



UTAH SYSTEM OF
HIGHER EDUCATION

GENERAL REPORT

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Descriptive Outcomes of Students with Disabilities Up to Five Years After High School (2012-19 Cohorts)

Abstract

This report analyzes the descriptive outcomes for students with disabilities (SWDs) from schools overseen by the Utah State Board of Education (USBE) who enrolled in postsecondary institutions. Data provided by USBE, the Utah System of Higher Education (USHE), and the Department of Workforce Services (DWS) allowed for the examination of metrics including the demographics, Career and Technical Education (CTE) enrollment, inclusion in a regular classroom setting, postsecondary programs, and wages up to five years after high school for SWDs from 2012-19. Compared to national analyses, SWDs from USBE schools had lower enrollment and graduation rates from postsecondary institutions. However, CTE enrollment and inclusion in regular classroom settings had an impact on enrollment and graduation rates. Students who completed a CTE pathway had the highest enrollment and graduation rates for SWDs from higher education institutions. Similarly, students who participated more in a regular classroom setting also enrolled in postsecondary institutions at higher rates than their peers who were participated less in a regular classroom setting.

Keywords

students with disabilities, inclusion, regular classroom setting, Career and Technical Education (CTE), vocational education, postsecondary education, postsecondary outcomes, wages, income

Introduction

Background

Students with disabilities have historically lagged behind their peers without disabilities in various ways. SWDs have lower enrollment rates in postsecondary institutions (Wagner et al., 2005; Lichtenberger, 2010; Newman, 2011), graduate from college at lower rates (Lichtenberger, 2010; Newman et al., 2011), and have lower wages than their colleagues without disabilities (Newman et al., 2011; Cornell, 2018). However, across these three outcomes, students with disabilities have narrowed the gap.

The percentage of SWDs enrolling in higher education has been steadily increasing. In the 1995-96 academic year, 6.0% of students reported having a disability (Horn et al., 1999); this proportion grew to 19.0% in the 2015-16 academic year (National Center for Education Statistics, 2022). Furthermore, the enrollment distribution between SWDs and their colleagues without disabilities differed by the institutions in which they enrolled. SWDs are more likely to enroll in two-year institutions, whereas individuals without disabilities enroll in four-year institutions at higher rates (Horn et al., 1999; Newman et al., 2011).

Like enrollment, the rate at which SWDs graduate from a postsecondary institution also lags behind students without disabilities. Horn et al. (1999) report that five years after entering higher education, 10.0% fewer SWDs had earned a degree. Similarly, Newman et al. 2011 report that eight years after entering postsecondary education, 40.7% of SWDs completed a postsecondary program, about 12.0% less than the general population. For the state of Illinois, completion rates are similar; SWDs had about 15.0% fewer graduates from college six years after enrolling.

Regarding wages, individuals with disabilities have historically had lower wages than their counterparts without disabilities (Cornell, 2008; Newman et al., 2011; Cornell, 2018). This may partly be due to the Fair Labor Standards Act, which allows some individuals to be paid below the minimum wage if the employer has received a Wage and Hour Division certificate. According to the U.S. Department of Labor Wage and Hour Division, “[a] worker who has disabilities for the job being performed is one whose earning or productive capacity is impaired by a physical or mental disability.” The federal subminimum is \$4.25, and hundreds of thousands of individuals earn this wage (the United States General Accounting Office, 2001).

This report aims to examine the descriptive outcomes for SWDs from USBE institutions from 2012-19. The specific research objectives are as follows: 1) report the postsecondary enrollment and graduation rates for SWDs between 2012 and 2019; 2) separate individuals by disability and report their highest educational attainment as well as their wages; 3) analyze the time spent in traditional classroom settings and their enrollment and graduation rates and wages by inclusion; 4) compare Career and Technical Education (CTE) enrollment and their enrollment and graduation rates in addition to their income.

Literature Review

The literature regarding students with disabilities (SWDs) and their transition into higher education is extensive. Researchers either focus on individual disabilities, such as learning disabilities, or they may incorporate all the disability types by which primary and secondary schools provide services. Consistently across the literature, it is found that SWDs have lower enrollment rates into higher education, lower graduation rates from postsecondary institutions (Wagner, et al. 1991; Wagner, et al. 2011), and receive lower wages (Wagner, et al. 2011; Cornell University 2008; Cornell University, 2018).

The postsecondary enrollment rate for students with disabilities is historically low. According to Wagner, et al. (1991), the first National Longitudinal Transition Study (NLTS) found that only 14.0% of students with disabilities enrolled in higher education within two years of exiting high school; the rate did increase to 30.0% by the second NLTS 14 years later (Wagner, 2005). However, this finding does not mean that all disability types enrolled in higher education at the same rate. In both NLTS reports, students with a hearing or visual impairment had the highest enrollment rates, approximately 30.0% in the first report. The second report's enrollment rate increased to about 70.0%. Comparatively, students with multiple disabilities or an intellectual disability had the lowest enrollment rates into higher education, 3.0% and 8.4%, respectively in the first NLTS, while in the second NLTS, the rates increased to 15.6% and 15.4%, respectively.

Enrollment by postsecondary institution type for SWDs also varies for students without disabilities. Both NLTS analyses report that all disability types had higher enrollment rates into two-year institutions than four-year colleges, two years after exiting high school. The NLTS2, with an analysis of eight years after high school, shows that SWDs still enrolled in two-year institutions at higher rates (Newman et al., 2011). This finding is consistent with another national analysis (Mamiseishvili and Koch, 2011) and an analysis from the state of Illinois (Lichtenberger, 2010).

To see if there are any predictors for enrollment into higher education and employment outcomes, researchers have conducted analyses that follow SWDs as they exit high school, complete their postsecondary education, and enter the workforce. Depending on the analysis, researchers have found that participation in Career and Technical Education (CTE) and inclusion in regular classroom settings positively impact postsecondary enrollment and wages. For impacts on education, Wagner et al. (1991) show that students who enrolled in an “occupationally specific training” course in their last year of secondary school were 12.0% more likely to enroll in higher education. Wagner et al. (2016) state that CTE enrollment positively impacts students with learning disabilities. Mazzotti et al. (2016) also show that CTE affects education outcomes. Comparatively, Theobald et al. showed CTE only had an impact on postsecondary enrollment for CTE concentrators, i.e., students who took four or more classes while in secondary school. The literature regarding CTE and post-high school wages is not as contested as enrollment rates. Harvey (2002), Shandra and Hogan (2008), and Test (2009) indicate that CTE has a positive impact on post-high school income for SWDs.

Inclusion, defined as the time SWDs participate in a regular classroom setting, is the other main predictor for postsecondary enrollment. SWDs who participate in a regular classroom are more likely to enroll and complete their secondary education at higher rates and have a higher income than SWDs who are included less in regular classroom settings (Test et al., 2009; Mazzotti et al., 2016; Theobald et al., 2017). Research regarding the course of study or what SWDs majored in postsecondary institutions is not as abundant as the enrollment and degree types that individuals received. The NLTS2 report highlights the

major or primary course of study of SWDs at two-year, vocational, and four-year colleges and found that the two most common majors or primary course of study were business and health programs. Two-year and four-year colleges had both business and health, while vocational institutions had health in their top five programs (Newman et al., 2011).

Finally, the NLTS' 2011 report also compared the incomes of individuals who had completed a postsecondary program, those who had some postsecondary education, and individuals who only completed high school. Individuals with a postsecondary award had significantly higher wages with an average hourly wage of \$14.64, compared to \$11.48 for individuals with some postsecondary education, and \$11.13 for high school graduates, adjusted to 2020 wages. Similarly, Cornell University (2018) analyzed the annual earnings of individuals with disabilities who were of working age and found that in 2018 the median annual wage for a full-time working individual with disabilities was \$42,335 or about \$9,100 less than individuals without disabilities when adjusted for inflation. Separating by disability types reveals that not all individuals with disabilities make that amount. People with hearing disabilities had the highest income of \$51,071, while the lowest-paid subgroup were individuals with a cognitive disability, earning just above \$37,305. The populations may partially explain the wage difference between Cornell University and the NLTS report. The NLTS report focused on recent college graduates with less experience than the individuals with disabilities population. In contrast, Cornell University analyzed all individuals with disabilities.

Data

Data Overview

We obtained the data for this research from USBE, USHE, and DWS. The data contain all the students who participated in special education, whether in primary or secondary school, between 2012 and 2019. USBE and USHE data allow us access to students as they transition from secondary to postsecondary education, while unemployment insurance (UI) data from DWS contains the wages they receive annually. In total, this study included 22,203 students with disabilities.

USBE data provided the demographic information used in this analysis and the USBE special education data, which contain all students who participated in special education and exited their secondary school between 2012 and 2019. The special education data included the disability for which the students were receiving services and the time a student was in a regular classroom setting. The disability types that USBE institutions identify are autism, emotional disturbance, speech/language impairment, deaf/blindness, developmental delay, hearing impairment/deafness, intellectual disability, multiple disabilities, other health impairments, orthopedic impairment, specific learning disability, traumatic

brain injury, and visual impairment. For definitions regarding the disability types, see Table 1 in the Appendix.

The amount of time students participated in a regular classroom is separated into three categories: students who participated in 80.0% or more, 40.0% to 79.0%, or less than 40.0% of the day in a regular classroom setting. Regardless of grade, primary and secondary schools are required to report the amount of time students age six or older are included in a regular classroom setting. This category is used for federal reporting.

USBE data also contained the demographic information of the students, what year they left high school, the amount of time SWDs participated in a regular classroom setting, and CTE enrollment. The demographic information from USBE included the gender and race of the SWDs. For race, the subgroups are Asian, Black/African American, Hispanic/Latino, American Indian/Alaskan Native, Multiple Races, Native Hawaiian/Pacific Islander, and White/Caucasian. We separated CTE enrollment into four categories: non-participant, participant, concentrator, and completer. Non-participants are students who did not complete one full credit in a CTE career pathway. Participants are individuals who have at least one full credit in a CTE career pathway. Utah defines CTE concentrators as those with at least two credits from the same CTE pathway, with one of the credits being a concentrator course. Students who complete a CTE pathway are considered completers.

Data obtained from USHE provided student data from postsecondary institutions. Data from two-year and four-year institutions included whether students enrolled in a higher education school, whether they received a certificate or degree, the graduation date, the program they graduated from, and the institution where they received their award. We defined enrollment as students who participated at a USHE institution, not including concurrent enrollment or advanced placement (AP) courses.

DWS' UI data provided the wage information for SWDs who worked and received wages from 2012-19. Most employers in Utah are required to report quarterly wages for their employees. We aggregated individuals' wages if they worked numerous jobs in the same quarter. To compare wages across the observed time frame, we adjusted wages using the Consumer Price Index for All Urban Consumers (CPI-U) indexed to 2020 wages. CPI-U measures the monthly average change for a market basket of consumer goods for urban consumers (Bureau of Labor Statistics (BLS), 2018).

All the analyses conducted in this paper were performed in R using the tidyverse package (Wickham et al., 2019).

Data Limitations

The first limitation facing this analysis is the sample size of students. To increase the sample size as much as possible, we included all students who participated in special education and left high school between 2012 and 2019, not just students who graduated from special education. Furthermore, due to small sample sizes for some disability types, we aggregated them with other disabilities; students with a hearing impairment, visual impairment, or were deaf/blind were combined into the “Visual or Hearing Disability.” We categorized students with a developmental disorder, intellectual disorder, multiple disabilities, orthopedic impairment, or traumatic brain injury into the “other health disabilities” category.

The second limitation regards the data from USHE. The data from USHE does not include all postsecondary institutions in Utah, including Brigham Young University, Westminster College, Western Governors University, or Ensign College. Furthermore, the data only include individuals who enrolled or graduated from a USHE institution. For instance, if an individual enrolled and graduated from an institution outside of Utah, the data would not capture them.

The last limitation concerns the data obtained from the UI system. The UI system does not capture all wages that individuals may receive in a quarter. UI data does not include income from self-employment, federal agencies, black market transactions, and non-covered agriculture. Similarly, this research does not include income from outside of Utah.

Methodology

We categorized students based on their highest educational attainment. Those with the highest educational attainment were SWDs who enrolled or are currently enrolled in a USHE postsecondary institution, those who received postsecondary awards, those who received certificates, and those who received degrees.

Analyses concerning award types and certificates have been combined based on the number of hours needed to receive them regardless of the institution they were received from. Certificates were separated into three categories: certificates that require less than 900 hours (less than one-year certificates), certificates that require between 900 and 1,800 hours (one-year certificates), and certificates that require more than 1,800 hours (two-year certificates). We separated degree types into associate, bachelor, and graduate degrees.

For wage analyses, we separated individuals based on the year they exited high school and combined individuals based on their disability type. We obtained the median wage from the DWS UI wage record for each disability type and year they had been out of secondary education up to the fifth year.

Results

Descriptive Statistics

Between 2012 and 2019, 22,203 SWDs exited USBE schools. Of those students (8,547 (38.5%)) enrolled, or were currently enrolled, in a postsecondary institution. SWDs were more likely to graduate from two-year institutions (834 students (3.8%)), in place of four-year institutions (574 students (2.6%)). In total, 1,408 (6.3%) students received a postsecondary award, with 1,004 students (4.5%) receiving certificates and 404 students (1.8%) earning degrees. In total, 9,955 students (44.8%) enrolled in a postsecondary institution.

Separating students by their last year at a USBE school reveals that most cohorts, besides the 2019 cohort, had a higher enrollment rate than the average for all students in the analysis. Cohort years 2012 to 2014 had enrollment rates between 42.3% and 43.8%, while cohort years 2015 and 2016 had 40.6% and 40.2%, respectively. SWDs enrolled at 38.9% and 39.7% for cohorts 2017 and 2018, respectively. SWDs who left USBE schools in 2019 had the lowest enrollment rates at 10.5%.

Separating by cohort years also reveals that, in most cases, the graduation rate increases the longer the SWDs have been out of high school. 9.7% of SWDs that exited USBE schools in 2012 received a postsecondary award; 2013 and 2014 had similar rates of 8.2% and 8.3%, respectively. Cohort years 2015 and 2016 had the same completion rate of 7.2%, while the completion rate for the 2017 cohort was 5.9%. 2019 had the lowest graduation rate from college at 1.2%.

Table 1: Highest Educational Attainment Percentages by Cohort for Students with Disabilities from 2012-19			
	# of USBE Students	Enrolled/Currently Enrolled	Received Postsecondary Award
2012	1,288	554 (43.0%)	125 (9.7%)
2013	1,861	788 (42.3%)	153 (8.2%)
2014	1,887	826 (43.8%)	156 (8.3%)
2015	2,764	1,121 (40.6%)	199 (7.2%)
2016	3,784	1,520 (40.2%)	274 (7.2%)
2017	3,842	1,496 (38.9%)	225 (5.9%)
2018	5,246	2,081 (39.7%)	258 (4.9%)
2019	1,531	161 (10.5%)	19 (1.2%)

Separating students by their disability type shows that students with a “specific learning disability” were the largest group, with 13,298 students (59.9%) accounting for more than half of all SWDs at USBE schools. The second largest group, individuals with other health impairments, made up 21.6%, or 4,794 students. Students with autism, speech/language impairment, and emotional disturbance were separated in total by less than 1.0%, making up 6.3%, 5.9%, and 5.3% of the SWDs, respectively.

The highest educational attainment for SWDs depends on the disability type (Table 2). Students with a speech/language impairment had the highest number of students enrolled, or currently enrolled, at 54.9%, while 7.8% received a postsecondary award. Similarly, students with a visual or hearing disability had the second highest rate of students whose highest educational attainment was enrolled at 52.7%; however, they had the highest rate of students earning a certificate or degree at 12.8%. Students with other health impairments had the lowest rate of students whose highest educational attainment was enrolled, or currently enrolled, at 28.4%. Furthermore, students with other health impairments had the lowest rate of students receiving a postsecondary award at 4.4% with either a postsecondary certificate or degree.

Table 2: Disability Type Distribution and Highest Educational Attainment for students with disabilities from 2012-2019				
	# of USBE Students	Enrolled/Currently Enrolled in public Higher Education	Certificates	Degrees
Specific Learning Disability	13,298	5,469 (41.1%)	679 (5.1%)	233 (1.8%)
Other Health Impairment	4,794	1,360 (28.4%)	150 (3.1%)	64 (1.3%)
Speech/Language Impairment	1,316	723 (54.9%)	59 (4.5%)	43 (3.3%)
Autism	1,402	499 (35.6%)	69 (4.9%)	35 (2.5%)
Emotional Disturbance	1,173	380 (32.4%)	35 (3.0%)	13 (1.1%)
Visual or Hearing Disability	220	116 (52.7%)	12 (5.5%)	16 (7.3%)

The data provided by USHE allow us to further separate certificate and degree types. Certificate types are segmented into certificates that require less than 900 hours (less than one-year certificates), certificates that require between 900 and 1,800 hours (one-year certificates), and certificates that require more than 1,800 hours (two-year certificates). Degree types include associate, bachelor’s, and graduate degrees.

Table 3: Awards received by disability type for students with disabilities from 2012-19				
(*) indicates that sample size is too low to report				
	Less than One-Year Certificate	One-Year Certificate	Associate Degree	Bachelor's Degree
Autism	45 (43.7%)	23 (22.3%)	24 (23.3%)	11 (10.7%)
Emotional Disturbance	26 (100.0%)		*	*
Other Health Impairment	89 (42.0%)	58 (27.4%)	48 (22.6%)	17 (8.0%)
Specific Learning Disability	464 (51.3%)	196 (21.7%)	188 (20.8%)	56 (6.2%)
Speech/Language Impairment	40 (39.2%)	18 (17.6%)	33 (32.4%)	11 (10.8%)
Visual or Hearing Impairments	*	*	12 (100.0%)	*

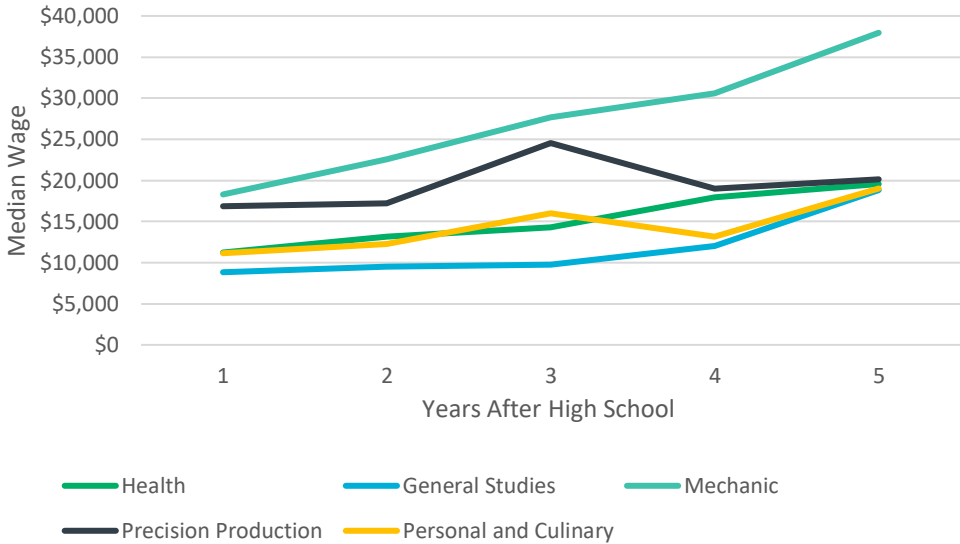
Most SWDs received award types that require less time to complete (Table 3). 43.7% of students with autism earned less than one-year certificates. Students with other health impairments had a plurality receiving less than one-year certificates, 89 students or 42.0%. Bachelor's degree recipients accounted for 8.0% of students or 17 individuals. Most students with a specific learning disability earned a certificate that required less than one year (51.3%).

Table 4 lists the top 5 Classification of Instructional Programs (CIPs) for SWDs and the number of students that graduated from those programs. SWDs who graduated from Health programs were the plurality of individuals making up 375 students (26.6%) of the 1,408 graduates. Of the 8.0% fewer students, Liberal Arts and Sciences, General Studies and Humanities (Liberal Arts) accounted for 262 students (18.6%). The lowest three reported CIPs had 143 students (10.2%), 110 students (7.8%), and 104 students (7.4%) for Mechanic and Repair Technologies/Technicians (Mechanic), Precision Production, and Culinary, Entertainment, and Personal Services (Culinary), respectively.

Table 4: Top five CIPs for students with disabilities from 2012-19	
Health	375 (26.6%)
Liberal Arts and Sciences, General Studies and Humanities	262 (18.6%)
Mechanic and Repair Technologies/Technicians	143 (10.2%)
Precision Production	110 (7.8%)
Culinary, Entertainment, and Personal Services	104 (7.4%)

Figure 1 shows the top five CIPs and their wages up to five years after high school. In the first year after high school, Health, Liberal Arts, and Culinary students had the smallest wages earning approximately \$11,200, \$8,800, and \$11,150, respectively. Comparatively, Mechanic program graduates earned \$18,293, and Precision Production graduates received \$16,858. Health, Liberal Arts, Precision Production, and Culinary graduates earn approximately the same wage by the fifth year. Mechanic students, however, have seen their wages increase substantially to \$37,954.

Figure 1: Top 5 CIPs' Median Wages for students with disabilities from 2012-19



Demographics

Of the 22,203 USBE SWDs included in the analysis, 14,011 (63.10%) were men, and women accounted for 8,103 (36.50%). While men accounted for significantly more students than women, the rate at which students whose highest educational attainment was enrolled, or currently enrolled in a postsecondary institution, is the same at 32.1% (Table 5).

Comparing gender to the award received reveals that women with disabilities are more likely to earn a postsecondary award, certificate, or degree than men with disabilities. Six hundred twelve women (7.6%) received a postsecondary award, with 413 (5.1%) earning certificates and 199 (2.5%) earning degrees. In comparison, 755 men (5.4%) received a postsecondary award, 573 men (4.1%) received a certificate, and 182 (1.3%) graduated with degrees (Table 5).

Table 5: Gender distribution and highest educational attainment for students with disabilities from 2012-19				
	USBE	Enrolled/Currently Enrolled	Certificate	Degree
Men	14,011	4,491 (32.1%)	573 (4.1%)	182 (1.3%)
Women	8,103	2,601 (32.1%)	413 (5.1%)	199 (2.5%)

Table 6 reports the disability distribution of men and women and the postsecondary outcomes for those subgroups. Except for specific learning disabilities and visual or hearing disabilities, men enrolled at higher rates than women. Men with specific learning disabilities enrolled at a rate of 33.8%, while women had a proportion 1.0% higher, at 34.8%. The difference was larger for students with visual or hearing disabilities, with men at 36.1% and women at 42.7%, whose highest educational attainment was enrolled or currently enrolled.

Table 6 also reports the proportion of students who completed a postsecondary program. In contrast to students whose highest educational attainment was enrolled or students currently enrolled, in almost every circumstance, women had higher graduation rates compared to their male counterparts. The exception was for students with autism, with 7.7% of male students graduating and 4.3% of women graduating.

Table 6: Gender-disability distribution for students with disabilities from 2012-19

	Men			Women		
	USBE	Enrolled	Graduated	USBE	Enrolled	Graduated
Autism	1,159	330 (28.5%)	89 (7.7%)	238	64 (26.9%)	11 (4.6%)
Emotional Disturbance	883	252 (28.5%)	35 (4.0%)	282	73 (25.9%)	12 (4.3%)
Other Health Impairment	2,961	738 (24.9%)	115 (3.9%)	1,816	401 (22.1%)	94 (5.2%)
Specific Learning Disability	8,031	2,714 (33.8%)	444 (5.5%)	5,217	1,815 (34.8%)	446 (8.5%)
Speech/Language Impairment	855	413 (48.3%)	60 (7.0%)	454	207 (45.6%)	36 (7.9%)
Visual or Hearing Disability	122	44 (36.1%)	12 (9.8%)	96	41 (42.7%)	13 (13.5%)

The data provided by USBE also includes other demographic variables, including students' racial and ethnic identities. Students of Asian identity accounted for 210 (0.9%) of USBE students, while Black/African American students comprised 605 (2.7%) students. Hispanic/Latino students were the second largest group, accounting for 4,521 students (20.4%). American Indian/Alaskan Native and students who identify as Multiple Races had a similar number of students at 462 (2.1%) and 435 (2.0%), respectively (Table 7). The racial or ethnic group with the smallest number of students were individuals of Native Hawaiian/Pacific Islander identity, accounting for 299, or just over 1.0% of all SWDs. White/Caucasian students were the largest group of USBE students accounting for 15,671 (70%) of all SWDs.

The proportion of students that had the highest educational attainment as enrolled, or were currently enrolled in a postsecondary institution, is similar in most cases between racial and ethnic categories. Asian students had the highest percentage of enrollees at 35.2%. Black/African Americans had 30.1%, while 28.2% of Hispanic/Latino students enrolled. Furthermore, individuals of American Indian/Alaskan Native descent and Multiple Races had enrollment rates that differed by 1.2% to 30.3% and 31.5%, respectively. Native Hawaiian/Pacific Islander students had the lowest enrollment rates at 25.1%—3.1%

less than Hispanic/Latino SWDs, the race or ethnic subgroup with the closest enrollment rate. White/Caucasian students had the second highest enrollment rate at 33.5%—1.7% less than Asian-identified SWDs (Table 7).

Lastly, the rate at which SWDs received postsecondary awards is very low. Certificate recipients that identify as Black/African American had 10 individuals (1.7%) receive postsecondary awards. Students of multiple races had the highest rate of individuals who received a postsecondary degree at 7.4%, 21 students (4.8%) earned certificates, and 11 students (2.5%) graduated with degrees. Finally, 823 White/Caucasian students (5.3%) received certificates, while 328 students of those students (2.1%) earned degrees, the second highest completion rate at 7.3% (Table 7).

Table 7: Disability distribution and postsecondary attainment counts and percentages by Race/Ethnicity for students with a disability who exited USBE from 2012-19				
<i>(*) indicates that sample size is too low to report</i>				
	USBE —Total Exiters	Enrolled/Currently Enrolled	Certificates	Degrees
Asian	210	90 (42.9%)	*	10 (4.8%)
Black/African American	605	199 (32.9%)	10 (1.7%)	*
Hispanic/Latino	4,521	1,441 (31.9%)	124 (2.7%)	43 (1.0%)
American Indian/Alaskan Native	462	160 (34.6%)	16 (3.5%)	*
Multiple Races	435	169 (38.9%)	21 (4.8%)	11 (2.5%)
Native Hawaiian/Pacific Islander	299	80 (26.8%)	*	*
White/Caucasian	15,671	6,408 (40.9%)	823 (5.3%)	328 (2.1%)

Time Spent in the Classroom

Individuals who participated at least 80% of the day in a regular K-12 classroom setting were the plurality of SWDs at USBE schools accounting for 10,342 students (46.6%) in Table 8.

Students who participated in a regular setting more often had higher enrollment and graduation rates. Students who participated at least 80% of the day had 39.0% enrollment, or were currently enrolled, and 8.2% received an award. Likewise, the students who were included in a regular classroom setting 40% to 79% of the day had 30% enrollment, or are currently enrolled, while 5.3% obtained higher education awards. Lastly, SWDs who participated less than 40% of the day in a regular classroom had the lowest number of students who enrolled, or were currently enrolled (Table 8).

Table 8: Time spent in a regular classroom setting while attending USBE schools for students with a disability from 2012-19				
	USBE – Total Exiters	Enrolled	Certificate	Degree
At least 80% of the day	10,342 (46.6%)	4,037 (39.0%)	495 (4.8%)	350 (3.4%)
40% to 79% of the day	8,127 (36.6%)	2,436 (30.0%)	295 (3.6%)	142 (1.7%)
Less than 40% of the day	3,734 (16.8%)	666 (17.8%)	92 (2.5%)	34 (0.9%)

The distribution of time spent in a regular classroom setting differs depending on the disability type. For each of the disability types, students who participated in a regular classroom setting at least 80% of the day had higher enrollment rates than their peers who participated less in a regular classroom for each disability type. The rate at which students graduate from postsecondary institutions differs dramatically for students whose highest educational attainment was enrolling or currently enrolled. Students who participated 80% or more in regular classroom settings occasionally had postsecondary completion rates lower than students who participated less in a regular classroom. Students with autism graduated at the highest rate when they participated less than 40% of the day in a regular classroom setting, with 23.0% of students receiving an award. Students with autism with 80% or more regular classroom participation had 21.8% of students receive an award. Likewise, individuals with emotional disturbance had 16.3% of students from the 40% or less regular classroom participation category earn awards, while 11.4% of students who participated 80% or more in a regular classroom earned awards. Students with other health

impairments are the only disability group where 40% to 79% of the day spent in a regular classroom setting had the highest completion rate compared to their peers (Table 9).

Students who participated in a regular classroom setting 80% of the time had the second-highest wage one year after high school and the highest wages by the end of the analysis. Individuals included in a regular classroom setting 40% to 79% of the day had wages that were not substantially different from their colleagues who participated more in a regular classroom setting. In the first year after high school, SWDs included 40% to 79% of the day in a regular classroom had the highest wages. By the fifth year, their wages had increased to \$19,690, the second highest wage. SWDs who were included the least, less than 40% of the day, had the lowest wages among subgroups: the first year after graduating, they earned \$8,165, and by the fifth year, their income increased to \$14,441 (Fig. 2).

Table 9: Time Spent in a regular classroom setting in USBE schools for students with a disability from 2012-19

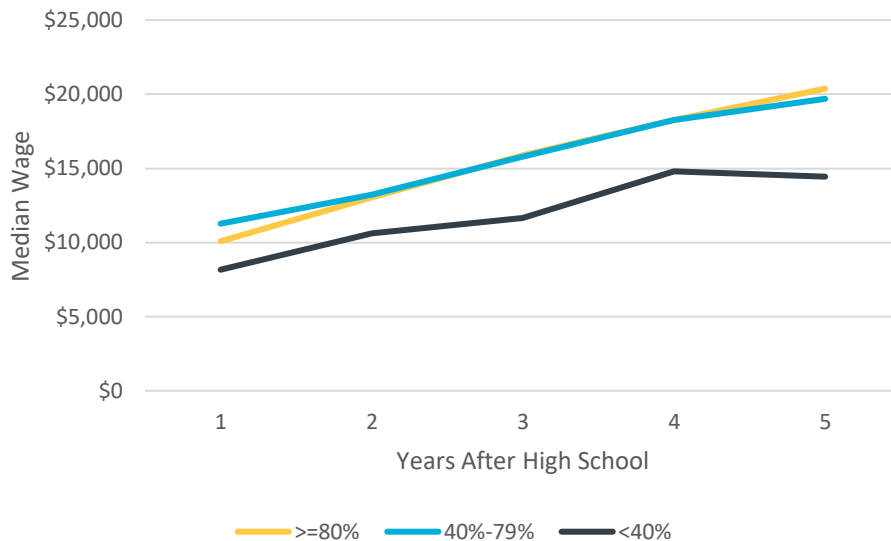
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	At Least 80% of the Day			40-79% of the Day			Less than 40% of the Day		
	USBE	Enrolled	Graduated	USBE	Enrolled	Graduated	USBE	Enrolled	Graduated
Autism	506	40.5%	21.8%	421	31.6%	18.4%	475	12.0%	23.0%
Emotional Disturbance	480	34.0%	11.4%	339	25.7%	11.2%	354	23.2%	16.3%
Other Health Impairments	1,522	34.2%	16.9%	1,567	27.7%	30.7%	1,690	11.4%	15.0%
Specific Learning Disabilities	6,775	38.4%	17.6%	5,485	30.6%	15.5%	1,038	26.8%	15.5%
Speech/Language Impairment	970	52.8%	14.7%	261	32.6%	11.5%	85	29.4%	*
Visual or Hearing Impairment	88	43.2%	33.3%	54	33.3%	*	92	34.8%	*

We employed the Wilcoxon rank sum test to test the statistical significance of the median wages among the SWDs and their participation in a regular classroom setting. The null hypothesis for this test is that the median wages were not significantly different. Students who participated in classes at least 80% of the day in a regular classroom did not have significantly different wages from those included 40% to 79% one and five years after high school. Conversely, students who participated at least 80% of the day had significantly higher wages than those who participated less than 40% of the day. Likewise, students in

regular classroom settings for 40% to 79% of the day had significantly higher wages than those who participated in less than 40% (Appendix Table 2).

Figure 2: Median wages by time in a regular classroom setting for students with disabilities from 2012-19



Wages by Disability Type

Students who enroll, or are currently enrolled, in higher education were the only group to meet the minimum requirement of 10 observations for each disability type throughout the analysis (Figure 3a). Students with a visual or hearing disability were among the lowest-paid groups in the first year but the highest-paid by the end of the analysis.

In almost every circumstance, when data were available, students who received postsecondary certificates had higher median incomes than their colleagues who only enrolled or were currently enrolled in a postsecondary institution (Figure 3b). Students with autism saw their wages increase from \$8,392 to \$26,597 between the first and fifth year after graduating. By the fifth year, certificate recipients with autism earned approximately \$9,600 more than their colleagues who were only enrolled or were currently enrolled. Unfortunately, graduates with a visual or hearing disability did not meet the minimum requirement of 10 observations for certificate recipients.

Contrary to certificate recipients, graduates who earned degrees, in most circumstances, had wages that were lower than those earned by students who only enrolled, or were currently enrolled in higher education (Figure 3c). Students with an emotional disturbance were one of the only groups to have degree recipients earn more than their counterparts who were only enrolled or were currently enrolled.

Individuals who earned degrees with a speech or language disability saw their wages decrease substantially over the five years since leaving high school.

We used the Wilcoxon rank sum test to compare the statistical significance of wages between disability types and students who received the same educational attainment. The null hypothesis for this test is that the median wages are statistically insignificant from one another. To see the results of the tests, see Tables 3a-c in the Appendix.

Figure 3a: Annual wages up to five years after high school by disability type for students with disabilities from 2012-19, whose highest educational attainment was enrollment into a postsecondary program

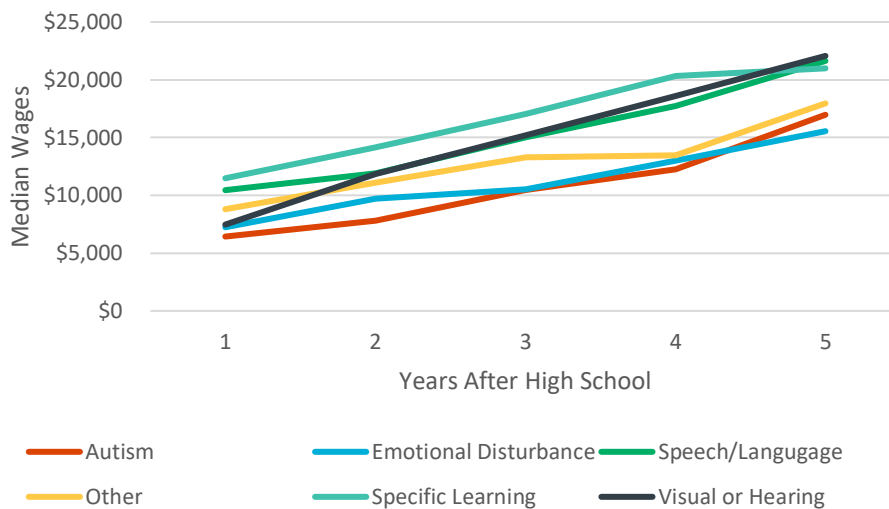


Figure 3b: Annual wages up to five years after high school by disability type for students with disabilities from 2012-19, whose highest educational attainment was receiving a certificate from a postsecondary institution

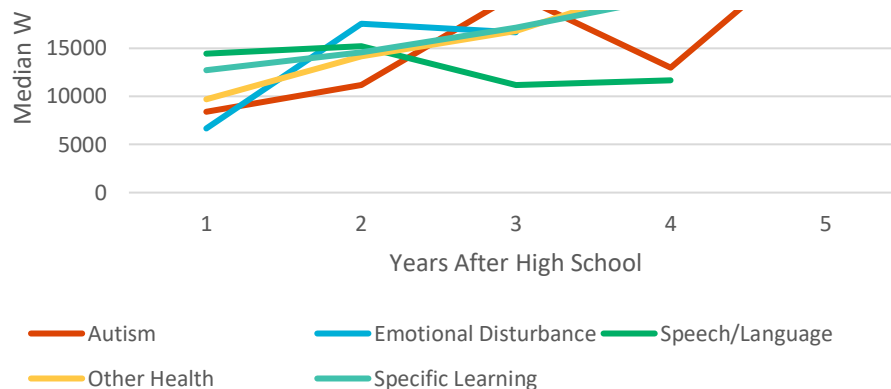
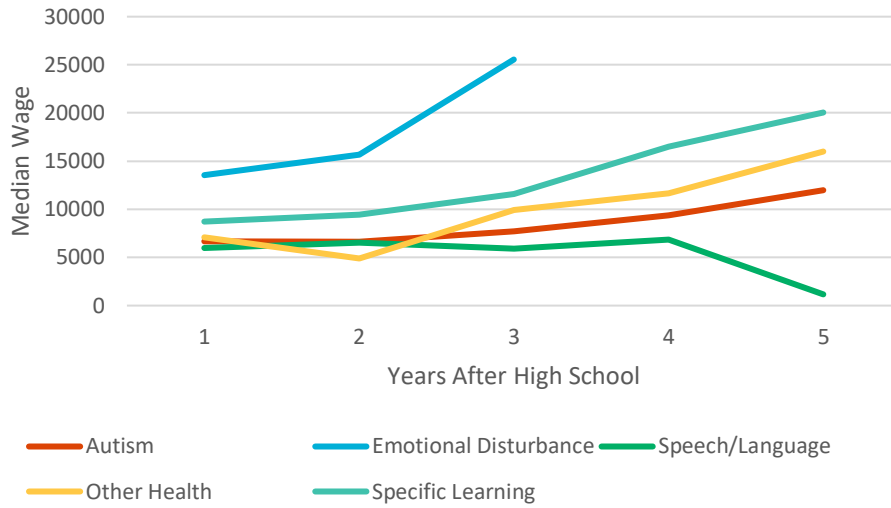


Figure 3c: Annual wages up to five years after high school by disability type for students with disabilities from 2012-19, whose highest educational attainment was receiving a degree from a postsecondary institution



CTE Analysis

Over 91.0% of all students with disabilities at USBE schools participated in a CTE course by earning at least one CTE credit. This finding is not surprising given that USBE has a CTE requirement to graduate high school (Utah Office of Administrative Rules R277-700-5). 7,492 students participated in CTE, individuals who completed no less than one approved CTE course, or 33.74% of all students, were with disabilities at USBE schools. Students who were CTE concentrators, individuals who completed at least two courses in a single CTE pathway, were the plurality of USBE students, accounting for 8,606 individuals, or 38.76%. 4,187 individuals, or 18.86% of students, were CTE completers, who completed a CTE pathway. 1,918, or 8.6% of students, made up the smallest subgroup, did not enroll in a CTE course (Table 10).

2,452 or 32.7% of students who participated in CTE courses had the highest educational attainment in enrollment or were currently enrolled, compared to the 3,746 or 43.5% of students who were CTE concentrators that enrolled. The largest group proportionally were CTE completers: 2,133 or 50.9% of students. Lastly, CTE non-participants had 189 or 9.9% of students enroll.

Enrollment in CTE had a positive influence on postsecondary graduation. More students who enrolled in CTE courses graduated from postsecondary institutions (Table 10). With 10.3% of students graduating, CTE completers had the highest proportion of CTE students who completed a postsecondary program followed by CTE concentrators. CTE non-participants had the lowest percentage of students receive awards.

The CTE distribution changes when analyzing students who graduated from postsecondary institutions. Similar to the USBE and enrolled students, CTE concentrators were the largest subgroup accounting for just under 46% of all award recipients. The second largest subgroup were CTE completers, with under 31% of all graduates, a 7% increase from students who were enrolled or only enrolled in higher education. CTE participants experienced the largest difference between students who enrolled and individuals who received an award. About 21% of higher education graduates only participated in CTE courses, 9% lower than CTE participants who enrolled. Non-participants had the lowest proportion of students graduate, accounting for 2% of students (Table 10).

Table 10: CTE Enrollment Distribution for Students with a Disability from 2012-19			
	USBE	Enrolled	Graduated
Participant	7,492	2,452 (32.7%)	301 (4.0%)
Concentrator	8,606	3,746 (43.5%)	647 (7.5%)
Completer	4,187	2,133 (50.9%)	433 (10.3%)
Non-Participants	1,918	216 (11.3%)	27 (1.4%)

Wages varied by CTE participation type. CTE completers had the highest wages for enrolled students earning \$11,622 one year after high school; by the fifth year, wages rose by \$9,375, for a median income of \$20,998. CTE non-participants were the second highest paid, earning \$10,990 and \$19,740, one and five years after graduating high school.

Figure 4b, which separated individuals who received certificates, largely follows the same pattern of students whose highest educational attainment was enrolled or were currently enrolled in higher education. CTE completers were the highest-paid group, with CTE participants and concentrators earning approximately the same wage.

Degree recipients were the only CTE-higher education subgroup to differ regarding median income sequence (Figure 4c). CTE participants that received degrees had the highest median income out of all CTE subgroups earning just under \$30,000 by their fifth year after high school. CTE completers had the second highest median income five years after high school at \$18,724, while in the first year after high school their median salary was \$9,321.

Figure 4a: Annual wages up to five years after high school by CTE enrollment for students with disabilities whose highest educational attainment was enrolled in a postsecondary program from 2012-19

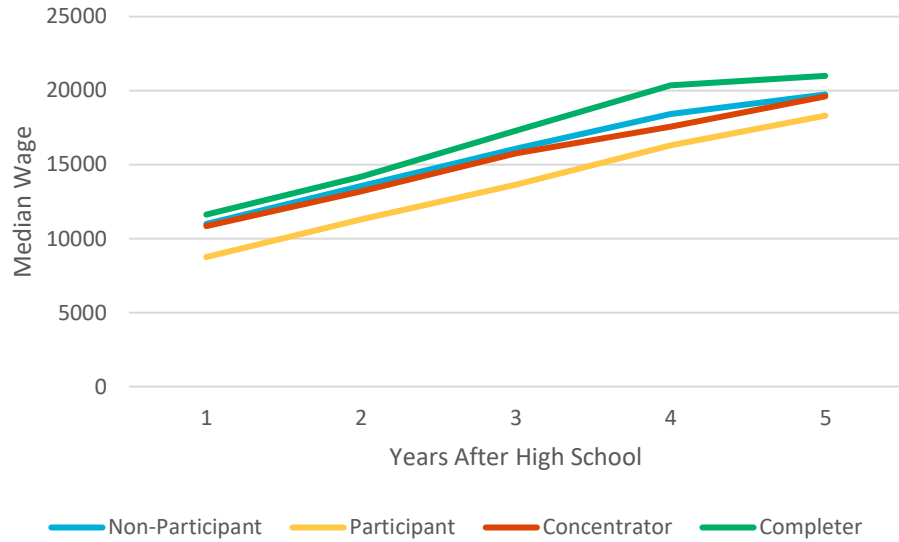


Figure 4b: Annual wages up to five years after high school by CTE enrollment for students with disabilities who received certificates from a postsecondary institution

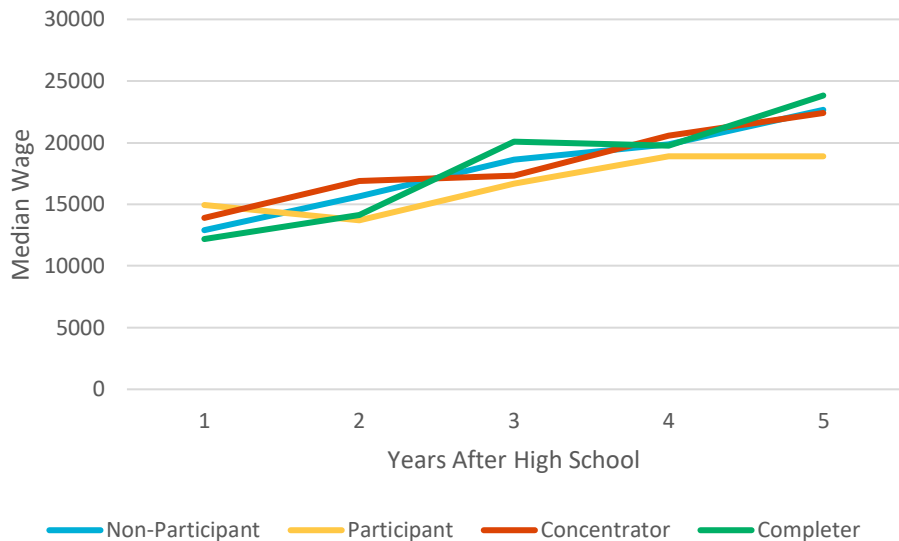
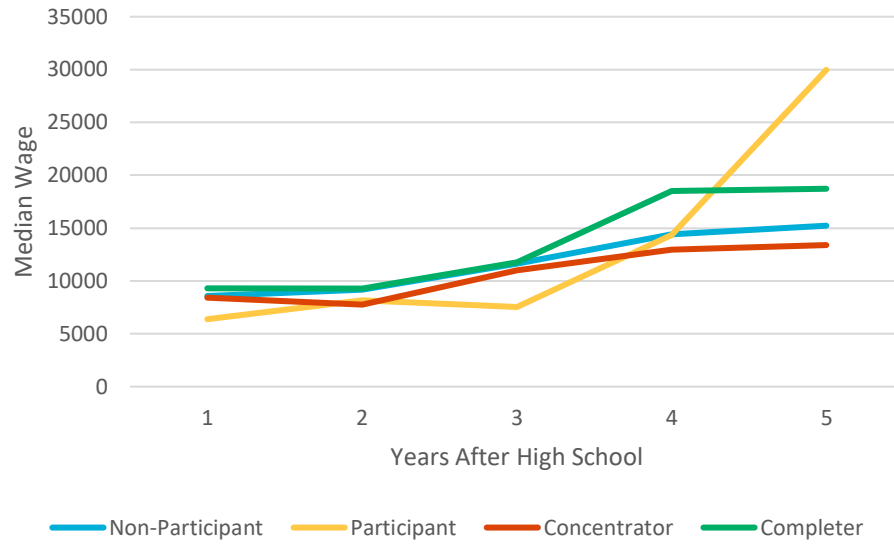


Figure 4c: Annual wages up to five years after high school by CTE enrollment for students with disabilities who received degrees from a postsecondary institution



Discussion

The enrollment and graduation rates for SWDs from USBE schools fall behind studies that analyze SWDs nationally. The highest enrollment rates that USBE SWDs had were 43.8% and 43.0% for the cohort years 2014 and 2012, respectively (Table 1). In comparison, Newman et al. (2011) found that 60.1% of SWDs enrolled within eight years, Horn et al. (1999) found that 62.8% enrolled within six years, and Illinois saw 66.0% enroll within six years (Lichtenberger, 2010). Similarly, SWDs from USBE schools had lower rates of higher education award attainment, defined as the number of individuals who left high school and the number of individuals who completed a postsecondary program, though rates differed depending on disability types (Table 9). SWDs who exited secondary school in 2012 had the highest rate of attaining postsecondary awards, 18.4% of all SWDs who participated in higher education received a degree, perhaps because they have been out of high school the longest, allowing the students more time to obtain their awards (Table 1). In comparison, Horn et al. (1999) reported 41.0% earned an award within five years, and Newman et al. (2011) reported 38.0% of SWDs received their awards within six years after high school.

SWDs differed in the rates they enrolled and graduated from their programs by disability type. The three USBE SWD groups with the largest enrollment rates were speech/language impairments with 54.9%, visual or hearing impairments had 46.4%, and 43.4% were students with specific learning disabilities (Table 2). The NLTS2 also had these three disability types with the highest enrollment rates, though they are substantially larger. The NLTS2 enrollment rates were 67.0% with speech/language impairment, 71.0% with visual impairment, 56.8% with deaf/blindness, 74.7% with hearing impairment, and 66.8% with a learning disability. Comparatively, Horn et al. (1999) found that the enrollment rate for an orthopedic impairment was 73.9%, 70.4% with a visual impairment, and 65.9% with other disability or impairment, the highest enrollment rates in their study. Regardless of the disability types, these analyses show that SWDs from USBE schools have lower enrollment rates than national analyses.

Of the students who received postsecondary awards, most enrolled and graduated from two-year institutions. 834 students (3.8%) graduated from two-year institutions while 574 students (2.6%) graduated from four-year schools. Likewise, SWDs had a higher rate of students receive certificates, 1,004 students, compared to degree recipients accounting for 404 students (Table 2). Similar to SWDs in Utah, national analyses have shown that SWDs are more likely to enroll and graduate from two-year institutions compared to four-year schools (Wagner (1991), Harvey (2002), Newman et al., 2011).

Regarding educational outcomes for SWDs, the literature does not report on the awards received as much as enrollment into postsecondary institutions. The literature that does explore higher education outcomes finds that SWDs have low rates of higher education award attainment. Horn et al. (1999) report that

19.0% of SWDs received a certificate within five years after high school, while Associate and Bachelor's degree attainment rates fell to 6.0% and 16.0%, respectively; in total, 41.0% of SWDs had received a postsecondary award five years after high school. Cornell University reports on the working-age population with disabilities (ages 21-64) and their educational attainment. In 2008, 29.7% of individuals with disabilities had some college/Associate degree; by 2018, the proportion had increased to 32.0%. Similarly, Bachelor's degree recipients increased from 12.3% to 15.2% over the same period (Cornell 2008 & 2018).

Comparing demographic data revealed that men, not only in this analysis but across the literature for SWDs have higher participation rates in special education classes than women (Table 4). Men with disabilities in USBE schools accounted for 63.4% of all SWDs, approximately a 2:1 ratio; the proportion of men to women in USBE schools is consistent across the literature (Wagner, 1991; Lichtenberger, 2010; Schaeffer, 2020). When separating men and women by their enrollment rates, we see that men and women are about equal with 37.4% of men enrolled in a postsecondary institution, while 39.7% of women enrolled. Similarly, this trend is consistent with other analyses which have found that men and women with disabilities enrolled in higher education at a similar rate, with women having a slightly higher edge (Horn et al., 1999 & Newman et al., 2011).

The demographic data also reveals that, in most cases, people of color with disabilities enrolled and graduated from higher education institutions at lower proportions than their USBE enrollment ratios (Table 6). 41.0% of Asian students enrolled in higher education, the highest enrollment rate among all races, and 5.7% received an award. Black students had 32.9% enroll, and 2.8% graduated from a postsecondary school. With 1.0% less, Hispanic/Latino students had 31.9% of SWDs enroll and 3.7% graduate, the second lowest among races included in the analysis. American Indian/Alaskan Native had similar enrollment rates at 33.8% but the lowest completion rate at 3.5%. Students of multiple races had the highest enrollment and graduation rates at 38.9% and 7.4%, respectively. Native Hawaiian/Pacific Islanders had the lowest enrollment rate among all races at 25.1% and did not meet the minimum requirement of 10 observations for students who received awards. Lastly, White/Caucasian students had the highest enrollment rate at 40.9% and the second highest graduation rate at 7.3%, 0.1% less than students of multiple races.

The enrollment and graduation data for race/ethnicity in other analyses are relatively scarce. Newman et al. (2011) report that 60.6% of white students, 59.6% of black students, and 61.7% of Hispanic enrolled in a postsecondary institution. Newman et al. (2010) reported on the enrollment rate of two cohorts, 1990 and 2005, up to four years after high school; for the 1990 cohort, 27.2% of white students, 26.8% of black students, and 33.6% of Hispanic students enrolled in higher education. For the 2005 cohort, all the enrollment rates increased substantially. White individuals increased their enrollment rate to 46.8%,

black students increased by a similar margin to 45.4%, and Hispanic students increased the least to 40.3%.

Students who participated more in a regular classroom setting had higher enrollment and completion rates from postsecondary institutions (Table 7). SWDs included in a regular classroom setting more than 80% of the day were the largest subgroup of students at USBE schools, accounting for 46.6% of students. This subgroup had the highest enrollment rate of 47.2% and graduation rate from higher education of 8.2%. 36.6% of SWDs at USBE schools who participated 40% to 79% of the day in a regular classroom setting had 35.4% of students enroll in a postsecondary institution, with 5.3% of the subgroup graduating. Students who participated less than 40% of the day in a regular classroom were the smallest USBE group, 16.8% of students, with the least number of students enroll in higher education, 21.2%. The literature regarding SWDs participating in a regular classroom setting has shown there is a positive impact on enrolling in higher education and there's a positive relationship between participation in a regular classroom setting and workforce outcomes (Test et al. 2009, Mazzotti et al. 2016, Theobald et al. 2017). The workforce outcomes, measured by wages that SWDs received, vary depending on the disability type (Figure 1). By the end of the analysis, students with a visual or hearing disability had the highest annual income, over \$22,000. Individuals with a specific learning disability were not far behind, earning approximately \$20,450, about \$1,500 less. The third highest wage were students with other health impairments, receiving just below \$18,200, followed by students with a speech/language impairment earning just above \$16,900, and finally, students with autism or emotional disturbance had similar wages of \$15,564 and \$15,170, respectively.

Compared to national wages, SWDs in Utah fell far behind. When adjusted to 2020 salaries, Cornell University reported the median wage for individuals working full-time to be \$42,559 for those with a visual impairment, students with a hearing impairment had a median salary of \$51,071. Employees with a cognitive disability had wages equal to \$37,305, while individuals with an ambulatory disability earned approximately \$4,100 more with a median income of \$41,430 (Cornell, 2008). Likewise, in 2018 Cornell University released an updated analysis reporting on full-time workers, the same disability types, and their median wages for 2018. Most disability types had median wages decrease between 2008 and 2018 when adjusted to 2020 salaries. For students with a visual disability, wages dropped by approximately \$400 to \$42,150; individuals with hearing impairment had their income fall by \$9,000 to \$42,359; employees with a cognitive disability decreased to \$31,847, approximately by \$5,500. Individuals with an ambulatory impairment were the only subgroup to have their wages increase: their salary increased by about \$700 to \$42,150.

Individuals who enrolled in CTE classes accounted for over 91.0% of all students who exited USBE schools between 2012 and 2019. A higher enrollment rate is expected, given that at least one CTE credit is required to graduate from secondary school (Utah Office of Administrative Rules R277-700-5). The

smallest CTE subgroup was non-participants, with 1,918 individuals, 8.6% (Table 5). Students that were CTE participants were the second largest group, accounting for just over a third of all students at USBE schools. CTE concentrators were the largest, with 38.8% of students, while CTE completers accounted for 4,187 students, 18.9%.

The relationship between students having CTE credit and students enroll, or currently enrolled, in a postsecondary institution shows that students who take part in CTE classes more frequently had higher enrollment rates into higher education (Table 5). CTE non-participants had below 10.0% of students enroll, or are currently enrolled, in higher education, while CTE participants had about 29.0%. Comparatively, CTE concentrators had 36.0%, and CTE completers enroll, or are currently enrolled, at a 40.6% rate. A similar relationship exists between CTE and postsecondary graduates. CTE non-participants had the lowest graduation rate at approximately 1.5%. CTE participants had the second lowest graduation rate at 4.0%, 7.5% of CTE concentrators graduated, and the largest graduation CTE subgroup were completers, over 10.0% of students received an award.

While Table 5 appears to report that CTE enrollment has a positive impact on enrolling and completing postsecondary education, we cannot make that assertion with the analyses used in this report due to this being a strictly descriptive analyses. The literature surrounding CTE participation and higher education enrollment and graduation indicates that a positive relationship exists (Test, et al., 2009 & Haber, et al., 2016).

The wages for SWDs regarding their CTE enrollment do not appear to show any relationship. CTE non-participants had the second highest wage among SWDs throughout the analysis; by the fifth year out of high school, they earned \$20,103. CTE participants were the lowest paid subgroup throughout the analysis, though, by the fifth year after high school their wages were comparable to all other SWDs. By the end of the analysis, CTE participants earned \$18,792. CTE concentrators had similar wages to CTE non-participants through the analysis: by the end, CTE concentrators received \$19,380 in wages. The highest-paid CTE group were completers earning \$21,411 by the fifth year after high school.

The statistical tests conducted in this paper cannot predict or are not corollary due to the analyses being descriptive. However, the literature indicates a relationship between SWDs participating in CTE courses and their post-school employment and educational outcomes. Harvey (2002) found that 55.0% of SWDs who participated in CTE courses were employed while 40.0% of SWDs who did not participate were employed. Test (2009) found that CTE education was a predictor of “post-school education” as well as employment. Shandra and Hogan (2008) argue that work-based programs have an impact on post-high school employment.

The literature regarding CTE participation and postsecondary school outcomes is mixed. Harvey (2002) found that students who participated in CTE courses had lower rates of enrollment in higher education. Similarly, Theobald et al. (2017) and Wagner et al. (2016) found a relationship with CTE enrollment that is positively predictive only when the student is considered a concentrator, defined as having four or more CTE credits. In comparison, Test et al. (2009) and Mazzotti et al. (2016) found “moderate” evidence between CTE education and employment.

Conclusion

Using administrative data from USBE, USHE, and the DWS UI Wage Data 2012-19, we analyzed SWDs in Utah up to five years after high school completion and found these students do not perform as well as their peers with disabilities nationally. Enrollment rates can be up to 20.0% less than national studies, completion rates for postsecondary education falls behind national analyses, and wages are below the national average for individuals with disabilities.

The disability type to have the best outcomes across the three metrics used in this analysis depends on the metric in question. Students with the highest postsecondary enrollment rate, including students who received a postsecondary award, were students with a speech or language impairment (54.9% enrollment). The highest proportion of students to receive a certificate or degree were students with a visual or hearing disability, 12.8% received an award. Lastly, individuals with a visual or hearing disability also had the highest median wage by the end of the analysis, and students with a specific learning disability were close behind.

While this study has illustrated that USBE SWDs fall behind their national colleagues, more research is needed to determine the predictive outcomes. For instance, further research could report the classes SWDs enroll in during their postsecondary education and examine the North American Industry Classification System (NAICS) codes for these individuals to determine their workforce outcomes. Such analyses would provide USBE with valuable information regarding how to help SWDs plan for postsecondary education and allow SWDs to plan their education to receive the best outcomes.

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References

- Blackorby, Jose, & Wagner, Mary (1996). *Longitudinal postschool outcomes of youth with disabilities: findings from the National Longitudinal Transition Study*. Education Resources Information Center.
<https://go.gale.com/ps/i.do?p=ITOF&u=marriottlibrary&id=GALE%7CA18139390&v=2.1&it=r>
- Cornell University (2008). *2008 Disability Status Report: United States*. Cornell University.
https://ecommons.cornell.edu/bitstream/handle/1813/90055/DE133_PDF.pdf?sequence=1&isAllowed=y
- Cornell University (2018). *2018 Disability Status Report: United States*. Cornell University.
https://www.disabilitystatistics.org/StatusReports/2018-PDF/2018-StatusReport_US.pdf
- Haber, G. Mason; Mazzotti, L. Valerie; Mustian, L. April; Rowe, A. Dawn; Bartholomew L. Audrey; Test, W. David; and Fowler, H. Catherine (2016). *What Works, When, for Whom, and With Whom: A Meta-Analytic Review of Predictors of Postsecondary Success for Students With Disabilities*. *Review of Educational Research*, 86(1) 123-162. https://www-jstor-org.ezproxy.lib.utah.edu/stable/pdf/24752871.pdf?refreqid=excelsior%3Adf45a3edeb2fb83be21ec7b8b1bf2a12&ab_segments=&origin=&acceptTC=1
- Harvey, W. Michael (2002). *Comparison of Postsecondary Transitional Outcomes Between Students With and Without Disabilities by Secondary Vocational Education Participation: Findings from the National Education Longitudinal Study*. *Career Development for Exceptional Individuals*, 25(2), 99-122. <https://journals.sagepub.com/doi/10.1177/088572880202500202>
- Hippolitus, Paul (1987). *College freshmen with disabilities preparing for employment*. President's Committee on Employment of the Handicapped.
https://books.google.com/books/about/College_freshmen_with_disabilities_prepa.html?id=uTFDjwEACAAJ
- Horn, Laura; Berktold, Jennifer; and Bobbitt, Larry (1999). *Students With Disabilities in Postsecondary Education: A Profile of Preparation, Participation, and Outcomes*. US Department of Education Office of Educational Research and Improvement.
<https://www.webharvest.gov/peth04/20041030145001/http://nces.ed.gov/pubs99/1999187.pdf>
- Lichtenberger, J. Eric (2010). *A Longitudinal Study of Illinois High School Graduates with Disabilities: A Six-Year Analysis of Postsecondary Enrollment and Completion*. Illinois Education Research Council. <https://eric.ed.gov/?id=ED513818>
- Lombardi, R. Allison; Dougherty, M. Shaun; Monahan, Jessica MA (2018). *Students With Intellectual Disabilities and Career and Technical Education Opportunities: A Systematic Literature Review*. *Journal of Disability Policy Studies*, 29(2) 82-96.
<https://journals.sagepub.com/doi/pdf/10.1177/1044207318764863>
- Mamiseishvilim, Ketevan, & Koch, C. Lynn (2011). *Students With Disabilities at 2-Year Institutions in the United States: Factors Related to Success*. *Community College Review* 40(4) 320-339. <https://journals.sagepub.com/doi/10.1177/0034355210382580>

- Mazzottie, L. Valerie; Rowe, A. Dawn; Sinclair, James MA; Poppen, Marcus, MA; Woods, E. William MA; Shearer, L. Mackenzie (2016). Predictors of Post-School Success: A Systematic Review of NLTS2 Secondary Analyses. *Career Development and Transition for Exceptional Individuals* 39(4) 196-215. <https://journals-sagepub-com.ezproxy.lib.utah.edu/doi/10.1177/2165143415588047>
- National Center for Education Statistics (NCES) (2022). *Fast Facts: Students with Disabilities*. Institute of Education Services. <https://nces.ed.gov/fastfacts/display.asp?id=60#:~:text=Response%3A,20%20percent%20for%20female%20students>
- Newman, Lynn; Wagner, Mary; Cameto, Renée; Knokey, Anne-Marie; Shaver, Debra (2010). *Comparisons Across time of the Outcomes of Youth With Disabilities up to 4 Years After High School: A Report of Findings From the National Longitudinal Transition Study (NLTS) and the National Longitudinal Transition Study-2 (NLTS2)*.
- Newman, Lynn; Wagner, Mary; Knokey, Anne-Marie; Marder, Camille; Nagle, Katherine; Shaver, Debra; Wei, Xin; Cameto, Renée; Contreras, Elidia; Ferguson, Kate; Greene, Sarah; Schwarting, Meredith; SRI International (2011). *The Post-High School Outcomes of Young Adults With Disabilities up to 8 Years After High School: A Report From the National Longitudinal Transition Study-2 (NLTS2)*. National Center for Special Education Research. <https://ies.ed.gov/ncser/pubs/20113005/pdf/20113005.pdf>
- Pebesma, E. (2018). *Simple Features for R: Standardized Support for Spatial Vector Data*. *The R Journal* 10(1), 439-446, <https://doi.org/10.32614/RJ-2018-009>.
- Sanford, Christopher; Newman, Lynn; Wagner, Mary; Cameto, Renée; Knokey, Anne-Marie, Shave, Debra; SRI International (2011). *The Post-High School Outcomes of Young Adults With Disabilities up to 6 Years After High School: Key Findings From the National Longitudinal Transition Study-2 (NLTS2)*. National Center for Special Education Research. <https://ies.ed.gov/ncser/pubs/20113004/pdf/20113004.pdf>
- Schaeffer, Katherine (2020). *As schools shift to online learning amid pandemic, here's what we know about disabled students in the U.S.* Pew Research Center. <https://www.pewresearch.org/fact-tank/2020/04/23/as-schools-shift-to-online-learning-amid-pandemic-heres-what-we-know-about-disabled-students-in-the-u-s/#:~:text=6The%20racial%20and%20ethnic,the%202017%2D18%20school%20year>.
- Shandra, L. Carrie, & Hogan, P. Dennis (2008). *School-to work program participation and the post-high school employment of young adults with disabilities*. *Journal of Vocational Rehabilitation* 29 117-130. <https://web.s.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=29cbaf8f-ab13-412c-be31-5df59b9cofco%40redis>
- Test, W. David; Mazzotti, L. Valerie; Mustian L. April; Fowler, H. Catherine; Kortering, Larry; and Kohler, Paula (2009). *Evidence-Based Secondary Transition Predictors for Improving Postschool Outcomes for Students With Disabilities*. *Career Development for Exceptional Individuals*, 32(3) 160-181. <https://journals.sagepub.com/doi/10.1177/0885728809346960>

- Theobald, Roddy; Goldhaber, Dan; Gratz, Trevor; and Holden, L. Kristian (2017). *Career and Technical Education, Inclusion, and Postsecondary Outcomes for Students with Disabilities*. National Center for Analysis of Longitudinal Data in Education Research. <https://caldercenter.org/sites/default/files/WP%20177.pdf>
- Torpey, Elka (2021). *Data on display: Education Pays, 2020*. US Bureau of Labor Statistics. <https://www.bls.gov/careeroutlook/2021/data-on-display/education-pays.htm#:~:text=Even%20in%20the%20best%20of,workers%20who%20have%20less%20education.>
- US Bureau of Labor Statistics (2018). *CPI-All Urban Consumers (Current Series)*. https://www.bls.gov/help/one_screen/cu.htm
- US General Accounting Office (2001). *Special Minimum Wage Program: Centers Offer Employment and Support Services to Workers With Disabilities, But Labor Should Improve Oversight*. <https://perma.cc/NCE4-MJFL>
- Utah Office of Administrative Rules. *The Elementary and Secondary School General Core (700)*. <https://www.schools.utah.gov/file/62737foa-dbfd-494a-88e0-eed7a0b337f6>
- Wagner, Mary; Newman, Lynn; D'Amico, Ronald; Jay, E., Deborah; Butler-Nalin, Paul; Marder Camille; and Cox, Robert (1991). *Youth with Disabilities: How are They Doing? The First Comprehensive Report from the National Longitudinal Transition Study of Special Education Youth*. *Exceptional Children*, 63(5). <https://eric.ed.gov/?id=ED341228>
- Wagner, M. Mary; Newman, A. Lynn, EdD; and Javitz, S. Harold (2016). *The Benefits of High School Career and Technical Education (CTE) for Youth With Learning Disabilities*. *Journal of Learning Disabilities*, 49(6) 658-670. <https://journals-sagepub-com.ezproxy.lib.utah.edu/doi/10.1177/0022219415574774>
- Wagner, Mary; Newman, Lynn; Cameto, Renée; Garza, Nicolle; and Levine, Phyllis (2005). *After High School: A First Look At the Postschool Experiences of Youth With Disabilities*. Office of Special Education Programs, US Department of Education. <https://files.eric.ed.gov/fulltext/ED494935.pdf>
- Wickham et al., (2019). *Welcome to the tidyverse*. *Journal of Open Source Software*, 4(43), 1686, <https://doi.org/10.21105/joss.01686>

Appendix

Appendix Table 1: Disability Type Definitions	
Disability Type	Definition
Autism	A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a student’s educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.
Deaf/Blindness	Concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that they cannot be accommodated in special education programs solely for students with deafness or students with blindness
Developmental Delay	In a student, ages three through seven, developmental delay means a significant delay in one or more of the following areas: physical/motor development, cognitive development, communication development, social/ emotional development, or adaptive development. The delay must adversely affect a student’s educational performance. LEAs that choose to use the classification of developmental delay must conform to the State’s definition of developmental delay, including the age range adopted by the State, and the requirement that the LEA conduct a full and individual initial evaluation.
Emotional Disturbance	A condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a student’s educational performance: <ol style="list-style-type: none"> (1) An inability to learn that cannot be explained by intellectual, sensory, or health factors. (2) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers. (3) Inappropriate types of behavior or feelings under normal circumstances. (4) A general pervasive mood of unhappiness or depression. (5) A tendency to develop physical symptoms or fears associated with personal or school problems.

	<p>Emotional disturbance includes schizophrenia. The term does not apply to students who are socially maladjusted, unless it is determined that they have an emotional disturbance.</p> <p>Emotional disturbance is a term that covers the following two types of behavioral difficulties, which are not mutually exclusive, and which may adversely affect a student’s educational performance.</p> <p>(a) Externalizing refers to behavior problems that are directed outwardly by the student toward the social environment, and usually involve behavioral excesses.</p> <p>(b) Internalizing refers to a class of behavior problems that are directed inwardly, and often involve behavioral deficits.</p>
Hearing Impairment/Deafness	<p>(1) Hearing loss is an impairment in hearing, whether permanent or fluctuating, that adversely affects a student’s educational performance but that is not included under the definition of deafness.</p> <p>(2) Deafness is a hearing loss that is so severe that the student is impaired in processing linguistic information through hearing, with or without amplification, and that adversely affects a student’s educational performance.</p>
Intellectual Disability	Significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a student’s educational performance.
Multiple Disabilities	Concomitant impairments (such as intellectual disability/blindness or intellectual disability/orthopedic impairment) that affect a student’s educational performance. The combination of disabilities must cause such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. The multiple disabilities category does not include deaf/blindness.
Orthopedic Impairment	A severe orthopedic impairment that adversely affects a student’s educational performance. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).
Other Health Impairment	Having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead

	poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, Tourette syndrome, and HIV/AIDS, or an acquired brain injury which may result from health problems such as an hypoxic event, encephalitis, meningitis, brain tumor, or stroke, and that adversely affects a student’s educational performance.
Specific Learning Disability	<p>A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia, that affects a student’s educational performance.</p> <p>Specific learning disabilities does not include learning problems that are primarily the result of visual, hearing, or motor disabilities; of intellectual disability; of emotional disturbance; or of environmental, cultural, or economic disadvantage.</p>
Speech/Language Impairment	A communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a student’s educational performance.
Traumatic Brain Injury	<p>An acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a student’s educational performance. Traumatic brain injury applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech, that affects a student’s educational performance.</p> <p>Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma.</p>
Visual Impairment (including Blindness)	An impairment in vision that, even with correction, adversely affects a student’s educational performance. The term includes both partial sight and blindness that adversely affects a student’s educational performance.

Table 2: Results of the Wilcoxon Rank Sum Test Comparing Wages for Time Spent in a Regular Classroom Setting

Statistical significance: ***p<0.001; **p<0.05; *p<0.1

	At Least 80% of the Day	40-79% of the Day	Less than 40% of the Day
At Least 80% of the Day	NA	One-Year After Five-Years After	One-Year After*** Five-Years After***
40-79% of the Day	One-Year After Five-Years After	NA	One-Year After*** Five-Years After***
Less than 40% of the Day	One-Year After*** Five-Years After***	One-Year After*** Five-Years After***	NA

Table 3a: Results of Wilcoxon Rank Sum Test for Students Whose Highest Educational Attainment was Enrolling, or Students Currently Enrolled, in a Postsecondary Institution

Statistical significance: ***p<0.001; **p<0.05; *p<0.1

	Autism	Emotional Disturbance	Speech/ Language Impairment	Other Health Impairment	Specific Learning Disability	Visual or Hearing Disability
Autism	NA	1-year wage 5-year wage	1-year wage*** 5-year wage*	1-year wage** 5-year wage	1-year wage*** 5-year wage**	1-year wage 5-year wage*
Emotional Disturbance	1-year wage 5-year wage	NA	1-year wage*** 5-year wage*	1-year wage 5-year wage	1-year wage*** 5-year wage**	1-year wage 5-year wage*
Speech/ Language Impairment	1-year wage*** 5-year wage*	1-year wage*** 5-year wage*	NA	1-year wage*** 5-year wage	1-year wage 5-year wage	1-year wage* 5-year wage
Other Health Impairment	1-year wage** 5-year wage	1-year wage 5-year wage	1-year wage*** 5-year wage	NA	1-year wage*** 5-year wage*	1-year wage 5-year wage
Specific Learning Disability	1-year wage*** 5-year wage**	1-year wage*** 5-year wage**	1-year wage 5-year wage	1-year wage*** 5-year wage*	NA	1-year wage* 5-year wage
Visual or Hearing Disability	1-year wage 5-year wage*	1-year wage 5-year wage*	1-year wage* 5-year wage	1-year wage 5-year wage	1-year wage* 5-year wage	NA

Table 3b: Results of Wilcoxon Rank Sum Test for Students Whose Highest Educational Attainment was Earning a Postsecondary Certificate

Statistical significance: ***p<0.001; **p<0.05; *p<0.1

	Autism	Emotional Disturbance	Speech/ Language Impairment	Other Health Impairment	Specific Learning Disability
Autism	NA	1-year wage* 5-year wage	1-year wage	1-year wage 5-year wage	1-year wage 5-year wage
Emotional Disturbance	1-year wage* 5-year wage	NA	1-year wage**	1-year wage** 5-year wage	1-year wage** 5-year wage
Speech/ Language Impairment	1-year wage	1-year wage**	NA	1-year wage	1-year wage
Other Health Impairment	1-year wage 5-year wage	1-year wage** 5-year wage	1-year wage	NA	1-year wage 5-year wage
Specific Learning Disability	1-year wage 5-year wage	1-year wage** 5-year wage	1-year wage	1-year wage 5-year wage	NA

Table 3c: Results of Wilcoxon Rank Sum Test for Students Whose Highest Educational Attainment was Earning a Postsecondary Degree

Statistical significance: ***p<0.001; **p<0.05; *p<0.1

	Autism	Emotional Disturbance	Speech/ Language Impairment	Other Health Impairment	Specific Learning Disability
Autism	NA	1-year wage	1-year wage 5-year wage	1-year wage 5-year wage	1-year wage 5-year wage
Emotional Disturbance	1-year wage	NA	1-year wage	1-year wage	1-year wage
Speech/ Language Impairment	1-year wage 5-year wage	1-year wage	NA	1-year wage* 5-year wage	1-year wage 5-year wage
Other Health Impairment	1-year wage 5-year wage	1-year wage	1-year wage* 5-year wage	NA	1-year wage 5-year wage
Specific Learning Disability	1-year wage 5-year wage	1-year wage	1-year wage 5-year wage	1-year wage 5-year wage	NA