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RESEARCH BRIEF:

An Examination of the Relationship Between Adult Education Engagement with Student Knowledge Gains and Future Educational Attainment

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**Research and
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Abstract

To help Commonwealth residents meet the needs of a changing economic landscape, Pennsylvania adult education programs provide students with a range of services to support the acquisition of skills necessary to obtain and sustain employment (Pennsylvania Department of Education, 2020). To provide evidence-based program and policy support, data from four cohorts of Pennsylvania adult education students enrolled in adult basic education (ABE), adult secondary education (ASE) and English as a Second Language (ESL) courses were analyzed to assess demographic characteristics, as well as the relationship between demographic characteristics with course completion, educational functioning level gains (EFL gains), high school equivalency attainment and postsecondary enrollment. Results from this study indicated that a significant percentage of students reported EFL gains, yet a much smaller percentage acquired a high school equivalency credential or enrolled in postsecondary after completing adult education programs. Analyses also indicated demographic differences in racial background and highest level of education were found among students who completed adult education courses and attained a high school equivalency credential. Students who entered the program with higher levels of education were also more likely to enroll in postsecondary. Generally, higher levels of program intensity, or receiving more instructional time, was also associated with EFL gains and attainment of a high school credential. Differences in course completion, EFL gains, high school equivalency attainment and postsecondary enrollment also existed by program type. Although the demographic composition of Pennsylvania adult education students is consistent with national trends, demographic differences in outcomes were found within and between programs.



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The Pennsylvania Department of Education (PDE) Evaluation and Research project is an effort that was established through a State Longitudinal Data System (SLDS) Grant from the Institute of Education Sciences (IES), National Center for Education Statistics (NCES), awarded in October 2015. The Research and Evaluation project is an initiative to make full use of the P-16+ system data and other data sources to answer priority questions from the PDE research agenda, to form collaborative research partnerships, and to increase PDE's capacity to conduct research. Our mission is to evaluate and analyze data to provide insight that can be used to positively impact policy, inform decision making and lead to improved student outcomes.

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Project Overview and Objectives

In an effort to better understand the ways in which adult education courses benefit Pennsylvania adults, a major objective of this study was to identify the percentage of students who begin adult education services and go on to earn a high school equivalency credential or enroll in postsecondary institutions. This research also utilizes national and statewide data to investigate the relationship between adult education course completion with educational knowledge gains, high school equivalency attainment and postsecondary enrollment. To gain a more comprehensive understanding of adult education trends in the Commonwealth, this research also examines demographic factors related to adult education course completion, high school equivalency, student educational gains, and postsecondary enrollment. Ultimately, this research will help guide future research and policy decisions regarding adult education in Pennsylvania.

Current and future employment projections indicate occupations that typically require a high school diploma are projected to grow at a slower rate than occupations requiring a postsecondary degree or more (Watson, 2017).

Literature Review

The U.S. Bureau of Labor Statistics suggests the American economy is in the midst of a significant shift. Current and future employment projections indicate occupations that typically require a high school diploma are projected to grow at a slower rate than occupations requiring a postsecondary degree or more (Watson, 2017). Between 2012 and 2022 the number of jobs requiring a postsecondary credential is expected to grow by fourteen percent (Carnevale et al., 2013; Richards & Terkanian, 2013). Conversely, of the thirty occupations projected to have the largest and fastest decline, more than half require a high school diploma or less (Richards & Terkanian, 2013). While this occupational shift is promising for the thirty-three percent of the population that holds a postsecondary credential (U.S. Census Bureau, 2017a), it is less encouraging for the twenty-three million Americans who lack even a high school diploma (U.S. Census Bureau, 2017b). Fundamentally, these individuals lack the credentials and training to compete in a twenty-first century economy. In response to these challenges, adult education programs in Pennsylvania provide a range of services to support the acquisition of skills necessary to obtain and sustain family-sustaining employment (Pennsylvania Department of Education, 2020) and encourage upward mobility (U.S. Department of Education, Office

of Career, Technical, and Adult Education, 2014). To fill the void in educational attainment, adult education courses across Pennsylvania 1) prepare adults to acquire basic literacy and numeracy skills via adult basic education courses (ABE), 2) provide instruction to individuals who have some literacy skills and can function in everyday life, but are not proficient in reading, writing, and math via adult secondary education courses (ASE) and 3) help individuals achieve competence in reading, writing, speaking and comprehension of the English language via English as a Second Language courses (ESL).

Adult education enrollment statistics highlighting gender, racial/ethnic background, age and education level are available nationally. However, statistics regarding socioeconomic status, neighborhood type/area and education experiences are less prevalent. Coupled with the dearth of research focusing on demographic trends among adult education students in Pennsylvania, research is warranted to fully understand demographic trends in the Commonwealth.

Pennsylvania adult education agencies center high school equivalency, postsecondary enrollment and increased EFL gains as evidence of their efficacy in preparing Pennsylvanians for entry into high quality careers. Unfortunately, there have not been widespread efforts to assess whether students are meeting these goals and demographic factors associated with attainment of these goals. According to the National Reporting System, an outcome-based reporting system for adult education programs, 88% of Pennsylvania adult education students who set a goal of completing a high school equivalent met this goal in 2015 – 2016 (U.S. Department of Education, 2018). Similarly, among students who set a goal of enrolling in postsecondary institutions, 16% achieved this goal (2018). Regarding EFL gains, aggregate data indicates 38% of students enrolled in adult education programs in Pennsylvania achieved at least one EFL gain in 2017 – 2018 (National Reporting System, 2018). However, this data has not been parsed out by race, ethnicity or other demographic factors.

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Method and Sample

Secondary data was obtained for four cohorts of Pennsylvania adult education students for the 2012 – 2013, 2013 – 2014, 2014 – 2015 and 2015 – 2016 academic years. The data consisted of demographic information, adult education course enrollment details, high school equivalency attainment and postsecondary enrollment. Table 1 displays high school

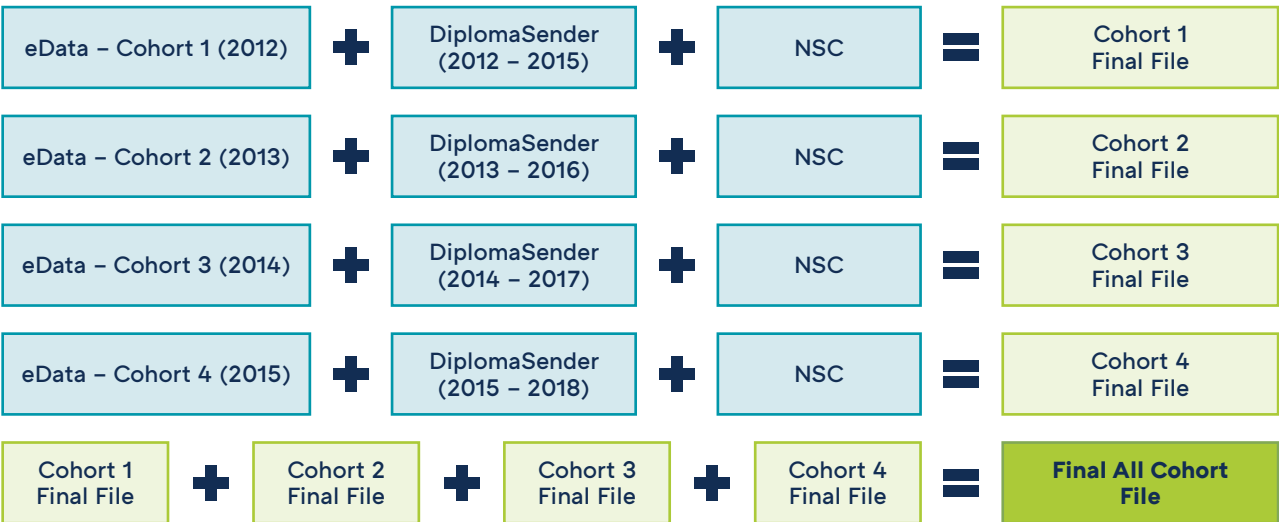
equivalency attainment and postsecondary enrollment tracking by cohort. The student and adult education course information was obtained from the eData system, a web-based data collection system for PDE’s Bureau of Postsecondary and Adult Education, Division of Adult Education. It is primarily used for evaluating program performance and reporting aggregate student data. High school credentialing information was obtained from DiplomaSender, a service PDE uses to acquire and distribute high school equivalency data nationally. Data regarding postsecondary enrollment was obtained using the National Student Clearinghouse (NSC). As shown in Figure 1, all data files were linked across cohorts to investigate the study research questions. Descriptive statistics, Chi-Square and logistic regression analyses were conducted to analyze all research questions.

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TABLE 1: Study Variables by Cohort

Outcome	Cohort 1 2012 – 2013	Cohort 2 2013 – 2014	Cohort 3 2014 – 2015	Cohort 4 2015 – 2016
Demographics	✓	✓	✓	✓
Adult Education Course Enrollment Details	✓	✓	✓	✓
High School Equivalency Attainment (Current)	✓	✓	✓	✓
High School Equivalency Attainment (Year 1 Follow-Up)	✓	✓	✓	✓
High School Equivalency Attainment (Year 2 Follow-Up)	✓	✓	✓	✓
Postsecondary Enrollment (Current)	✓	✓	✓	✓
Postsecondary Enrollment (Year 1 Follow-Up)	✓	✓	✓	✓

FIGURE 1. Linking Process for Data Files



Discussion of Key Findings

RESEARCH QUESTION 1:

What are the demographic characteristics of the adult education student population in Pennsylvania?

FINDING SUMMARY #1: Generally, Pennsylvania adult education students were female, White, middle-aged, economically disadvantaged and resided in urban communities. Regarding highest level of education, a higher proportion of students enrolled in adult education courses completed Grades 9–11 than any other grade.

Consistent with past research (Coley, 2008), female enrollment in adult education programs outpaced male enrollment in Pennsylvania. While enrollment in adult education is typically split evenly between males and females nationally, the rate of female enrollment outpaces males in Pennsylvania (58% versus 42%). While other studies typically cite male enrollment between 47% – 50% (State of Iowa Department of Education, 2016; Tamassia, Lennon, Yamamoto & Kirsch, 2007), the proportion of females enrolled in adult education courses in the Commonwealth is slightly higher than what is reported in other studies for female enrollment (State of Iowa Department of Education, 2016; U.S. Department of Education, Office of Career, Technical, and Adult Education, 2014). Research exploring the path towards adult education enrollment for males and females would be useful in understanding the gender difference in enrollment. Considering females made up only 41.7% of high school dropouts in Pennsylvania for the 2016 – 2017 academic year (Pennsylvania Department of Education, 2019), it is reasonable to assume that male enrollment would be slightly higher than what the current data suggests. Future research exploring the decision-making process and factors associated with adult education enrollment would be especially useful in understanding the consistent difference in male-female adult education enrollment.

Regarding race and ethnicity, rates of enrollment in adult education courses were highest among White students (40.6%). This was unsurprising, as close to 81% of the state identifies as White. However, when broken down by program type the rate of enrollment in ABE and ASE courses was highest among White students (44.1% and 60.6% respectively), but the rate of enrollment in ESL courses was highest among Hispanic (47.9%) students. Considering Hispanics are just under 8% and African Americans are 12% of the population in Pennsylvania, Hispanic and Black/African American students were overrepresented in adult education courses (24.4% and 24.3% respectively) overall. Though we do not have data about student immigration status, it is also likely that Hispanic students were accessing the language assistance offered in ESL courses. Similarly, African American students were overrepresented in ABE (31.2%) and ASE (24.8%) courses. It is possible that lower rates of high school graduation among African American students in Pennsylvania, 72.1% (Pennsylvania Department of Education, 2019), may compel them to enroll in adult education courses at a disproportionate rate.

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The age distribution of adult education students in Pennsylvania was consistent with national data. Specifically, most of the adult education population is made up of students between 19 and 44 years old (73.6%). Furthermore, 16 – 18-year-old students were primarily enrolled in ABE and ASE courses, while students 60 years of age and older were the least represented age group in ABE and ASE courses. The distribution of students in ESL courses was slightly different with the majority of students (58.4%) between 25 – 44 years old, compared to 44.5% for ABE and 41.1% for ASE courses. A significantly lower percentage of students in ESL courses were between 19 and 24 years old (14.4%), compared to ASE (33.3%) and ABE (29.3%).

More than half of the students enrolled in adult education courses in Pennsylvania experienced economic disadvantage at some point in their enrollment. This was consistent across programs and suggests Pennsylvania is fulfilling one of the primary goals of the WIOA, targeting vulnerable populations including low-income individuals. Adult education programs are particularly useful for low-income communities, as research by Morgan and colleagues (2017) concluded that ABE students earned more income over time compared to individuals with similar backgrounds who did not complete ABE courses. Considering the growing body of research examining the link between adult education and income (Morgan et al., 2017; U.S. Department of Education, OCTAE, 2014), the economic benefits of adult education for individual students, as well as the Commonwealth (via increased revenue), cannot be overstated.

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Generally, Pennsylvania students entered adult education courses with education levels comparable to what has been reported in national and international studies (Desjardins, 2015; MacArthur et al., 2012). Specifically, a significant proportion of adult education students in Pennsylvania completed Grades 9 – 11 or higher (44.3%). When looking more closely at differences by program type, a majority of ABE and ASE students completed Grades 9 – 11 (55.9% and 55.6% respectively), compared to only a small percentage of ESL students (11.6%). A large percentage of students in ESL courses had a High School Diploma (28%) or College or Professional Degree (24.5%), compared to ABE students (10.5% and 4.1% respectively) and ASE students (14.2% and 3.5% respectively). Research by Desjardins (2015) concluded that individuals with higher levels of educational attainment were more likely to enroll in adult education courses, regardless of the student's age, gender and other demographic factors.

The findings from this work indicate more than half of ESL students entered adult education courses with a high school diploma, some

college attendance or a college/professional degree. While a greater proportion of ESL students entered adult education courses with a higher level of education, a greater proportion (compared to ABE and ASE students) also reported having a 5th grade education or less. Again, this suggests there are underlying differences between ESL students compared to ABE and ASE students. To gain a greater understanding of these differences, research efforts should continue to study ABE, ASE and ESL students as a single adult education group, as well as isolated program types. Regarding past education experiences, it is also notable that more than one-third of the students in Pennsylvania adult education courses previously received schooling outside of the country. This may not be unprecedented, as MacArthur and colleagues (2012) found that 30% of the students in their study also received education outside of the U.S.

Taken together, the demographic composition of Pennsylvania's adult education students is consistent with national trends. While it is encouraging that a diverse group of students is engaged in adult education in Pennsylvania, it is also worth noting that there are notable demographic differences between students enrolled in ABE and ASE courses compared to ESL students. Future research efforts should continue to investigate this trend.

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TABLE 2. Demographic Statistics for Adult Education by Program Type

	Overall	Adult Basic Education	Adult Secondary Education	English as a Second Language
	% (n)	% (n)	% (n)	% (n)
Overall				
Total	100 (85,732)	53.7 (46,001)	20.3 (17,368)	26.1 (22,363)
Gender				
Male	42.0 (36,019)	42.5 (19,553)	45.8 (7,953)	38.1 (8,513)
Female	58.0 (49,713)	57.5 (26,448)	54.2 (9,415)	61.9 (13,850)
Race				
American Indian/Alaskan Native	0.6 (473)	0.7 (304)	0.7 (126)	0.2 (43)
Asian	8.4 (7,203)	3.7 (1,706)	1.2 (209)	23.6 (5,288)
Black or African American	24.3 (20,867)	31.2 (14,344)	24.8 (4,309)	9.9 (2,214)
Multi-Racial	1.4 (1,227)	1.7 (800)	2.1 (370)	0.3 (57)
Native Hawaiian/Other Pacific Islander	0.3 (230)	0.3 (141)	0.2 (43)	0.2 (46)
White	40.6 (34,801)	44.1 (20,281)	60.6 (10,519)	17.9 (4,001)
Hispanic	24.4 (20,931)	18.3 (8,425)	10.3 (1,792)	47.9 (10,714)
Age				
16 – 18	7.9 (6,783)	9.7 (4,444)	11.3 (1,959)	1.7 (380)
19 – 24	26.2 (22,453)	29.3 (13,456)	33.3 (5,777)	14.4 (3,220)
25 – 44	47.4 (40,650)	44.5 (20,467)	41.1 (7,132)	58.4 (13,051)
45 – 54	12.1 (10,391)	11.1 (5,119)	10.0 (1,734)	15.8 (3,538)
55 – 59	3.4 (2,924)	3.2 (1,472)	2.9 (506)	4.2 (946)
60 and older	3.0 (2,531)	2.3 (1,043)	1.5 (260)	5.5 (1,228)
Economic Disadvantage				
No	40.9 (35,067)	38.9 (17,888)	44.7 (7,758)	42.1 (9,421)
Yes	59.1 (50,665)	61.1 (28,113)	55.3 (9,610)	57.9 (12,942)
Area				
Rural	30.9 (26,508)	35.2 (16,170)	46.1 (8,004)	10.4 (2,334)
Urban	69.1 (59,224)	64.8 (29,831)	53.9 (9,364)	89.6 (20,029)
Special Education Status				
No	99.8 (85,533)	99.6 (45,807)	100.0 (17,3663)	100.0 (22,363)
Yes	0.2 (199)	0.4 (194)	0.0 (5)	0.0 (0)
Previous Schooling Type				
Non-U.S. Based Schooling	32.3 (27,725)	13.4 (6,163)	4.5 (778)	92.9 (20,784)
U.S. Based Schooling	67.7 (58,007)	86.6 (39,838)	95.5 (16,590)	7.1 (1,579)
Highest Grade Completed				
Elementary School (K – Grade 5)	1.6 (1,348)	0.6 (294)	0.2 (38)	4.5 (1,016)
Middle School (Grade 5 – 8)	7.9 (6,744)	8.0 (3,679)	5.2 (896)	9.7 (2,169)
High School (Grade 9 – 11)	44.3 (37,968)	55.9 (25,717)	55.6 (9,660)	11.6 (2,591)
Attended/Did Not Complete Grade 12	11.8 (10,143)	14.2 (6,533)	13.1 (2,273)	6.0 (1,337)
GED	1.6 (1,353)	1.4 (658)	2.4 (414)	1.3 (281)
High School Diploma/Grade 12	15.8 (13,551)	10.5 (4,817)	14.2 (2,467)	28.0 (6,267)
College or Professional Degree	9.3 (7,973)	4.1 (1,870)	3.5 (614)	24.5 (5,489)
Some College, No Degree	5.1 (4,402)	3.2 (1,471)	5.2 (911)	9.0 (2,020)
Special Education/IEP Diploma	0.6 (485)	0.9 (393)	0.2 (30)	0.3 (62)
No Schooling	1.1 (948)	0.4 (163)	0.0 (7)	3.5 (778)
Unknown	1.0 (817)	0.9 (406)	0.3 (58)	1.6 (353)

RESEARCH QUESTION 2:

To what extent are there differences in completion for adult education courses based on program type, student demographics and background characteristics?

FINDING SUMMARY #2: Close to one-third of students completed at least one adult education course. However, there were demographic differences in course completion by program, as well as race and highest level of education.

Overall, close to 30% of adult education students in Pennsylvania completed at least one course. However, ASE (37.8%, $n = 4,043$) students consistently completed courses at higher rates than ABE (26.0%, $n = 6,713$) and ESL (26.6%, $n = 2,603$) students. Considering this pattern of completion, it is likely that ASE students enter adult education courses with a set of skills that help facilitate course completion. While there were not large differences in course completion between males and females, there were some obvious differences in completion by race/ethnicity across adult education courses ($V = .15$), as well as in ABE ($V = .16$) and ASE ($V = .17$) courses. An observation of adult education courses overall indicates White (36.1%) and Asian (33.6%) students completed courses at a higher rate than Native Hawaiian/Pacific Islander (19.8%), Black/African American (21.6%), Hispanic (22.6%) and American Indian/Alaskan Native (23.4%) students (See Figure 2). The disparities identified in this research are consistent with disparities in other educational areas in Pennsylvania and nationally (U.S. Department of Education, National Center for Educational Statistics, 2018).

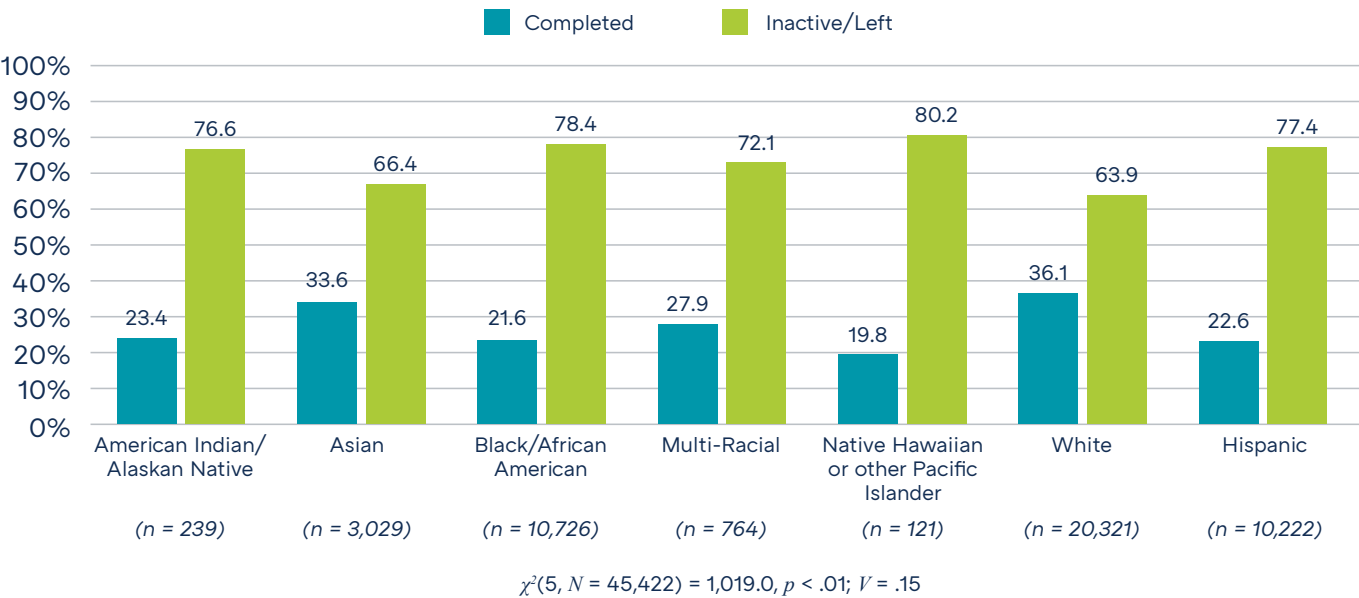
Adult education as a whole should take systemic and programmatic steps to try to explain these disparate outcomes, as well as reduce these disparities. An examination of course completion by racial/ethnic group and program type revealed that rates were similar to the overall adult education rates for ABE and ASE students with White (ABE: 32.1%, $n = 12,419$; ASE: 43.8%, $n = 6,825$) and Asian (ABE: 40.5%, $n = 746$; ASE: 38.7%, $n = 111$) students completing courses at a higher rate than other students. However, among ESL students the proportion of American Indian/Alaskan Native students to complete courses doubled. In fact, the American Indian/Alaskan Native student group had the highest proportion (45%, $n = 20$) of students to complete ESL courses. Interestingly, although Hispanic students made up the largest proportion of ESL students (47.9%), they had one of the lowest course completion rates (24.3%, $n = 5,051$). While there is not a clear explanation for higher course completion rates among American Indian/Alaskan Native ESL students, it is possible that these students entered ESL courses more familiar with the language than other non-native English speakers. There is evidence to suggest many American Indian/Alaskan Native primary and secondary students enrolled in English-language courses do not speak a language other than English, they simply need assistance speaking and utilizing the language in formal, academic settings (Carjuzaa & Ruff, 2016).

Overall, close to 30% of adult education students in Pennsylvania completed at least one course. However, ASE (37.8%, $n = 4,043$) students consistently completed courses at higher rates than ABE (26.0%, $n = 6,713$) and ESL (26.6%, $n = 2,603$) students.

Differences in course completion by age were largely a function of the large sample size. Completion

rates were similar across all age ranges for ESL students; however, it is worth mentioning that the course completion rates were marginally higher among older students in ABE and ASE courses. Comings (1999) suggests older students are more motivated to complete adult education courses as a result of their cumulative life experiences.

FIGURE 2. Adult Education Completed Courses vs. Inactive/Left Status by Race



Though there were marginal differences in course completion by economic status and previous schooling type, there were more pronounced differences in course completion by area. While close to 70% of adult education students in Pennsylvania were from urban communities, a larger proportion of rural students completed adult education courses compared to urban students overall (35.5% versus 25.2%). A higher percentage of rural students than urban students demonstrated higher completion rates among students enrolled in ABE (31.4% versus 22.0%) and ASE (45.4% versus 29.5%) courses. This trend was not evident among ESL students. Specifically, a slightly higher proportion of urban ESL students (27.3%) completed courses than rural students (21.7%). Taken together, these findings raise several questions. First, are there specific challenges that urban students face that hinder their progression in adult education courses generally? If so, how can adult education programs in the Commonwealth increase supports for urban students in ABE and ASE courses? Specifically, are there other demographic, programmatic or systemic factors that exacerbate the difference between rural and urban ASE students? Concerning the differences between rural and urban students' course completion rates, it is interesting that the difference between rural and urban students was larger for ASE students (45.4% versus 29.5%). A closer examination of demographic characteristics showed that rural ASE students were less racially/ethnically diverse and entered their courses with slightly higher levels of education than urban ASE students and rural and urban students enrolled in ABE courses. While this

A higher percentage of rural students than urban students demonstrated higher completion rates among students enrolled in ABE (31.4% versus 22.0%) and ASE (45.4% versus 29.5%) courses.

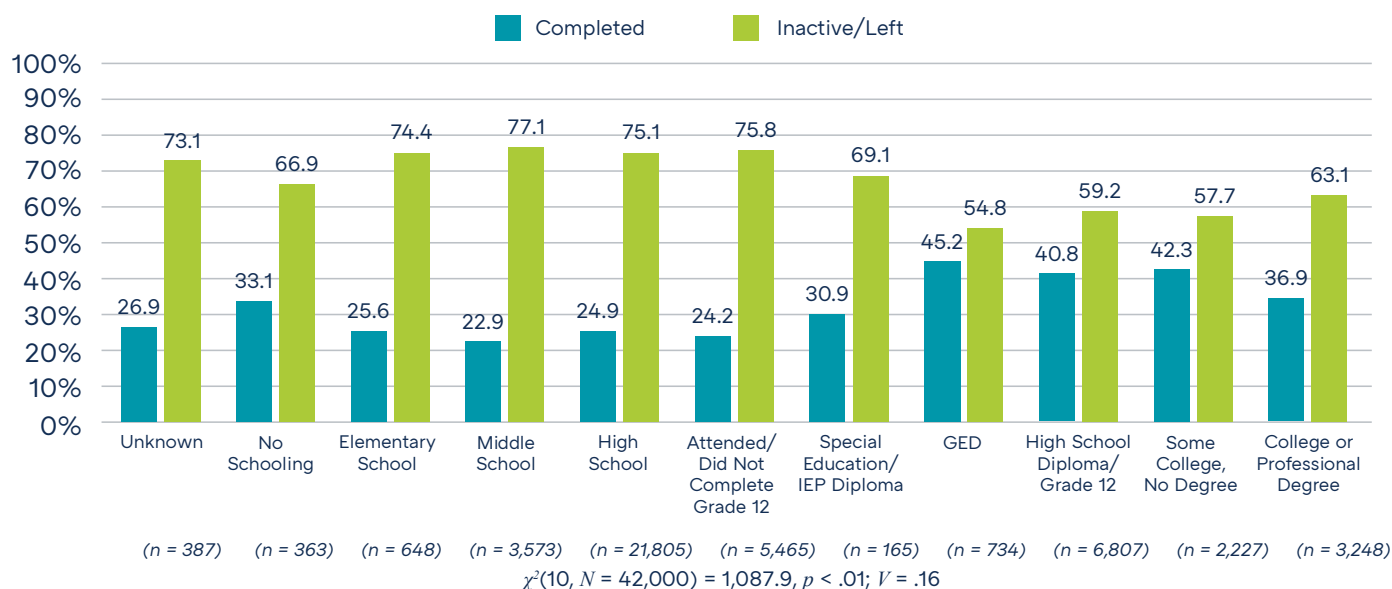
does not definitively explain the larger effect of area among ASE students, it does provide greater contextual information for future research in this area.

Differences in course completion were also found based on previous educational attainment across adult education courses (See Figure 3). Specifically, students who entered courses with a GED (45.2%), who attended some college, but did not obtain a degree (42.3%) and students who earned a high school diploma /completed Grade 12 (40.8%) had the highest rates of course completion overall ($V = .16$). Across programs, ABE ($V = .18$) and ASE ($V = .31$) students with higher levels of education had higher rates of course completion, consistent with previous research (Greenberg et al., 2013). However, this trend did not hold for ESL students ($V = .06$). Although the majority of ESL students entered the adult education program with a high school diploma or higher, there were no true differences in course completion among ESL students, regardless of their level of education. Taken together, these results suggest the characteristics that influence course completion among ABE and ASE students may operate somewhat differently for ESL students. The knowledge and skills highly educated ABE and ASE students use to move through their programs may not be as useful among highly educated ESL students. Taken together, it appears that the ways in which race/ethnicity, age, area and highest level of education influence our understanding of course completion among ABE and ASE students, may not quite fit for ESL students. Practice and policy efforts to support and increase course completion among ESL students must take a decidedly different approach to engage these students.

A closer examination of demographic characteristics showed that rural ASE students were less racially/ethnically diverse and entered their courses with slightly higher levels of education than urban ASE students and rural and urban students enrolled in ABE courses.

Across programs, ABE and ASE students with higher levels of education had higher rates of course completion ($V = .18$ and $V = .31$), consistent with previous research (Greenberg et al., 2013); this trend did not hold for ESL students ($V = .06$).

FIGURE 3. Adult Education Completed Courses vs. Inactive/Left Status by Highest Grade Completed



RESEARCH QUESTION 3:

What percentage of adult education students report EFL gains, high school equivalency and postsecondary enrollment after completing adult education courses? Are there differences in these outcomes among sub-groups of adult education students?

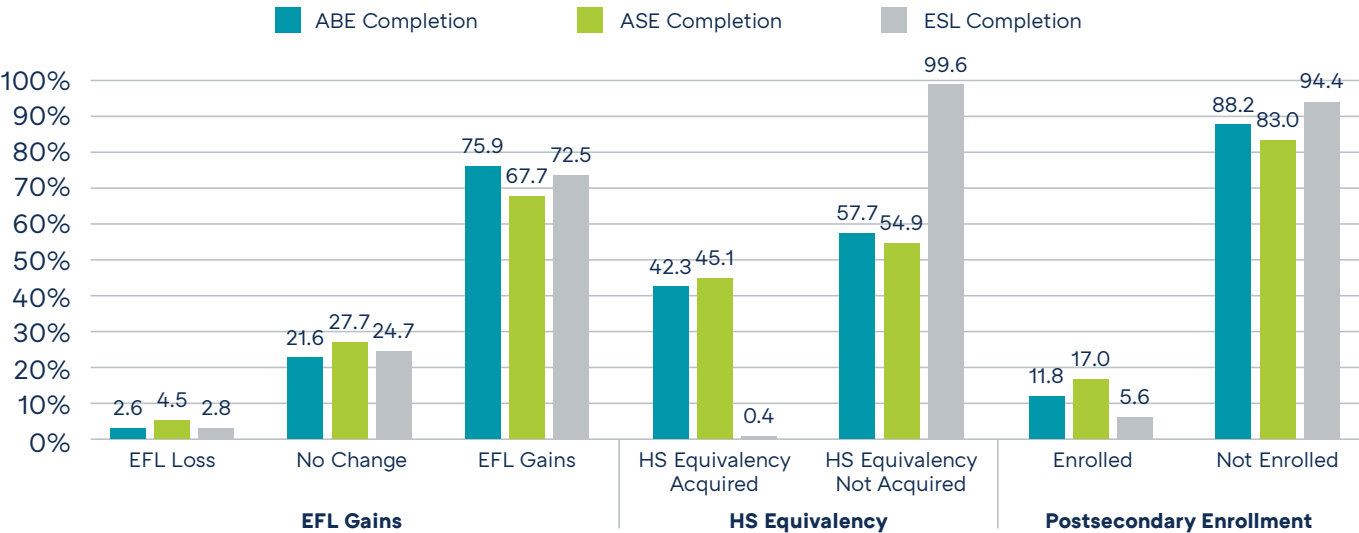
FINDING SUMMARY #3: Most students reported EFL gains, but a much smaller percentage of students earned a high school equivalency credential or enrolled in postsecondary institutions after completing adult education courses. Also, though there were not meaningful demographic differences in EFL gains, there were differences in high school equivalency attainment by race, age, area type, previous schooling type and highest levels of education completed. Differences in postsecondary enrollment were also identified.

Overall, most of the students who completed at least one adult education course also demonstrated EFL gains and the percentage was consistent across programs. Among students in ABE, ASE and ESL courses, between 67.7% and 75.9% of students in each program reported EFL gains. However, substantially fewer students acquired a high school equivalency or enrolled in postsecondary institutions. See Figure 4. While EFL assessments are given during class time and within the structured time of adult education courses, seeking a high school equivalency and enrolling in postsecondary requires students to be self-motivated enough to seek out such opportunities. Though rates of high school equivalency attainment and postsecondary enrollment were similar for ABE (42.3% and 11.8% respectively) and ASE (45.1% and 17.0% respectively) students, the percentage of ESL (0.4% and 5.6%) students to achieve these outcomes was significantly lower. While we know a majority of ESL students came into the program with a high school education or more, many of their counterparts entering into the program with lower levels of education may have experienced immigration-related challenges that created barriers and served as

roadblocks to earning a high school equivalency or entering postsecondary. Despite ASE students having the highest rates of course completion, they also had the lowest percentage of students with EFL gains. One would assume that students with the highest rates of completion would also demonstrate the highest rates of EFL gains. While the underlying reason for these discrepant findings is unclear, it is possible that ASE students entered with more skills and knowledge, with fewer gains to be made. Finally, it is also worth noting that rates of high school equivalency attainment and enrollment in postsecondary were much higher among students who completed at least one adult education course than students who did not. Hence, completing at least one course may increase the likelihood that a student will realize more positive outcomes related to their enrollment in adult education.

Finally, it is also worth noting that rates of high school equivalency attainment and enrollment in postsecondary were much higher among students who completed at least one adult education course than students' who did not.

FIGURE 4. EFL Gains, High School Equivalency and Postsecondary Enrollment Percentages by Program



Findings from this study suggest there were differences in EFL gains, high school equivalency and postsecondary enrollment as a function of student demographics. There were not significant or meaningful differences in EFL gains by gender, age, economic status, area or previous schooling type. While the overall test that examined EFL gains by race was significant ($V = .04$), those differences were primarily between racial groups in the rate of EFL losses or the percentage of students who experienced no change, and not differences in EFL gains.

Although there were statistically significant differences in EFL gains among students with different levels of education, it

Findings from this study suggest there were differences in EFL gains, high school equivalency and postsecondary enrollment as a function of student demographics.

should be noted that a majority of students experienced gains regardless of level of education ($V = .06$). Overall, there was a trend such that the highest proportion of students with EFL gains were students who entered the adult education program with the lowest levels of educational attainment. Students whose highest level of education was special education/IEP diploma (60.5%), students whose education was unknown (63.7%) and students who attended some college but did not receive a degree (65.7%) were reported to have the lowest percentage of students to demonstrate EFL gains.

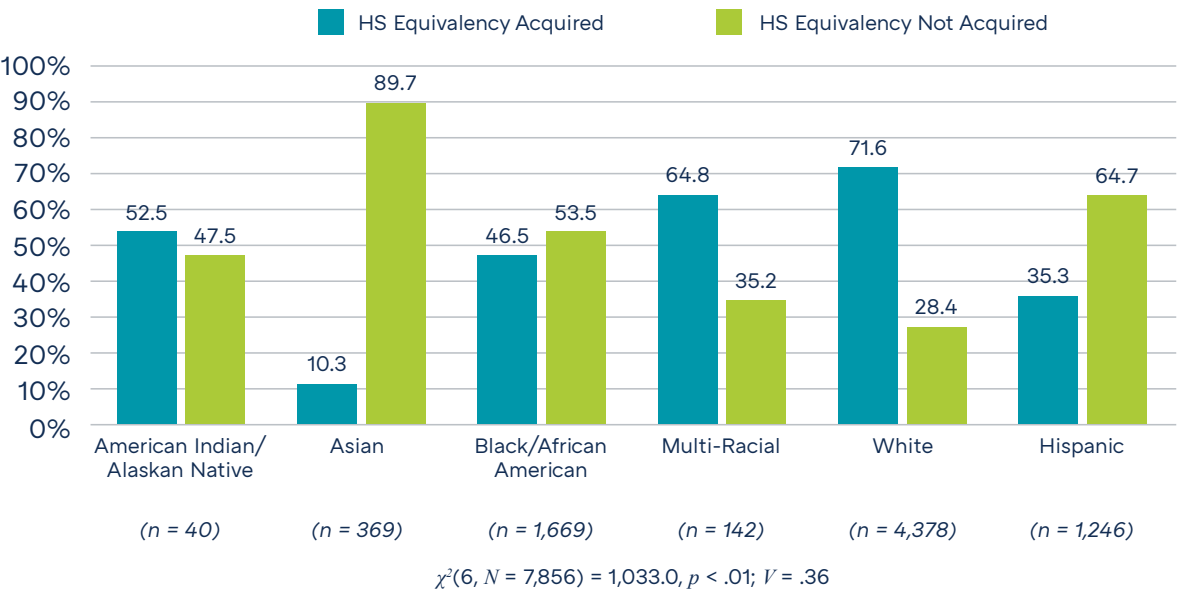
Group differences in attainment of a high school equivalency were evident among students with different racial/ethnic backgrounds ($V = .36$), ages ($V = .22$), economic status ($\phi = -.09$), area ($\phi = -.19$), previous schooling type ($\phi = .41$) and highest grade completed ($V = .25$). See Figure 5. The majority of White students (71.6%) and multi-racial (64.8%) students and close to or more than half of American Indian/Alaskan Native (52.5%) and Black/African American (46.5%) students acquired a high school equivalency within two years of completing their adult education courses. Yet, just over a third of Hispanic (35.3%) and a very low percentage of Asian students (10.3%) attained the high school equivalent. Broadly, the results from this study, as well as other reports of high school equivalency (GED Testing Service, 2014), suggest racial/ethnic disparities in high school equivalency attainment are not uncommon. These disparities are not without consequence for adult education students. Without high school equivalency credentials students are unable to move into postsecondary institutions, preventing them from taking advantage of a host of opportunities within those institutions. Extrapolating from more general assertions put forth by Van Horn and Kassab (2011), it is possible that the skills deficits that exist among students of color are carried into adult education courses and are evident when they seek a high school equivalency. As stated previously, students coming into the program with lower levels of education or as ESL students, may experience immigration-related challenges or barriers that serve as roadblocks to earning a high school equivalency. Additional research is warranted to gain a greater understanding of why disparities in high school equivalency attainment persist.

Differences in high school equivalency attainment were also evident based on age. A very clear pattern emerged suggesting rates of high school equivalency attainment were lower among older students. More than half of students under 44-years-old earned a high school equivalency, while significantly fewer students over the age of 60 (27.7%) earned similar credentials. Younger students may perceive a greater benefit in attaining a high school equivalency than older students; they may enter

The highest proportion of students with EFL gains were students who entered the adult education program with the lowest levels of educational attainment.

their programs with an explicit goal of attaining a high school equivalency credential. Conversely, students over the age of 60 may enter adult education programs with the sole purpose of acquiring more knowledge and skills. They may not perceive any benefit in earning a high school credential at their age.

FIGURE 5. Adult Education Students High School Equivalency Attainment by Race



Note: Native Hawaiian/Other Pacific Islander students were excluded from this figure due to a small sample size.

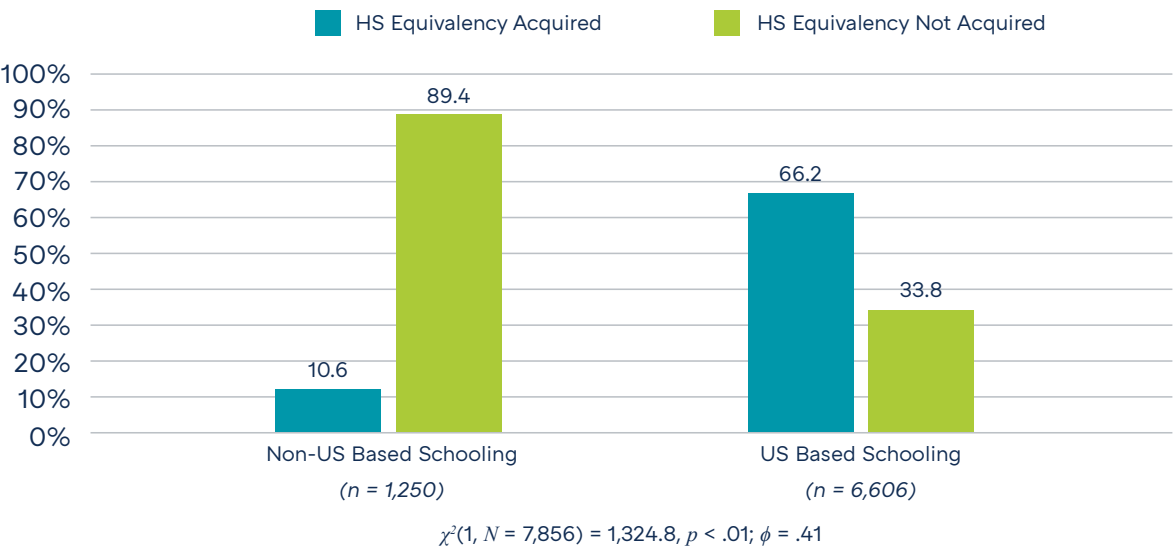
Notable differences in high school equivalency attainment were also found between rural and urban students. Rural students were significantly more likely to acquire the credential than urban students (67.3% versus 48.5%). These findings mirror research by Van Horn and Kassab (2011), whose quantitative analyses also indicated that a slightly larger percentage of rural students passed their high school credentialing exam than urban students. However, this relationship may be even more complex and warrant additional research. Notably, while Van Horn and Kassab (2011) identified a host of demographic factors associated with obtaining a high school credential for both rural and urban students (higher level of educational attainment, younger age, higher income), they also concluded that being male and White was more strongly associated with obtaining the credential among urban adult education students only.

The effect of previous education experiences may be especially critical, considering findings from the current study. As shown in Figure 6, students who attended US-based schools were much more likely to acquire a high school equivalency credential than students who attended an international school (66.2% versus 10.6%). Overall, a closer examination revealed that there were stark differences between students whose last education experience was outside of the U.S. and other students. First, there were more Asian and Hispanic students with schooling experience outside of the U.S., yet a much higher percentage of White students whose last schooling experiences were in the U.S. Additionally, a majority of students whose last schooling was outside of the U.S. were older and more likely to reside in urban areas (Non-

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U.S. based 87.3% urban vs. U.S. based 46.9% urban). Regarding highest education completed, a much higher percentage of U.S. based students attended high school (91.5%), compared to non-U.S. based schooling students (51.1%).

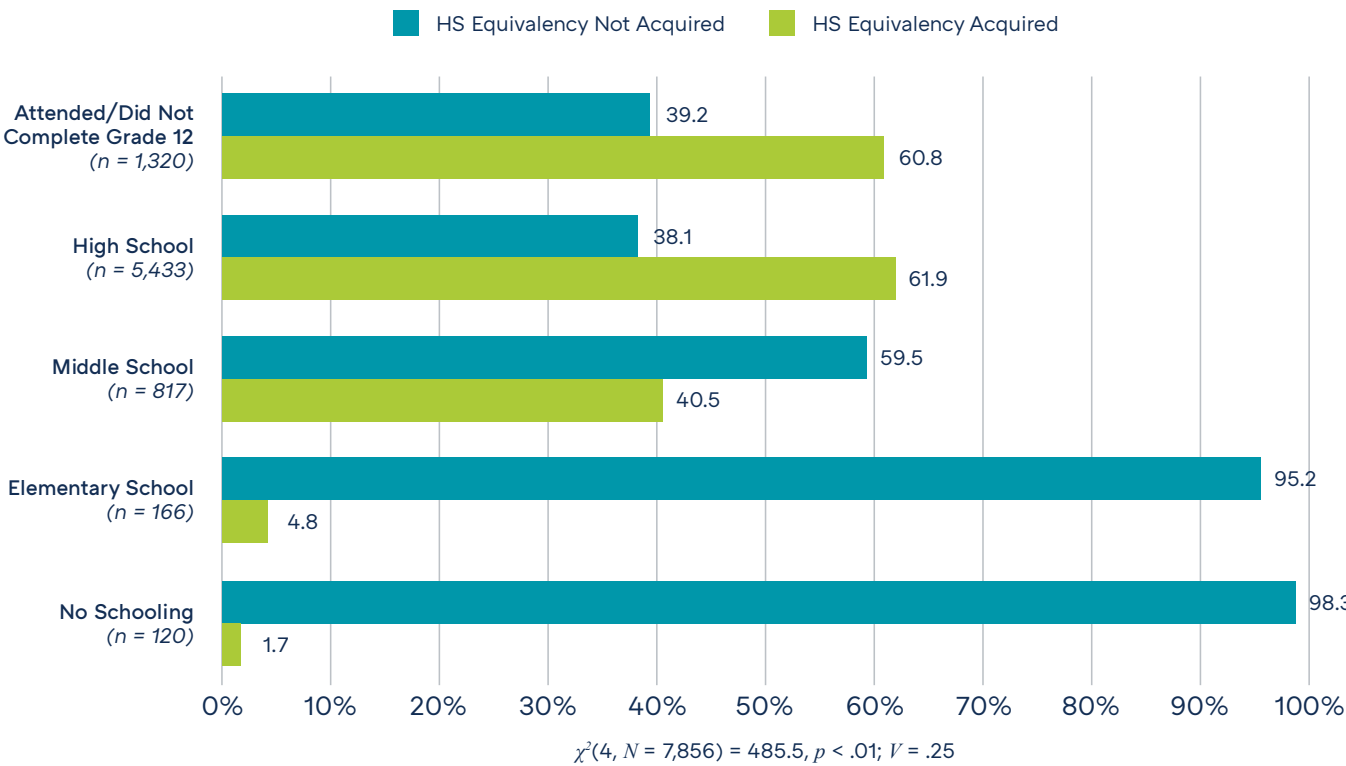
FIGURE 6. Adult Education Students High School Equivalency Attainment by International Schooling



As one might expect students who entered adult education courses with higher levels of education had the highest rates of high school equivalency attainment. See Figure 7. This suggests that students with at least a middle school education or higher when entering an adult education program may have the requisite knowledge and skills to pass a high school credentialing exam. These students may have also perceived the acquisition of a high school credential as less challenging and been more persistent in their efforts to obtain a credential because they were so close to obtaining a traditional high school diploma before entering adult education courses. Future empirical studies must examine the simultaneous effects of area, previous schooling type and highest grade completed on high school equivalency attainment.

As one might expect students who entered adult education courses with higher levels of education had the highest rates of high school equivalency attainment.

FIGURE 7. Adult Education Students High School Equivalency Attainment by Highest Grade Completed



Note: Students entering adult education courses with unknown levels of education or a high school diploma/credential or above were excluded from this analysis.

Consistent with previous research (Rutschow & Crary-Ross, 2014; U.S. Department of Education, 2013), only a small percentage of adult education students enrolled in postsecondary institutions after completing their courses (12.1%). Unlike EFL gains and high school equivalency, there were not true differences in postsecondary enrollment by race, economic status, area or previous schooling type. Because postsecondary enrollment was so rare among students in this study, demographic differences in postsecondary enrollment were statistically more difficult to detect. Perhaps more variation within the sample would have yielded more robust findings regarding postsecondary enrollment. Despite the dearth of students who enrolled in postsecondary overall, there were marginal group differences in postsecondary enrollment by gender ($\phi = -.09$), age ($V = .06$) and highest grade completed ($V = .19$). Females in this study were slightly more likely to continue to postsecondary after completing adult education courses than male students (14.6% versus 8.5%). While the reasons for this are unclear, it is consistent with national trends which indicate females outnumber males in postsecondary enrollment (Coley, 2008; U.S. Department of Education, National Center for Education Statistics, 2018). Parallel to the findings for high school equivalency, younger students were more likely to enroll in postsecondary.

Consistent with previous research (Rutschow & Crary-Ross, 2014; U.S. Department of Education, 2013), only a small percentage of adult education students enrolled in postsecondary institutions after completing their courses (12.1%).

Students between the ages of 16 – 18 (13.6%), 19 – 24 (14.4%) and 25 – 44 (11.9%) reported the highest rates of postsecondary enrollment. Older adult education students may have more familial and financial demands preventing them from moving forward with this phase of their education (Bosworth, 2008). Regarding highest grade completed, a significantly higher percentage of students who entered adult education courses with some college experience, but no degree (28.3%) transitioned into postsecondary institutions after completing their adult education program. More than half of these students were enrolled in ASE courses, likely because they entered adult education programs with more knowledge and skills than their counterparts with less education. Students with a high school credential (e.g. GED) also entered postsecondary at a higher rate than other students (17.5%). Students whose highest level of education was a high school credential may have been more explicit and intentional in their pursuit of postsecondary enrollment. Specifically, these students may perceive adult education courses as a steppingstone towards their goal of postsecondary enrollment.

RESEARCH QUESTION 4:

Is there intensity of instruction that correlates more strongly with better student outcomes?

FINDING SUMMARY #4: Logistic regression analysis showed that there is a statistically significant effect of intensity on EFL gains and GED attainment for Pennsylvania adult education students, even after controlling for other significant explanatory variables.

The likelihood of Commonwealth adult education students achieving EFL gains, obtaining a GED or enrolling in postsecondary are influenced by a complex set of factors and vary by program. Regarding EFL gains, results suggest ABE, ASE and ESL students were more likely to demonstrate gains if they received at least 100 hours of instructional time. The odds of achieving EFL gains increased even more among students from all programs when they received 175 hours or more of instruction. The likelihood of acquiring a high school credential also increased among ASE students when they received 100 hours or more of instruction. Specifically, for ASE students the odds of a student showing EFL gains increased 40 to 60 percent. By itself a benchmark of 100 hours may seem arbitrary, yet studies suggest students who engage in adult education for 100 hours also report more desirable outcomes. Rose and Wright (2006) analyzed NRS data from three states and concluded that 50% of the students who completed 100 – 110 hours of instructional time reported EFL gains and acquired a high school credential. Similarly, Morgan, Waite and Diecuch (2017) concluded that the odds of obtaining a high school credential increased when ABE students completed 100 hours or more of instruction. According to the U.S. Department of Education (2003) the average amount of time adult education students spend in their courses is 113 hours. Hence, it appears that “average” engagement in adult education programs is positively associated with the likelihood of achieving some of the educational goals put forth for adult education students. However, for ABE and ASE students’ findings from this study suggest the likelihood of

Regarding EFL gains, results suggest ABE, ASE and ESL students were more likely to demonstrate gains if they received at least 100 hours of instructional time.

achieving gains is even more pronounced when they receive 175 hours of instruction or more. Specifically, among ABE students there was a 146 percent increase in odds if a student had 175 hours. For ASE students there was a 130 to 170 percent increase in odds if a student had 175 or more hours of instruction. Conversely, ESL student's chances of achieving EFL gains increased significantly when they received 50 hours of instruction or more, suggesting these students benefit even when they have less instructional time compared to ABE and ASE students. Essentially, program specific analysis utilized in this study suggests the odds of demonstrating EFL gains and attaining a high school credential vary by intensity, but also by program. Furthermore, while the research focusing on 100 hours or more is valuable, this study provides a strong justification for examining the likelihood of desired educational outcomes at more and less intense levels of adult education.

The relationship between intensity of instruction with attainment of a high school credential cannot be oversimplified. While there was an increased likelihood of acquiring a high school credential among ASE students who received 100 hours or more of instruction time (39 percent increase in odds), it is worth noting that having fewer than 100 instructional hours was associated with increased odds of obtaining a high school credential among ABE students (17 percent increase in odds). Although this may seem counterintuitive, if the prior education of students in this program is considered this finding makes sense. A majority of ABE students with prior education that included "attended but did not complete Grade 12" (65%) and "some high school" (61%) went on to obtain a high school credential/GED. Additionally, as the findings for EFL gains showed, students with less than a high school diploma had higher odds of experiencing EFL gains. It is likely a lower intensity of instruction (fewer hours) is needed for these students to experience gains and reach the level needed to go on to obtain a GED, thus the effect we find regarding intensity. Despite the differences in high school credential attainment between ABE and ASE students who receive 100 hours of instruction or more, students from both programs were more likely to earn a high school credential if they received any ABE (6.85 higher odds) or ASE (12.28 higher odds) instruction. In other words, ABE and ASE students' chances of acquiring a high school credential increase if they receive any instruction. Many students enter adult education programs with the explicit goal of acquiring a high school credential (Tighe, Barnes, Connor & Steadman, 2013). Hence, it could be that students who acquire any hours in adult education are simply more likely to earn a high school credential.

While there was an increased likelihood of acquiring a high school credential among ASE students who received 100 hours or more of instruction time (39 percent increase in odds), it is worth noting that having fewer than 100 instructional hours was associated with increased odds of obtaining a high school credential among ABE students (17 percent increase in odds).

Despite the relationship between program intensity with EFL gains and high school credential attainment, there continues to be a persistent relationship between these outcomes and demographic factors. Namely, among ASE students the likelihood of achieving EFL gains increased when the student was male (30 percent increase in odds), and even more so when the student had less than a high school diploma (70 percent increase in odds) or college/professional degree (80 percent increase in odds). Knowledge gains may be more robust among students with less education. Specifically, students who enroll in ASE courses and have a high school diploma or college/professional degree may not show any demonstrable EFL gains from their pre-test to post-test, as they are entering their courses with a stronger academic skill set. Among ESL students, the chances of achieving EFL gains were higher among non-Hispanic students (30 percent increase in odds). This finding is consistent with a more general trend in

the educational literature which suggests educational outcomes among Hispanic students' lag behind other racial/ethnic groups (Kena et al., 2014; Merolla, 2018; Stillwell & Sable, 2013). This finding suggests that even among other ESL students, Hispanic students might face unique cultural barriers that hinder their academic performance. Contrary to prior research (Van Horn & Kassab, 2011), results from this study also show that ESL students residing in urban areas had a higher likelihood of achieving EFL gains than their rural counterparts (40 percent increase in odds). While this might seem surprising given the volume of literature touting more positive academic outcomes among rural students (2011), it is also possible that ESL students in urban communities benefit from more access to cultural, social and educational resources in urban communities that students in rural communities do not have access to. ESL students may also reap the benefits of having tighter social networks in urban areas that are more populated by immigrants and non-native English speakers (Pew Research Center, 2018).

Demographic effects were also evident for high school credential attainment. Specifically, White students and students who were not low-income had a much higher chance of acquiring a high school credential than non-White students and students experiencing economic disadvantage, regardless of intensity of instruction. For our cohorts, White students were 2.4 times more likely (a 140 percent increase in odds) to obtain a GED compared to non-White students. Students who were not economically disadvantaged had 1.24 higher odds (a 24 percent increase in odds) of obtaining a GED. Unfortunately, even intense academic engagement does not seem to dull the well-established relationship between academic outcomes with income (Crosnoe & Mueller, 2014; Palardy, 2013)

and race (Murnane, 2013; National Center for Educational Statistics, 2017) for students. Economically disadvantaged and non-White students often face challenges their peers do not have to navigate which may hinder their performance and achievement in adult education spaces. Finally, it is worth noting that demographic factors did not have any impact on the likelihood of achieving EFL gains among ABE students. This suggests that receiving intense ABE instruction (100 or more hours) in and of itself is critical for students who enter adult education courses with fewer skills. Among ABE students, intense instruction alone has a favorable impact on student educational outcomes.

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Study Limitations and Future Research

The conclusions of this research are based on data collected by individual adult education programs across the state. These programs vary greatly in the amount of resources they have to carry out their programs and perform other administrative duties. Relevant to the current study, a lack of resources may have impacted the quality of data reported, as well as the frequency of data reporting for some programs. Despite federal and state guidance that dictates the methodology for how adult education data should be collected and categorized, it is likely that there was some variation in the data collection methodology across programs.

Several thought-provoking findings were revealed in this study. However, in many cases the significant tests of association were found to have small effect sizes. This suggests there are other factors that should be considered to fully understand adult education processes and student outcomes in

Pennsylvania. Additionally, given the differences found by program type, it would be beneficial to examine additional research questions and student group differences individually for each program type. Lastly, we were unable to examine student motivation, student familial characteristics, or specific information about the adult education programs and teachers involved in adult education courses. To increase our general understanding of adult education students in Pennsylvania, these variables should be included in future research.

Conclusion

Taken together, the demographic composition of Pennsylvania adult education students is consistent with national trends. While it is encouraging that a diverse group of students is engaged in adult education in Pennsylvania, demographic differences in student outcomes suggest students from certain backgrounds may benefit from more guidance and assistance as they strive to complete adult education courses, attain a high school equivalency or enroll in postsecondary. More than half of the students enrolled in adult education courses in Pennsylvania identified as students of color and/or experienced economic disadvantage during their enrollment. This suggests Pennsylvania is fulfilling one of the primary goals of the WIOA, targeting vulnerable populations. The growing body of research linking adult education and future earnings is robust (Morgan, Waite & Diecuch, 2017; U.S. Department of Education, OCTAE, 2014), highlighting the economic benefits of adult education for vulnerable students, as well as the Commonwealth (via increased revenue). This report suggests adult education provides a subset of students with the academic opportunities required to navigate a changing national economic landscape.

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This report suggests adult education provides a subset of students with the academic opportunities required to navigate a changing national economic landscape.

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Appendix 1

Study Definitions

- 1. Active:** Students who were actively enrolled in adult education courses and did not report any other enrollment status (i.e. completed, inactive, left).
- 2. Adult Education:** Services or instruction below the postsecondary level for individuals who have attained 16 years of age; are not enrolled or required to be enrolled in secondary school under state law; and who
 - a. lack sufficient mastery of basic education skills to enable the individuals to function effectively in society,
 - b. do not have a secondary school diploma or its recognized equivalent, and have not achieved an equivalent, and have not achieved an equivalent level of education, or
 - c. are unable to speak, read, or write the English language.
- 3. Adult Basic Education:** ABE courses are designed for adults who lack competence in reading, writing, and math, and are looking to acquire basic literacy and numeracy skills. Instruction in reading, writing and math are offered at grade-level equivalents through eighth grade.
- 4. Adult Secondary Education:** ASE courses provide instruction to individuals who have some literacy skills and can function in everyday life, but are not proficient in reading, writing, and math. Instruction in reading, writing and math is offered at 9 – 12 grade-level equivalents. These courses also support individuals' transition to postsecondary education or training.
- 5. Completed Courses:** Students who completed at least one ABE, ASE or ESL course during their tenure in adult education. They may have reported other enrollment statuses during their adult education tenure, but the course completion status superseded any other status.
- 6. English as a Second Language:** ESL courses help individuals achieve competence in reading, writing, speaking and comprehension of the English language. These programs focus on strengthening individuals advanced language skills required for academic settings. ESL courses provide concentrated instruction in English for students who primarily speak another language.
- 7. Highest Level of Education Completed:** The following categories represent the highest levels of education completed by students enrolled in adult education courses:
 - a. **Elementary School:** Represents students whose highest education was between Kindergarten and Grade 5.
 - b. **Middle School:** Represents students whose highest education was between Grade 6 through Grade 8.
 - c. **High School:** Represents students whose highest education was between Grade 9 through Grade 11.

- d. Attended/Did Not Complete Grade 12:** Represents students whose highest education was enrollment in Grade 12 but did not complete Grade 12.
 - e. High School Diploma/Grade 12:** Represents students who enrolled in and completed Grade 12 and received a high school diploma.
 - f. College or Professional Degree:** Represents students whose highest education was a college or professional degree.
 - g. GED:** Represents students whose highest education was a high school equivalency credential outside of a traditional K – 12 institution.
 - h. Some College, No Degree:** Represents students whose highest level of education was some college but did not obtain a college degree.
 - i. Special Education/IEP Diploma:** Represents students whose highest level of education was a special education or IEP diploma.
 - j. No Schooling:** Represents students who report not having any formal schooling/education.
 - k. Unknown:** Represents students whose highest level of education was unknown.
- 8. Inactive/Left:** Students who reported an enrollment status as either inactive or left and had not completed a single adult education course.

- POL PK-20 Policy
- ECE Early Childhood Education
- K12 K-12 Education
- PSE Postsecondary Education
- WRK Workforce
- LIB Public Libraries

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