that SPED and CTE departments worked together to better support students. An example of this included SPED and CTE staff who provided cross-training and professional learning to better support students with disabilities.

The reported collaborative efforts occurred beyond professional learning and training spaces as well. For instance, a CTE Director at an improvement site described their intentional efforts to foster communication and shared understanding with SPED colleagues.

I mean, we're very intentional about [collaboration ... Because right off the bat, we felt like it wasn't happening as well five, six years ago. There was a massive gap and any promotional stuff we talk about, I send out weekly emails of cool pictures and cool stories and awesome things that are going on in CTE, and I always copy our SPED teachers so that they're as educated as our counselors, as educated as our teachers on what cool programs are going on in CTE. (Improvement Site, CTE Director)

A SPED Director at another improvement site described being intentional with collaborative efforts. This educator noted how a formal IEP team can support collaboration across departments to keep all team members informed and engaged to support student success.

I'll go back to counselors being a part of that IEP team. Counselors being in classrooms, presenting on what's available, I think it's truly a team effort ... It's really the adults being at the table and being aware of the student's needs and interests, which I recognize we're in a smaller school district, it's a little easier to do, but you really have to be intentional about providing that exposure and experience for the student. (Improvement Site SPED Director)

Building on the role of IEP teams, participants indicated the importance of recognizing the strength of broader, cross-functional school teams to bring together key stakeholders from multiple departments. Grounded in the principles of the *Without Limits* framework, which advocates for inclusive, equitable, and coordinated support systems for students with disabilities in CTE, these cross-functional teams collaborated to create tailored plans to expand CTE access for students with disabilities engaged in CTE.

[E]ach school brought in an administrator, a special educator, a CTE teacher, and a school counselor. And out of those 27 sites, they had about 20 of them that ended up after they learned about Without Limits... each school then created their own plan based off of that ... I want to say 17 or 18 that came up with plans. And then of that group, there was about five or six that really had traction over more than just one year. (Improvement Site CTE Director)

A CTE Director from an exemplar site described how CTE is involved in planning for SPED supports in the classroom when they are invited, and how their departments meet informally to discuss the students with disabilities they serve in their small district.

[I]f we have 504s, or if we have SPED students with IEPs, we're trying to be involved with everything, as long as we are invited to it. We're such a small district, that these students are well-known, and are well-protected that way, and are well-served that way. So, if a student is coming in with a disability or something, we know about it before they come. We started organizing our SPED team to come in and talk with us with specific kids. Every kid that is enrolled in our program, we talk about that kid specifically. It's not an IEP, it's just a meeting we have with all of our CTE teachers, and what we can do to help accommodate them, and help them with their needs. (Exemplar Site CTE Director)

CTE teachers were noted as playing a crucial role in linking students to local colleges that offer programs aligned with their CTE pathway interests, and collaborating in this way can facilitate seamless post-school transitions that further students with disabilities' postsecondary education and career goals.

[A] lot of my kids, since I'm further up in the animal science pathway already know that they like animals already. So that's where I'm kind of bringing in [a local university] now has a veterinary program and a lot of animal programs up there, so I start introducing them to that. (Improvement Site CTE Teacher)

Coordinating with local colleges to align supports for high school students to attend classes was an important aspect of external collaborations and partnerships. Here a CTE Director from an exemplar site explains how they were able to align transportation and scheduling supports for students accessing CTE courses and programs at a local college.

Up at the [local] college, there's the welding, the automotive, the diesel. We don't have automotive or diesel here in our district, but we do up there. The buses, the way we have the schedule set up, and we've worked with [the] college really closely with their tech ed programs, they help align with our same schedule for a lot of those classes ... Where the bus drops off for the CTE Center is halfway between the college and the high school, so the kids can walk either way. We are providing transportation, which is really helping give access to all of the kids, to all of the programs. (Exemplar Site CTE Director)

Collaborations with local colleges also helped fill gaps with high school classroom supports. A SPED Director at an exemplar LEA described how their partnership with a local university brings student tutors into high school classrooms to provide extra support.

We do have, from the university, tutors that come down ... and they help all of our students, not just our special ed students. They're in the classroom, they're helping with kids that need extra support, but also helping with kids that need makeup work because they're absent or gone ... So sometimes I can pull from them to go support versus one of my paras that's maybe trying to do something else at the time. (Exemplar Site SPED Director)

Conversely, some LEA leaders have partnered with local colleges to provide SPED supports directly on campus, ensuring students with disabilities receive their required service minutes and coordinated assistance while enrolled in CTE courses at the college.

[W]e will now have the capability to monitor our students' progress during their certifications on a weekly basis [at a local college]. And we will have a [college] coordinator present supporting the students ... [W]e see it with all of our kids - they get over to [the college], and especially with our students that don't have the support from the SPED department, they end up not doing very well, and then they stop going and we don't hear about it ... So, we'll be monitoring their progress towards their certification and putting in interventions ... They'll be getting their IEP minutes in math and English during their time at [the college], so they won't have to go back to their high school and find a way to schedule that in. (Improvement Site CTE Director)

While these examples highlight promising efforts to build capacity and foster collaboration across SPED, CTE, and other external partners, it is important to recognize that some barriers can preclude or diminish these collaborative efforts.

Barriers to Building Capacity to Increase CTE Participation and Engagement among Students with Disabilities

In our analysis, we noted that several barriers may be hindering the ability of LEAs and educators to build capacity of the system and educators to increase CTE participation and engagement among students with disabilities. However, the analysis did not produce primary subthemes. Instead, we note that the barriers to building knowledge, using data, scaling and modeling best practices, and fostering collaborations often reflected the need to negotiate competing demands (e.g., meeting compliance regulations), accessing real-time data, finding sufficient time for meaningful collaboration and relationship building between SPED teachers and CTE teachers, and expanding partnerships between schools, CTE programs, and industry.

Recommendations

As part of a USBE and UEPC research-practice partnership, this study was designed to provide information about the facilitators and barriers for engaging students with disabilities in CTE in Utah. The study sample included both exemplar sites and improvement sites, although ultimately, more participants from improvement sites chose to participate in the totality of the study. Given the nature of this study, findings cannot be generalized. However, the findings do provide valuable insights about the perspectives of educators and their efforts to increase the participation of students with disabilities in CTE programs and pathways and the barriers they face in doing so. The comprehensive nature of the factors (i.e., facilitators and barriers) studied provides an opportunity for LEAs and educators to continue to examine their current practices and invest further in practices as part of their program improvement efforts.

The following recommendations offer insights about how to translate the findings into actionable strategies that will lead to greater impact across the state. These recommendations are not prescriptive; rather, they are intended to inform the work of state and local leaders, educators, and partners seeking to advance participation of students with disabilities in CTE. Similar to the nuance in the findings, these recommendations capitalize on the possibility of facilitators that can be adapted to local context and need. Notably, both the findings and the recommendations are complementary to the USBE's 2024-2029 Strategic Plan for Utah's Secondary Career and Technical Education, which outlines the goals of Awareness and Outreach, Industry Alignment, Postsecondary Alignment, and Durable Skills.⁴ Taken together, these recommendations can be used to support the strategic plan and implementation efforts at the school, LEA, and state level.

1. **Develop materials and resources to raise and maintain awareness and exposure to CTE opportunities.** This study highlighted a number of ways that schools are increasing awareness of CTE opportunities for students with disabilities through their communication, outreach, and exposure to CTE programing. This study also highlighted the barriers to raising awareness such as limited and inconsistent information that is available for students and families, as well as a variety of competing priorities and career decision factors. LEAs and USBE can encourage and support practices to accelerate the spread of effective practices and address identified barriers by ensuring students with disabilities and their families are consistently informed about CTE pathways and opportunities. Below are examples of practical strategies:

⁴ See the Strategic Plan for Utah's Secondary Career and Technical Education plan here: <https://schools.utah.gov/cte/cte/UtahCTEStrategicPlan.pdf>.

- a. *Early Exploratory Exposure*: Integrate CTE exploratory experiences earlier into middle school and 9th grade CCR or post-school planning, such as in career fairs, CTE nights, and IEP discussions that include CTE.
 - b. *Experiential Opportunities*: Expand afterschool programs, mobile labs, augmented reality, or short-term exploratory CTE modules for students with disabilities, including prior to high school course selections.
 - c. *Student and Family Communication*: Design family-friendly materials in multiple languages and formats (e.g., videos, infographics/brochures, virtual sessions/workshops) to share relevant information, such as postsecondary and career opportunities/benefits, as well as addressing misconceptions about CTE.
 - d. *Systematic Practice Integration*: LEAs and state agencies can promote systematic practices that embed CTE awareness into standard post-school planning processes (e.g., requiring CTE options to be discussed at CCRP and IEP post-school planning meetings).
2. **Evaluate and prioritize access and inclusion opportunities through coordinated collaboration and content-specific flexibility.** This study found that inclusion of students with disabilities in CTE programs often depends heavily on the presence, or absence, of coordinated practices between SPED and CTE teachers and teams. While there was evidence of reported collaboration in both the exemplar site and the improvement sites, there were descriptions of structural and scheduling barriers that limit access and inclusion in CTE participation and pathway completion for students with disabilities. Below are examples of how to feasibly evaluate and prioritize access and inclusion opportunities, including designing and publicizing particular initiatives:
- a. *Scheduling Protocols*: Prioritize pathway course enrollment for students with disabilities in mind (e.g., schedule CTE courses first then fit other required core classes around them).
 - b. *Dual Enrollment/Concurrent Enrollment*: Explore options or opportunities for accommodations that can be made to ensure students with disabilities are eligible for college-level CTE courses.
 - c. *Integrated Course Designs*: Identify CTE courses that can count toward core graduation requirements and share resources broadly such as the Utah Career and Technical Education Career Pathway Chart.⁵
 - d. *Transportation*: Explore opportunities for ensuring effective transportation options are available, such as partnerships with the Utah Transit Authority or other partner agencies to help with off-site CTE programs.

⁵ See https://schools.utah.gov/parent/_parent_/GeneralFrequentlyAskedQuestionsPathways.pdf. See https://schools.utah.gov/parent/_parent_/GeneralFrequentlyAskedQuestionsPathways.pdf, https://schools.utah.gov/cte/_cte/pathways/CredentialsOfValue.pdf

- e. *Internships and Apprenticeships*: Promote access to apprenticeship opportunities that align with student interests and post-secondary transition plans, including coordinating with USBE, LEAs, and workforce partners to ensure appropriate accommodations and supports for students with disabilities.
3. **Build capacity through collaboration, professional learning, and shared resource strategies.** This study highlighted the benefits of students participating in CTE programs and pathways as well as the investment needed to expand or improve CTE opportunities. In particular, this study highlighted the need for investing in leaders and educator skills to support inclusive practices, as well as the opportunities for expanding or improving collaboration and partnership development opportunities. Below are examples of how to build capacity through collaboration, professional learning, and shared resource strategies.
- a. *Role-Specific and Collaborative Professional Learning*: Provide school leaders, counselors, SPED teachers, and CTE teachers with targeted professional learning opportunities differentiated for their roles (e.g., administrators on policy alignment and coherence, counselors on embedding CTE into their CCRP tools and resources). Provide cross-role collaborative sessions to build shared understanding of CTE pathways, and strategies to support students with disabilities.
 - b. *Co-Teaching/Co-Planning*: Explore opportunities for SPED and CTE teachers to co-plan and, where feasible, co-teach. While co-teaching models have many benefits, even when resource constraints prevent or limit full co-teaching, shared planning and coordination can improve classroom strategies and accommodations within CTE courses. This could include identifying teachers time and resources/protocols for collaborative planning for both departmental and grade level teams.
 - c. *Communities of Practice*: Consider establishing district-, regional-, or state-level professional learning networks that bring together role-alike and/or cross role teams to identify common challenges, identify promising strategies, and share solutions, tools, and resources.
 - d. *External Partnerships*: Expand collaborations with businesses and higher education institutions to create work-based learning opportunities or internships tailored to students with disabilities. This could also include exploring further the barriers that limit such opportunities.
 - e. *Evaluate Resource Allocations and Use*: Review, identify issues, and reallocate strategically how staff, staff time, scheduling, transportation, and other instructional supports are allocated to ensure alignment with the goals of increasing opportunities for and inclusion of students with disabilities in CTE programming and pathways.

Conclusion

Supporting students with disabilities to increase participation and engagement with CTE requires a coordinated approach that blends vision, strategy, and practice. The need for greater inclusion of students with disabilities in CTE is clear. Part of this need is driven by anticipated knowledge and job requirements. For instance, the Association for Career and Technical Education (June 2025) indicates that by 2031, 35% of jobs in Utah will require education beyond high school, although not require a bachelor's degree. Another need is the opportunity to create pathways for students with disabilities who do not plan to pursue a post-secondary 4-year degree or credential. Secondary CTE programs are prime spaces for preparing students, including students with disabilities, for post-secondary success, including addressing demands for skilled workers to full jobs in key Utah industries (e.g., advanced manufacturing, aerospace and defense, life sciences and health care, and financial services).

This study offers a comprehensive analysis of the facilitators and barriers educators perceived in supporting students with disabilities' engagement in CTE pathways in their LEA. The analysis was grounded in the perspectives of leaders and educational practitioners across 19 LEAs in the state of Utah. It included an analysis of both qualitative and quantitative data collected through interviews, focus groups, and surveys of educational leaders and practitioners. In analyzing the data collected by study participants, it was clear that supporting students with disabilities in identifying their path toward a successful future post-high school was important. Ultimately, increasing access and success for students with disabilities in CTE will require a systemic effort that is responsive to locally identified needs.

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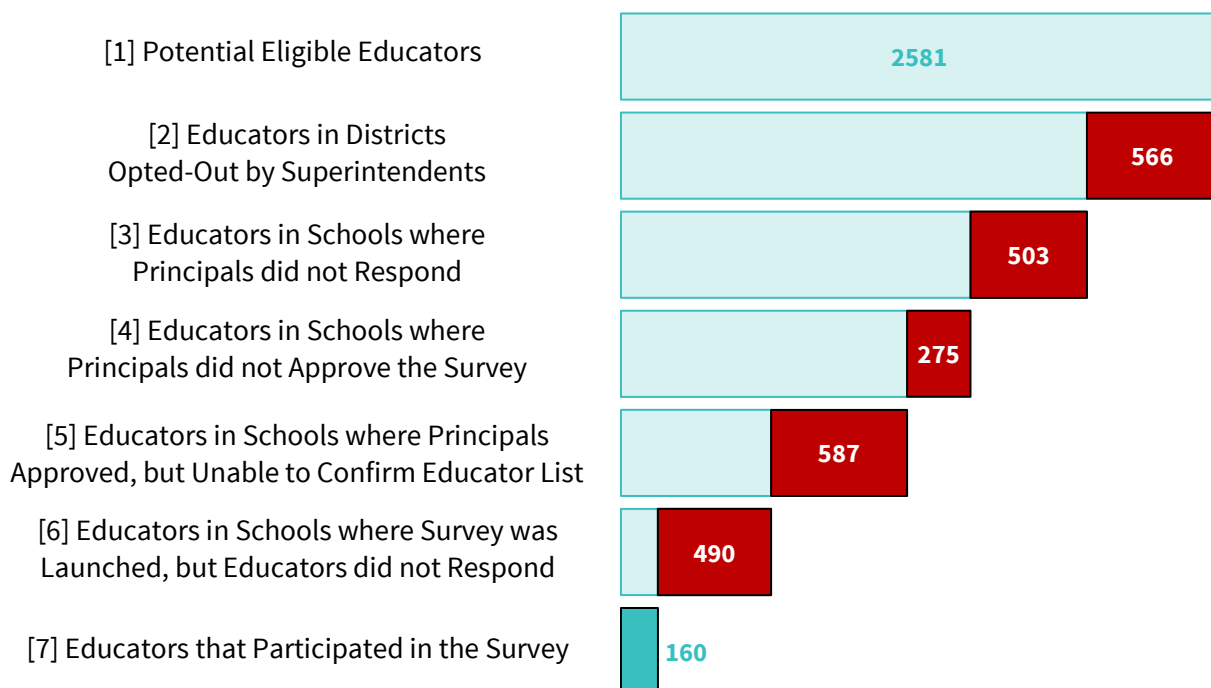
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Appendices

Appendix A: Survey Recruitment Overview

Recruitment efforts for the CTE Educator Survey were conducted in close coordination with USBE leadership to ensure appropriate permissions and consent were received from district superintendents, school principals, and ultimately school educators to participate in the study. Figure 6 below provides an overview of each step of the recruitment process and how many educators were removed during each step of this process. The accompanying text provides additional details about the recruitment efforts taken by the UEPC at each step to minimize educator attrition.

Figure 6. Educator Survey Recruitment Efforts and Attrition



- **[1] Potential Eligible Educators:** The UEPC has a master data sharing agreement with USBE that allows for limited access to USBE education records. Using these records, potential educators who met the survey selection criteria (e.g., worked in the selected school during the 2021-22 or 2022-23 academic school years) were identified in the LEAs chosen to participate in the survey. It is estimated that approximately 2,581 educators were preidentified as eligible for participating in the study.
- **[2] Educators in Districts Opted Out by Superintendents:** Some district superintendents who previously participated in phase one of the project decided to not opt-in to participate in phase two and the accompanying Educator Survey. This removed

an approximate 566 educators from participating in the survey.

- **[3] Educators in School where Principals did not Respond:** Once the study received approval from the district superintendents to participate in the Educator Survey, the UEPC study team reached out to the high school principals in the approved districts to receive consent for the survey to be administered in their individual schools. School principals were contacted 3-4 times via email about their school participating in the study. However, there were some principals that never reached back out to the UEPC study team. These schools account for another approximately 503 educators being unable to participate in the survey.
- **[4] Educators in Schools where Principals did not Approve the Survey:** A handful of school principals did reach back out to the UEPC study team, but did not consent for the survey to be launched in their schools. This accounted for another 275 educators being unable to participate in the survey.
- **[5] Educators in Schools where Principals Approved, but Unable to Confirm Educator List:** Once a principal consented for their school to participate in the survey, the UEPC study team then reached out to confirm the educator contact list for these sites. The study team reached out 3-4 times to these principals to confirm the educator list, as well as tried to identify as many of the educator emails addresses as possible using publicly available directory information on school and district websites. However, there were some school principals who the team was unable to hear back from, resulting in another approximately 587 educators being unable to participate in the survey.
- **[6] Educators in Schools where Survey was Launched, but Educators did not Respond:** The survey was ultimately launched to approximately 650 educators, which represents 25% of the originally identified educators who were eligible to participate in the survey. Amongst those invited to participate, 490 educators either did not respond to the survey invitation at all after multiple invitation emails or did not provide sufficient data to be included in the final analysis.
- **[7] Educators that Participated in the Survey:** Among the approximately 650 educators invited to participate in the study, we received responses from 160 educators that were ultimately included in the analysis. Some responses were removed from the final analysis because only provided demographic information was provided.

Appendix B: Complete List of Facilitator Items

Item No	Facilitator (1=Not a facilitator; 4=Major facilitator)	Mean Score	SE	N
1	Empowering students with disabilities to self-advocate or take steps in planning their own futures.	3.33	0.07	105
2	Promoting a school culture that is asset-based and inclusive of students with disabilities within CTE courses or programs.	3.21	0.09	103
3	Providing staff professional learning or training, cross-training, or online educational courses on the following topics: - Awareness and understanding of CTE pathways	3.16	0.08	110
4	Communicating CTE opportunities in ways that align with students with disabilities' interests and post-secondary plans.	3.15	0.09	107
5	Providing staff professional learning or training, cross-training, or online educational courses on the following topics: - Accommodations and advocacy strategies to support students with disabilities	3.10	0.08	110
6	Engaging the students with disabilities' advocate(s) to support post-school planning (e.g., parent, paraprofessional, case manager).	3.09	0.09	100
7	Touring facilities to provide classroom examples of what CTE learning can look like (e.g., hands-on, project-based).	3.05	0.09	105
8	Including CTE coursework in students' Individualized Education Program when post-school plans align.	3.04	0.11	92
9	Having guided conversations to help students with disabilities identify post-school plans (e.g., College and Career Readiness (CCR) planning, transition planning).	3.03	0.10	99
10	Sequencing and scheduling CTE courses to encourage pathway completion.	3.03	0.10	104
11	Communicating CTE opportunities early to students with disabilities and their families (e.g., beginning in middle school).	3.01	0.10	108
12	Encouraging school staff to participate in IEP meetings for the students with disabilities they serve.	2.99	0.09	111
13	Increasing the availability of CTE course sections taught for popular courses or those required for pathway completion.	2.99	0.10	99
14	Facilitating opportunities for students with disabilities to build relationships with peers and/or teachers involved in CTE courses or pathways of interest.	2.97	0.10	103
15	Providing CTE courses that also fulfill core credit requirements (e.g., math credit for welding).	2.94	0.10	104
16	Tailoring interventions (e.g., coaching, counseling, IEP goal setting) to address barriers (e.g., academic or financial) that students with disabilities face when considering taking CTE courses.	2.94	0.09	101
17	Ensuring classroom spaces are ADA compliant and accessible to students with disabilities.	2.93	0.10	104
18	Strategically scheduling to provide opportunities for students with disabilities to enroll in CTE courses (e.g., through scheduling rare course offerings first or using directed studies to provide extra academic support).	2.93	0.10	99
19	Using technology in the classroom to increase accessibility for students with disabilities.	2.91	0.10	107
20	Providing transportation to off campus CTE sites (e.g., other high schools, CTE Center, local technical or community college).	2.86	0.12	93

Item No	Facilitator (1=Not a facilitator; 4=Major facilitator)	Mean Score	SE	N
21	Reducing entry barriers for CTE course enrollment for students with disabilities (e.g., offer entry exam workarounds, remove pre-requisites or grade requirements for taking CTE courses).	2.86	0.10	97
22	Building capacity of teachers to support students with disabilities in the classroom (e.g., pay for a prep teacher, utilize peer tutors or co-teaching to support students in-class and reduce extra help needed outside of the classroom, etc.).	2.85	0.11	104
23	Providing Individualized Education Program (IEP) summaries to teachers serving students with disabilities to support their understanding of students' needs.	2.84	0.10	111
24	Expanding the range of CTE courses offered at my high school (i.e., different types of courses).	2.82	0.11	97
25	Providing staff professional learning or training, cross-training, or online educational courses on the following topics: - Community resources to support career and postsecondary transition	2.81	0.10	95
26	Providing staff professional learning or training, cross-training, or online educational courses on the following topics: - Pedagogical training or endorsements for teachers from industry	2.72	0.11	98
27	Creating professional learning communities or embedded coaching for teachers and/or other school staff to understand the needs of students with disabilities.	2.70	0.10	106
28	Hosting events that showcase students with disabilities' successes in CTE (e.g., Ambassador Program, CTE Nights, Transition Nights, etc.).	2.70	0.10	102
29	Using programs like YouScience or Major Clarity to help students with disabilities identify their skills or career interests.	2.67	0.09	95
30	Providing staff professional learning or training, cross-training, or online educational courses on the following topics: - Evidence-based predictors of post-school success for students with disabilities	2.58	0.10	92
31	Providing flex periods to increase teacher availability for professional training or student support.	2.56	0.11	99
32	Co-teaching CTE courses with special education teachers to meet students with disabilities' learning needs.	2.54	0.12	105

Appendix C: Complete List of Barrier Items

Item No	Barrier (1=Not a barrier; 4=Major barrier)	Mean Score	SE	n
1	Students with disabilities are uncertain about their post-high school plans.	2.86	0.07	111
2	There are not enough staff to provide support in CTE classrooms (e.g., peer tutors, paraeducators, co-teachers, etc.).	2.62	0.10	130
3	Parents and/or guardians of students with disabilities are uncertain about the benefits of completing CTE courses and programs.	2.59	0.10	104
4	CTE teachers are uncertain about how to advocate for additional classroom resources to support students with disabilities' full participation in their course.	2.51	0.09	120
5	Students with disabilities believe they lack sufficient skills or abilities needed to complete CTE coursework or skill certifications.	2.50	0.09	112
6	Additional academic requirements limit students with disabilities' ability to take elective CTE courses (e.g., credit recovery, one-on-one academic support).	2.41	0.09	128
7	CTE teachers are uncertain how to provide appropriate accommodations so that students with disabilities can fully participate in their course.	2.40	0.09	124
8	Students with disabilities are unable to pass or complete CTE entry requirements (e.g., entry exams, safety tests).	2.38	0.09	123
9	Insufficient funding limits schools' ability to expand CTE programs, update equipment, or provide high-quality facilities.	2.26	0.11	108
10	Transportation challenges prevent students with disabilities from accessing offsite CTE programming.	2.24	0.11	108
11	The number of required courses needed to graduate can limit schedule availability for students with disabilities to take elective CTE courses.	2.23	0.09	128
12	Limited partnerships between schools and local businesses reduce opportunities for students with disabilities to experience real-world applications of CTE skills	2.18	0.11	97
13	Students with disabilities are concerned about the financial costs associated with CTE (e.g., course fees, materials, transportation).	2.17	0.11	98
14	Staff lack training to effectively guide students with disabilities in exploring and enrolling in CTE pathways.	2.12	0.09	131
15	Students with disabilities perceive CTE courses do not align with their career goals or post-secondary plans school plans.	2.06	0.09	106
16	Students with disabilities have not taken the pre-requisite course(s) required.	2.03	0.09	121
17	Limited availability of internships, apprenticeships, or other work-based learning opportunities reduces student with disabilities' engagement in CTE.	2.02	0.11	98
18	School staff are not aware of CTE programs, course offerings, and/or pathways available to students with disabilities.	1.91	0.08	126
19	Students' Individualized Education Program (IEP) requirements limit their ability to enroll in elective CTE courses.	1.89	0.08	129
20	CTE teachers are not involved in students' IEP meetings.	1.87	0.08	124
21	There are insufficient CTE teachers to provide course instruction for a wide range of offerings.	1.83	0.09	128
22	Physical barriers limit students with disabilities' access or full participation in CTE classes (e.g., elevator access, lack of modified desks or equipment, etc.).	1.82	0.09	123
23	Counselors are not involved in students' IEP meetings.	1.72	0.09	125

Item No	Barrier (1=Not a barrier; 4=Major barrier)	Mean Score	SE	n
24	Courses of interest to students with disabilities are not offered at the high school they attend.	1.71	0.08	117
25	Participation in extracurricular activities or other electives conflicts with students with disabilities' ability to schedule elective CTE courses.	1.65	0.07	125
26	Staff turnover among CTE instructors disrupts program continuity and limits course availability.	1.65	0.08	124
27	CTE courses of interest fill up before students with disabilities have a chance to enroll in the course.	1.60	0.08	118
28	Counselors do not participate in students with disabilities' College and Career Readiness or course planning.	1.50	0.08	114