THE WILLIAM D. RUCKELSHAUS CENTER | education northwest

Apprenticeship and Higher Education

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December 2023

About The William D. Ruckelshaus Center

The William D. Ruckelshaus Center (the Center) is an impartial resource for collaborative problem solving in Washington State and the Pacific Northwest dedicated to assisting public, private, nonprofit, tribal, and other community leaders in their efforts to resolve conflicts around difficult public policy issues. The Center is a joint effort between the Washington State University Office of the Provost and the University of Washington Daniel J. Evans School of Public Policy and Governance. For more information about the Center, please visit: https://ruckelshauscenter.wsu.edu/about/

About Education Northwest

Education Northwest is a nonprofit, nonpartisan organization dedicated to helping all children and youth reach their full potential. We partner with public, private, and community-based organizations to address educational inequities and improve student success. While most of our work centers on the Pacific Northwest, our evaluations, technical assistance, and research studies have national impact and provide timely and actionable results.

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SUGGESTED CITATION

Maller, R., Stiefvater, E., & Davidson, S. (2023). *Apprenticeship and Higher Education.* The William D. Ruckelshaus Center and Education Northwest.

ACKNOWLEDGMENTS

This report was commissioned by the William D. Ruckelshaus Center in response to Washington State Senate Bill 5764, passed in 2022. Education Northwest would like to acknowledge our partners at the William D. Ruckelshaus Center—Tye Ferrell, Melissa Girbach, and Chris Page—for their valuable collaboration and feedback throughout this project. We are also grateful for the assistance of the Washington State Department of Labor & Industries and the Washington State Education Research and Data Center in obtaining data on apprenticeship and higher education in Washington.

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Introduction

Apprenticeship provides on-the-job training, guided by a master practitioner, and classroom instruction for individuals to learn a trade, craft, or profession. Though best known in construction and trades occupations, apprenticeships provide a pathway to many different jobs, such as health care, education, information technology, and engineering. Apprenticeships are unique in combining theoretical knowledge learned in the classroom with practical skills learned on the work site (Jones, 2011). Additionally, apprentices receive wages throughout the program, making an apprenticeship an "earn while you learn" opportunity. Registered apprenticeships, those officially recognized and supervised by the U.S. Department of Labor's Office of Apprenticeship or a State Apprenticeship Agency (U.S Department of Labor, n.d.), culminate in the attainment of a nationally recognized certificate upon program completion. Apprentices enjoy a high employability rate and salary, making apprenticeship an attractive career pathway for diverse youth and adult workers (Washington State Board for Community and Technical Colleges, 2022).

In 2021, there were nearly

600,000 apprentices in the U.S.

(U.S. Department of Labor, 2021a)

This represents a

50 percent increase over 10 years from over **350,000** apprentices in 2011

However, compared to college enrollment statistics, which show over

15 million students enrolled in 2021, apprenticeships are a much less common postsecondary pathway in the U.S.

(U.S. Department of Education, 2023)

Additionally, the U.S. trails behind other countries such as Switzerland, where more than two-thirds of students choose apprenticeship and in Germany, where more than half do

(Neuber-Pohl, 2021; Swiss Confederation, 2023)

While apprenticeship programs offer numerous benefits to both apprentices and employers, they are not as prevalent as other career pathways in the U.S. Though on the rise, apprenticeship numbers trail college enrollment in the U.S. and apprenticeship participation in other countries, such as Switzerland and Germany. These countries are internationally known for their highly developed dual education and vocational (VET) systems, which promote apprenticeship and postsecondary education as connected, viable pathways to a variety of careers. In contrast, the U.S. operates its apprenticeship and higher education systems relatively independently, each with its

own distinct identity, culture, regulations, and financing mechanisms (McCarthy et al., 2017). McCarthy et al. (2017) suggest that one significant challenge to the widespread adoption of apprenticeship programs in the U.S. is that they do not provide the necessary credentials, such as college degrees, for career advancement. Therefore, there is growing interest in exploring ways to enable people to simultaneously engage in apprenticeship programs and higher education at the same time, recognizing the potential for both pathways to coexist and complement each other.

The integration of higher education and apprenticeship has the potential to broaden the availability of apprenticeship opportunities and enhance equitable access to higher education (McCarthy et al. 2017). Establishing a dual system of higher education and apprenticeship could provide apprentices with a verified credential, such as an industry certificate, college certificate, or degree, upon completion of their apprenticeship. Nevertheless, this integration presents notable challenges, including accounting for the amount of learning and training that goes on in the workplace, inflexible credit requirements for degree programs, the amount of institutional resources and effort needed to start a program, and the willingness of apprentices to go through a years-long classroom and hands-on training program (Klor de Alva & Schneider, 2018). Addressing these challenges increasingly involves collaborative efforts between the two systems and is gaining momentum among funders, policymakers, and institutions.

Methods

Washington State is interested in connections between higher education and apprenticeship pathways. Passed in 2022, Washington state Senate bills 5764 and 5600 aim to develop and improve opportunities for apprentices to receive credit towards degrees. Specifically, Senate bill 5764 instructs the Washington Student Achievement Council to work with the William D. Ruckelshaus Center to study, consult stakeholders about, and report on opportunities for apprentices to earn degrees. The Ruckelshaus Center partnered with Education Northwest to review the literature on creating pathways to credentials for apprentices.

Our research focused on four main topics of interest, as outlined in Senate bill 5764.

1. Paths to credentials for apprentices
2. Apprentices' demand for degrees
3. Funding models
4. National best practices

We performed a broad-ranging literature and policy scan to collect information and sources on these topics. Sources included data and publications produced by regional, national, and international organizations with relevant authority and/or expertise in apprenticeship-related policy and practice. We requested and analyzed data from the Education Research and Data Center (ERDC) and Washington Labor & Industries (L&I) to provide context for apprenticeships and higher

education. Additionally, we created a survey to assess apprentices' experiences and interest in credentials.

This research is intended to complement the situation assessment conducted by the William D. Ruckelshaus Center through interviews with Washington-based informants, stakeholders, and apprenticeship experts. Together, the combined research highlights both national and local trends, themes, and topics of interest in apprenticeship that can facilitate continued conversation and innovation to expand opportunities for apprentices in Washington.

Washington context

Apprenticeships in Washington typically last
two to five years

Require a minimum of
2,000 hours
of on-the-job training

144 hours
of related supplemental instruction
(Washington State Apprenticeship and Training Council, 2023a)

As of fall 2022, there were about
200 registered apprenticeship programs in the state
covering **220** different occupations
(Washington State Department of Labor and Industries, n.d.a)

Washington has seen apprenticeships grow 100 percent from nearly
8,000 in 2013 to around **16,000** in 2023
(Washington State Department of Labor & Industries, 2023)

Construction trade occupations make up around 84 percent
of Washington apprenticeships, with the most popular occupation by far being construction electrician
(Washington State Apprenticeship and Training Council, 2023)

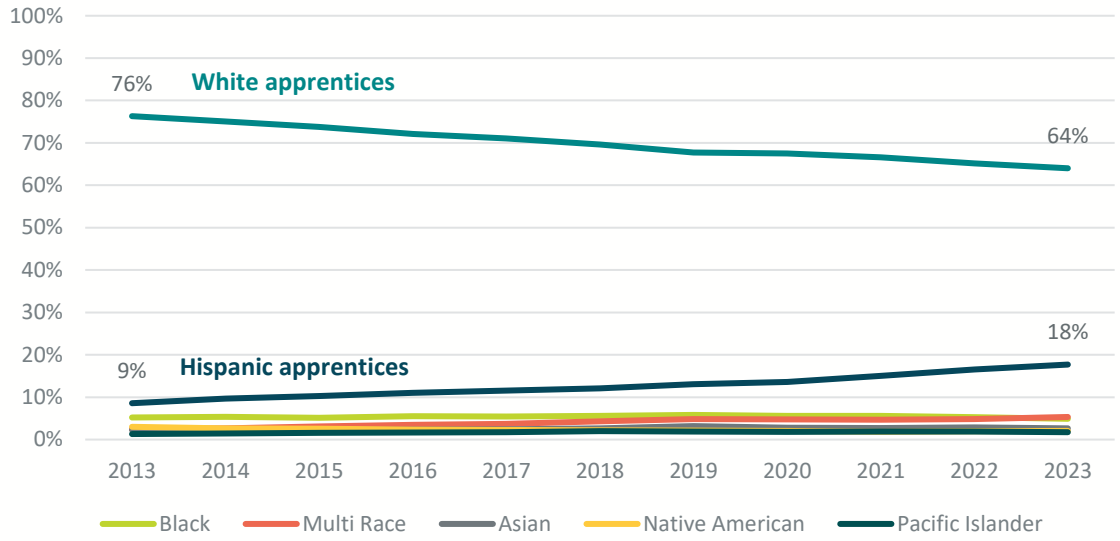
Enrollments in apprenticeship and higher education

Data from the Washington State Department of Labor & Industries (L&I) show that as of 2023, there were about 16,000 apprentices.[1] Of these apprentices, 87 percent of apprentices were male, while 13 percent were female. By race, 64 percent of apprentices were White, 18 percent were Hispanic, 5 percent were Black, 5 percent were multi-racial, 3 percent were Asian, 2 percent were Native American, and 2 percent were Pacific Islander.

[1] This number reflects the total number of individuals who were active in their apprenticeship throughout the year.

Apprenticeships in Washington State have become more diverse over time, mostly due to an increase in apprentices identifying as Hispanic. Between 2013 and 2023, the number of Hispanic apprentices went up by 9 percentage points, while the number of White apprentices went down by 12 percent (figure 1). For other racial and ethnic groups, there were small changes over time: a 3 percent increase for multi-racial apprentices, a 1 percent increase for Asian and Pacific Islander apprentices, a 0 percent change for Black apprentices, and a 1 percent decrease for Native American apprentices.

Figure 1. Racial demographics of Washington State apprentices



Notes: From 2013 to 2023, the population of Black apprentices went from 5% to 5%, multi-racial from 2% to 5%, Asian from 2% to 3%, Native American from 3% to 2%, and Pacific Islander from 1% to 2%.

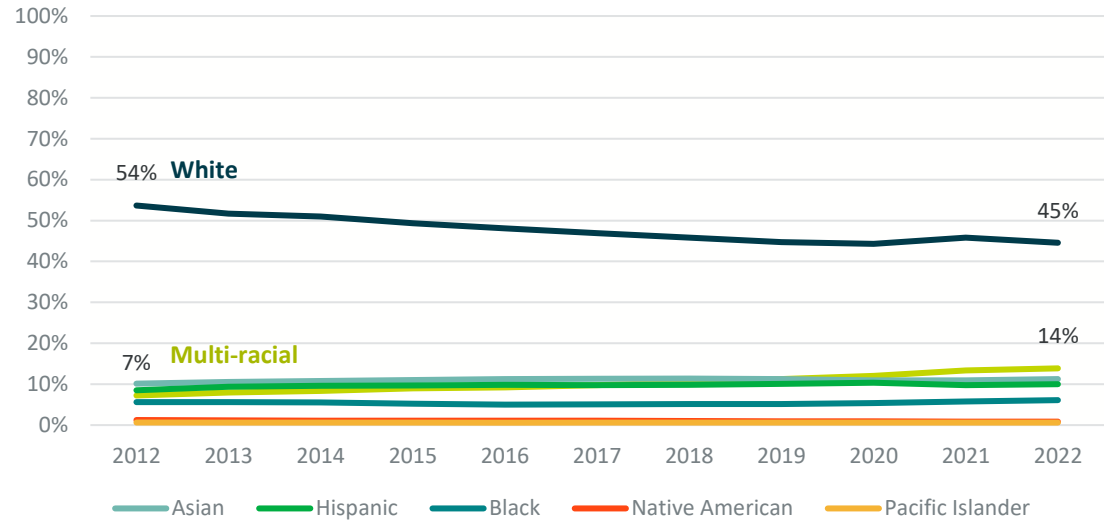
This graph reflects the percentage of active apprentices throughout the year.

Source: Washington State Department of Labor & Industries, 2023.

As of 2022, there are around 156,000 students enrolled in Washington community and technical colleges. This is a decrease from 10 years ago, when about 240,000 thousand students were enrolled. Around 39 percent of community and technical college students are male, while 54 percent are female (6 percent are not reported). By race, 45 percent of students are White, 14 percent are multi-racial, 11 percent are Asian, 10 percent are Hispanic, 6 percent are Black, 1 percent are Native American, and 1 percent are Pacific Islander (12 percent are not reported).

From 2012 to 2022, there has been a 9 percent decline in the number of White students, and a 7 percent increase in multi-racial students (figure 2). For other racial and ethnic groups, there were small changes over time: a 1 percent increase for Asian and Hispanic student, and no change for Black, Native American and Pacific Islander students.

Figure 2. Racial demographics of Washington State community and technical college population



Note: From 2012 to 2022, the population of Asian students changed from 10% to 11%, Hispanic students from 9% to 10%, Black students 6% to 6%, Native American 1% to 1%, and Pacific Islander 1% to 1%.

Source: Washington State Board for Community and Technical Colleges, 2023.

Governance

The Washington State Department of Labor & Industries (L&I) oversees registered apprenticeships in Washington State. The director of L&I appoints the Washington State Apprenticeship and Training Council (WSATC) to regulate apprenticeship program standards and approve new or revised apprenticeship programs. These standards cover a wide range of topics, including program administration, qualifications for apprenticeship sponsors and instructors, and requirements for on-the-job training, related supplemental instruction, and safety and health. Employers, unions, employer associations, and others who sponsor apprenticeship programs use the online Apprenticeship Registration Tracking System (ARTS) system to register their apprenticeship programs with WSATC and L&I and to manage their program information, including apprentice registration, training schedules, and related supplemental instruction.

The Washington State Board for Community and Technical Colleges oversees Washington State's system of 34 public community and technical colleges. They are responsible for operating budget requests and disbursing funds appropriating by the state legislature, ensuring colleges offer programs and services specified by law, establishing standards for operation, and preparing a master plan for community and technical college education.

Paths to credentials for apprentices

Credentials are an important marker of skill that can improve an individual's labor-market experience through higher earnings, greater mobility, and enhanced job security (U.S. Department of Labor, 2010). A credential is defined as a "verification of qualification or competence issued to an individual by a third party with the relevant authority or jurisdiction to issue such credentials (such as an accredited educational institution, an industry recognized association, or an occupational association or professional society)" (U.S. Department of Labor, 2010). There are many kinds of credentials, including educational diplomas and certificates, educational degrees (e.g., associate degrees or bachelor's degrees), registered apprenticeship certificates, occupational licenses, and industry-recognized certificates.

There are several characteristics of credentials that strengthen their value to individuals (U.S. Department of Labor, 2010):

1. **Industry recognized** credentials are developed or endorsed by nationally recognized industry associations or organizations that represent a large part of an industry. They can also be credentials that companies in a local area may be seeking.
2. **Stackable** credentials are part of a sequence that can be accumulated over time to build up an individual's qualifications and move them forward in a career pathway.
3. **Portable** credentials are recognized and accepted across geographic areas, educational institutions, or other industries or employing companies.
4. **Accredited** credentials ensure quality though verification from a regional or national accrediting organization.

Traditional apprenticeships

Traditional apprenticeships offer related supplemental instruction from third parties (e.g., community colleges, unions, and community-based organizations), and they often do not result in college credits or a degree. They do, however, culminate in a **Certificate of Completion for an apprenticeship program** issued by the U.S. Department of Labor or a State Apprenticeship Agency (U.S. Department of Labor, 2010). A Registered Apprenticeship Certificate is a nationally recognized credential that demonstrates an apprentice has successfully completed the apprentice training requirements outlined in the standards of the apprenticeship. Furthermore, an apprentice can obtain a **journeyworker license** upon completion of the program, which may be necessary to practice in some building trades. Journeyworker status refers to an individual who has mastered the

skills, abilities, and competencies recognized within a field. Journeymen are qualified to then train and guide the next generation of apprentices through their program.

There are additional ways apprentices can earn credentials through their program (U.S. Department of Labor, 2010):

1. **Interim credentials** or certificates can be issued to an apprentice by the program sponsor based on a competency, time, or hybrid approach. These credentials demonstrate an apprentice's attainment of competency in a particular area of their trade, providing a certificate of skill before completion of their program.
2. **Occupational licenses** are required by government licensing boards to practice in certain occupations, such as construction, so apprentices may apply for these licenses during or after their apprenticeship.
3. **Personnel certifications (professional/industry certifications)** can be issued by non-governmental organizations (e.g., professional associations, companies) to indicate an individual has the necessary skills to perform a specific occupation or skill. Certificates are earned by participating in learning and work experiences, taking a certification exam, and submitting documentation of relevant experience.

These credentials help apprentices gain recognition and advance in their occupation. But while apprentices may receive interim credentials and industry certifications during their program, these are not usually translated into credits in the higher education system.

College-connected and degree apprenticeships

As states continue to look for ways to support and develop their workforces, more are considering and implementing new or expanded pathways to credentials for apprentices. Earning college credits through apprenticeship can make postsecondary education more accessible, flexible, and affordable, particularly for adult learners, job changers, and students from economically disadvantaged backgrounds (Universities UK, 2017). Additionally, providing college credit for apprenticeship training ensures those who do not complete their program can apply them toward earning a different credential (Camardelle, 2023). This is particularly important when thinking about equity in apprenticeship, as national data show Black apprentices have lower completion rates than their white counterparts (Jones & DeCarlo, 2021).

Community colleges have a strong history of providing career and technical education and are well positioned to contribute significantly to this expansion (Klor de Alva & Schneider, 2018). These institutions have a proven track record of developing and implementing training programs that effectively meet the specific needs of local employers (Tesfai, 2019). Community colleges also play a vital role in offering affordable pathways for students to obtain valuable postsecondary credentials

(Tesfai, 2019). Tesfai (2019) provides a useful schematic for classifying the ways community colleges support pathways to degrees through apprenticeships (figure 3).

Figure 3. Pathways to credentials for apprentices

Source: Adapted from Tesfai, L. (2019). *Creating Pathways to College Degrees through Apprenticeships*. Education Policy. In New America. **https://eric.ed.gov/?id=ED599746**.

There are several ways colleges can provide opportunities for apprentices to earn academic credit for the classroom and/or on-the-job components of their training. Colleges can offer for-credit courses for some or all the instruction, as well as for on-the-job training, aimed at earning a credential.

- **Credit for on-the-job learning.** One method is to award credit for the on-the-job apprenticeship training. This can involve conducting a credit evaluation of a completed apprenticeship program (Tesfai, 2019). The American Council on Education (ACE) is one organization that conducts such evaluations. For example, IBM and ACE partnered to translate IBM apprentices' 12 months of on-the-job training into up to 45 college credits (IBM, 2021). IBM apprentices can use this credit at two- and four-year institutions to accelerate progression toward an associate or bachelor's degree.
- **Credit for prior learning.** Another method is using prior learning experiences to award credit for competencies (Tesfai, 2019). The term *recognition of prior learning* (RPL) refers to methods of valuing college-level learning that has taken place outside of formal educational institutions to count toward a credential (Uranis & Davis, 2020). RPL is a way to help accelerate time-to-degree for adult learners. Different methods of valuing prior learning include (Rasmussen et al., 2015; Uranis & Davis, 2020):

- *Standardized examination*, such as Advanced Placement (AP), College Level Examination Program (CLEP), International Baccalaureate (IB), or Defense Activity Test and Examination Services Subject Standardized Tests (DSST).
- *Faculty-developed challenge exams,* which give students credit for a specific course by taking a comprehensive exam developed by campus faculty.
- *Portfolio-based and other individualized assessments,* which allow students to demonstrate their learning through a portfolio.
- *Evaluation of non-college programs,* allowing students to receive credit based on recommendations from the National College Credit Recommendation Service (NCCRS) and ACE. These organizations evaluate training offered by the military or employers. Alternatively, institutions can conduct their own review.
- *Credit by certification*, such as industry certification or licenses.

- **For-credit courses leading to a degree.** Higher education institutions can create a degree pathway that comprises for-credit courses leading to an associate or bachelor's degree. This degree apprenticeship would result in both an academic award and certificate of completion for the apprenticeship. In addition to for-credit courses, institutions can recognize on-the-job learning and prior learning as part of that degree pathway, ultimately creating a competency-based degree program.

A sampling of states that have established college credentials for apprentices is described in table 1. These programs provide apprentices with opportunities to earn academic credit, an associate degree, or bachelor's degree as part of their apprenticeship program.

Table 1. Selected state examples of college-connected apprenticeships

	Offering	Description
 Indiana	Ivy Tech Community College of Indiana Associate of Applied Science in Apprenticeship Technology	Ivy Tech's Associate of Applied Science in Apprenticeship Technology for Ironwork Apprentices and Journeymen gives apprentices and journeypersons the opportunity to apply their apprenticeship courses towards an associate of applied science degree.
 Kansas	Metropolitan Community College Degrees After Apprenticeship	The college helps apprenticeship program completers fulfill credit hours needed to obtain an associate of applied science in industrial technology degree. Prior learning credits can be used to earn a bachelor's degree in technology management at the University of Central Missouri, DeVry University, or Missouri Western State University.

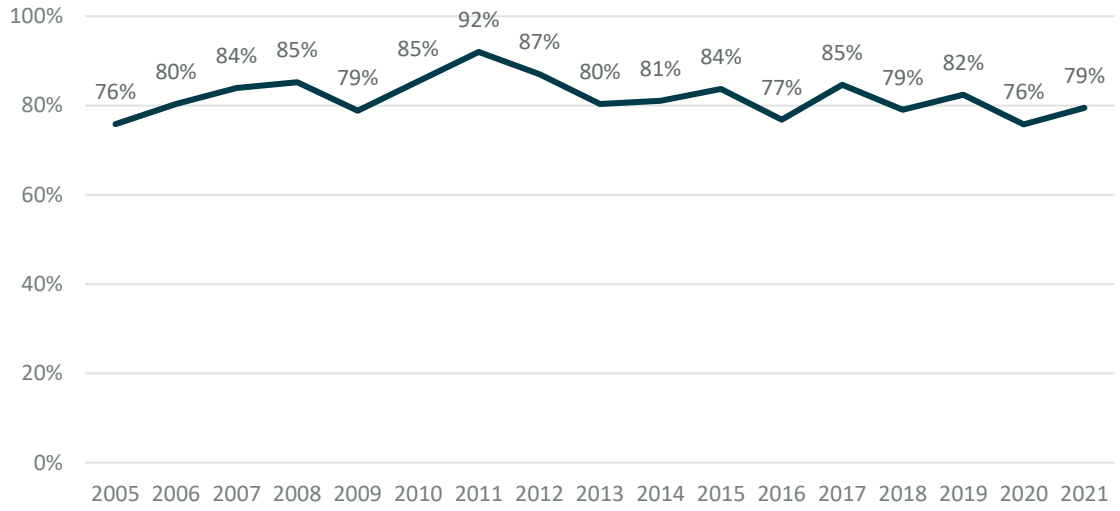
 Kentucky	Associate in Applied Science in Apprenticeship Studies	Offered at several Kentucky community and technical colleges to completers of federally or state-approved apprenticeship programs.
 Oregon	Oregon Community College Apprenticeship Consortium (OCCAC)	Oregon community colleges provide related training for apprenticeship programs including associate of applied science degrees. The OCCAC manages construction trades, electrician, and industrial mechanics and maintenance technology pathways.

Washington path to credentials

Nineteen Washington State community and technical colleges provide 80 percent of all related supplemental instruction for apprentices, having partnerships with 156 active apprenticeship programs (Washington State Board for Community and Technical Colleges, 2022). Apprentices can receive college credit for coursework at community and technical colleges. At some colleges, this credit can lead toward a Multi-Occupational Trades associate degree that can be used to transition to one of several applied bachelor's degrees offered in Washington state (South Seattle College, n.d.). In addition, Washington State offers financial assistance through the Washington College Grant for Apprenticeship. This grant supports income-eligible apprentices enrolled in approved registered apprenticeship programs and can cover tuition, fees, and materials (Washington Student Achievement Council, 2023).

Data from the Washington State Education Research and Data Center (ERDC) show that 78 percent of individuals who completed a state-registered apprenticeship since 2000 were concurrently enrolled in a Washington community or technical college. This percentage has remained mostly steady over time (figure 4). Less than 1 percent of apprentices have been concurrently enrolled in a Washington public university.

Figure 4. Apprentices' concurrent enrollment in community and technical colleges



Note: Enrollment in public universities is not included on this graph as it is less than 1 percent.
Source: Washington State Education Research and Data Center, 2023.

Though most apprentices are enrolled in a community or technical college, very few leave with a certificate or associate degree. Around 4 percent of apprentices complete a degree, most of these are certificates (3%), followed by associate degrees (1%).

Compared to general college population in Washington, the graduation rate within 150 percent of expected time at 2-year postsecondary institutions in 2018 was 53 percent (U.S. Department of Education, 2021). For a 4-year postsecondary institution, the corresponding rate is 58 percent.

Some apprentices later enroll in a Washington community or technical college after completing their apprenticeship—around 15 percent since 2000, and around 13 percent of these individuals complete a certificate or associate degree. Only around 1 percent of apprentices later enroll in a Washington public university.

The ERDC data highlights the high level of involvement of Washington public postsecondary institutions—particularly community and technical colleges—in apprenticeship training in the state. Most apprentices are already enrolled in a college or technical college, and some enroll after their apprenticeship. The data also point to a low rate of completion of degrees and certificates by apprenticeship completers during their apprenticeship training.

Apprentices' demand for degrees

Even with strong support from government and industry, there is little research available on potential demand for degrees among U.S. apprentices. In an exploratory survey to assess two-year associate degree students' perceptions of apprenticeships, Decker (2019) finds that students support the idea of an apprenticeship if it means they can have a transferable degree at an affordable price. Open-ended survey responses revealed that most community and technical college students seem unaware of the option of an apprenticeship, there is a strong pressure to attend college to be successful, and the affordability of the option is appealing. However, the study was limited by its small sample and focus on community college students. There is a strong need for researchers and policymakers to listen to the "voice" of apprentices, particularly in discussions and decisions directly affecting them.

Apprentice survey

We sought to gauge the demand for degrees among Washington apprentices through a survey of apprentices. With input from stakeholders that included staff of the State Board for Community and Technical Colleges and apprenticeship coordinators, we designed and launched a survey to capture apprentices' interest in earning college degrees or certificates (see appendix A). We distributed the survey link to apprenticeship coordinators and others Education Northwest and William D. Ruckelshaus Center staff members engaged with during the project.

Though this survey fills a key gap in research in terms of gathering data on apprentices' perceptions of credentials, it has several notable limitations at this stage. To begin administering the survey, we collaborated with apprenticeship coordinators with whom we had existing relationships. Only a few apprenticeship coordinators have distributed the survey so far, resulting in a relatively small sample size of 69. This restricted sample size limits the generalizability of our survey findings. Additionally, respondents who were particularly interested in credentials may have been more likely to participate in the survey, potentially introducing bias into the results. This bias could lead to an overstatement of the demand for degrees among apprentices. Because of these limitations, these results should be interpreted with caution and be considered preliminary. Future administrations of the survey, bolstered by findings from interviews and focus groups, will improve understanding of apprentices' demand for degrees.

Survey sample

A total of 69 individuals responded to the survey. Nearly all respondents were in manufacturing (58%) or construction trades (38%). The sample comprised 86 percent men and 14 percent women. By race, the sample was 68 percent white, 20 percent Hispanic/Latino, 13 percent Asian, 7 percent Native Hawaiian or Pacific Islander, 5 percent American Indian or Alaska Native, and 5 percent Black. By age, 35 percent of sample respondents were 18–29 years old, 42 percent were 30–39 years old, and 23 percent were 40–54 years old. Forty-five percent had their high school diploma or GED, 32 percent had some college, 13 percent had an associate degree, and 8 percent had a bachelor's degree.

Apprenticeship program

Most respondents reported learning about career pathways from a business or their workplace (35%), friends or acquaintances (25%), word of mouth (25%), and family (22%; table 2). Very few respondents reported using Washington-specific websites for information about career pathways.

Table 2. How did you learn about the education, training, and/or experience needed to start a career, including your apprenticeship? Select all that apply.

Information Source	Percentage
Business or workplace	36%
Friends or acquaintances	25%
Word of mouth	25%
Family	22%
School teacher	16%
Labor Union	12%
School counselor	6%
Google searches	6%
Other	4%
WA Department of Labor & Industries website	4%
Social media	1%
Career Connect Washington website	0%

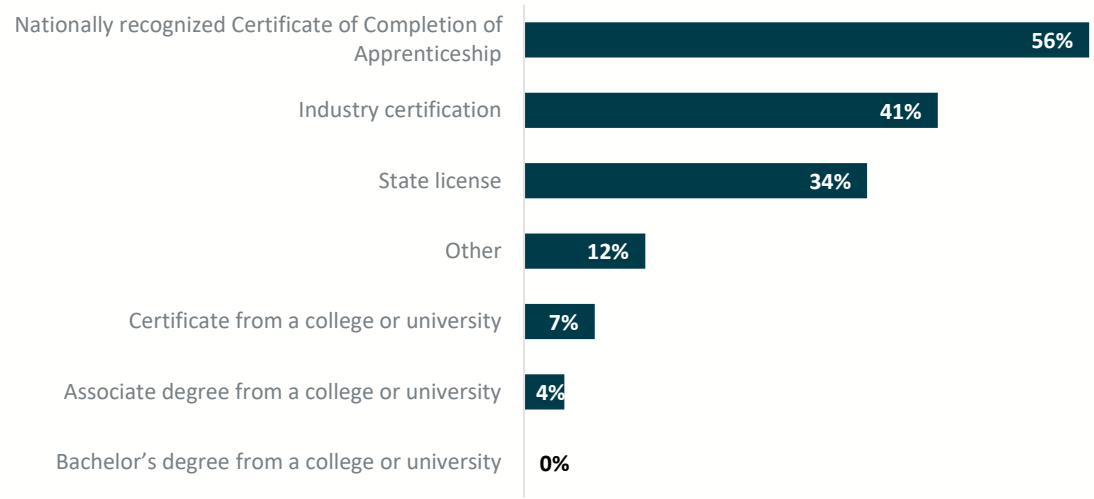
Note: Other includes military, trades fair, and Pioneer Human Services.

Source: Washington Apprenticeship Survey, Education Northwest, 2023.

The credential most apprentices report they will earn after their apprenticeship is a nationally

recognized certificate of completion of apprenticeship (56%), followed by an industry certification (41%), and state licenses (34%; figure 5). Few respondents reported they will receive a certificate, associate degree, or bachelor's degree after completing their apprenticeship.

Figure 5. What credential(s) will you receive after completing your registered apprenticeship program? Select all that apply.

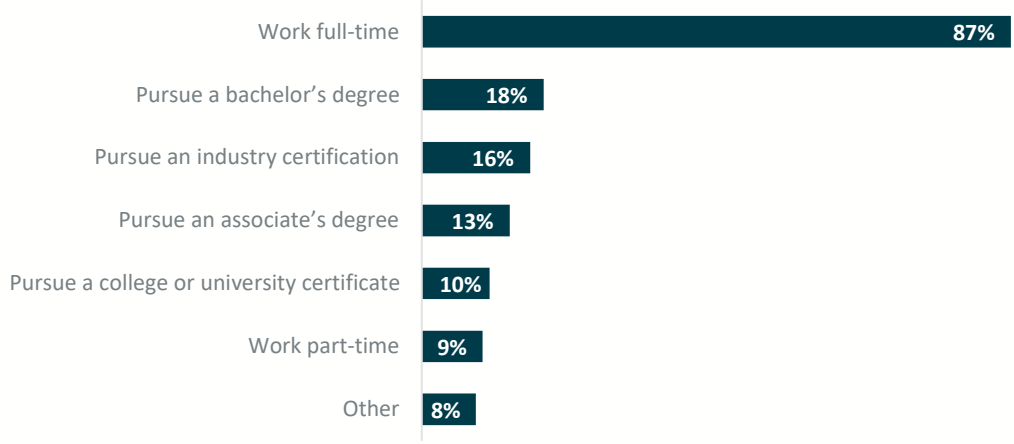


Note: Other includes journeyman's card and unsure.

Source: Washington Apprenticeship Survey, Education Northwest, 2023.

Most respondents (87%) plan to work full-time after their apprenticeship (figure 6). Some are also interested in pursuing a bachelor's degree (18%) or industry certification (16%).

Figure 6. What are you planning to do after completing your apprenticeship program? Select all that apply.

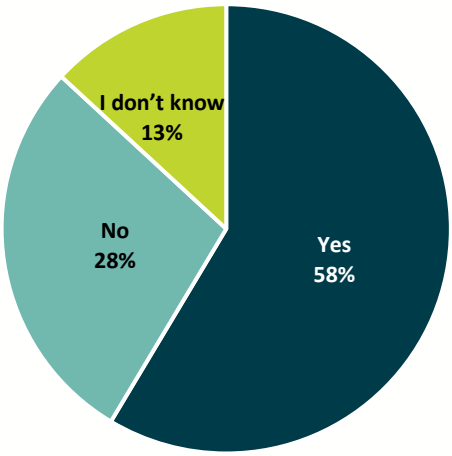


Note: Other includes starting a business, wage increase, work for nonprofit, and continue working acquiring more certification.
Source: Washington Apprenticeship Survey, Education Northwest, 2023.

College credits

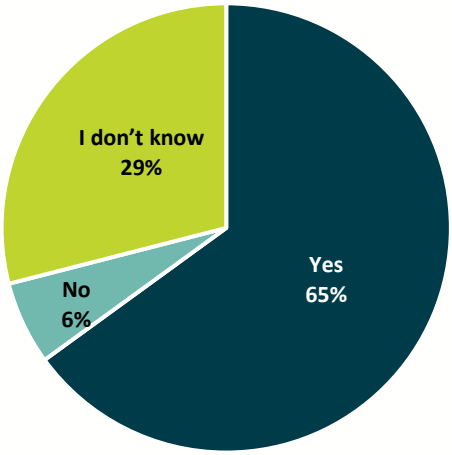
Over half of the survey respondents reported earning college credits *prior* to their apprenticeship (figure 7). Furthermore, around 65 percent of respondents report earning college credits or expecting to earn college credits *during* their apprenticeship (figure 8).

Figure 7. Did you earn any college credit prior to your apprenticeship?



Source: Washington Apprenticeship Survey, Education Northwest, 2023.

Figure 8. Have you earned (or will you earn) any college credit during your apprenticeship?



Source: Washington Apprenticeship Survey, Education Northwest, 2023.

Of those who reported receiving college credit, 81 percent reported it would apply towards a college credential, while 17 percent reported they did not know whether it would apply or not. Most respondents who reported they earned college credit said they learned about it through their college classes and teachers or their apprenticeship coordinators.

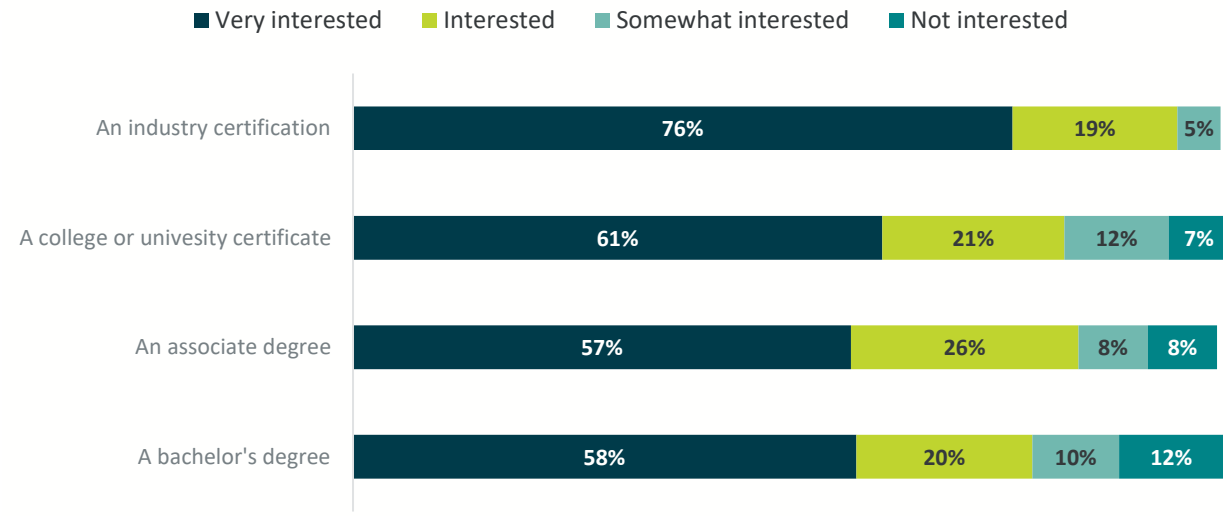
Interest in credentials

Many survey respondents are interested in receiving college credit as part of their apprenticeship program (figure 9). There is a high level of interest in receiving credentials as part of an apprenticeship program (figure 10). The credential most apprentices are interested in is an industry certification.

Figure 9. How interested would you be in receiving college credit as part of your apprenticeship program?

Source: Washington Apprenticeship Survey, Education Northwest, 2023.

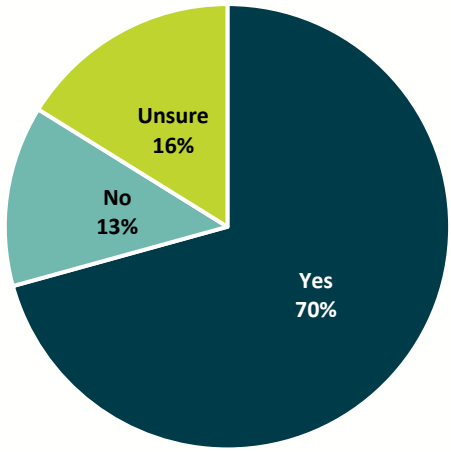
Figure 10. How interested would you be in receiving the following credentials as part of your apprenticeship program?



Source: Washington Apprenticeship Survey, Education Northwest, 2023.

Seventy percent of respondents believe earning a college degree or certificate would improve their chances for employment and career advancement (figure 11).

Figure 11. In your view, would earning a college degree or certificate improve your chances for employment and career advancement?



Source: Washington Apprenticeship Survey, Education Northwest, 2023.

Respondents were asked to describe (why or why not) they thought a college degree would improve their employment chances. Responses included having a college degree or certificate would show employers their personal growth and learning, make them more competitive, provide

better pay and opportunities, help with future career advancement, and meet employers' desire for credentials.

> ***"It shows ability and willingness to learn and advance knowledge."***
>
> **– Survey respondent**

> ***"I know that if I have college credits, I'll get a better salary and more job opportunities."***
>
> **– Survey respondent**

> ***"Overall, it would strengthen the attractiveness of the construction industry. This would incentivize my work and keep me interested in the trades. Additionally, earning a degree through the program would create an advantage for these programs as they offer a more credible and valuable acknowledgement of experience."***
>
> **– Survey respondent**

> ***"Because it's becoming a very common dilemma in the work force, where employers value a college degree over experience. So, I'd rather just have it since it's what people care about most."***
>
> **– Survey respondent**

> ***"Allows me to further my education if I were to change careers."***
>
> **– Survey respondent**

A few respondents shared that real-world experience is better for their occupations, or that college credentials are not necessary to advance in their careers.

"The manufacturing industry is no longer as interested in college degrees and certifications as it used to be. Real world experience and job skills are the most desired traits that I have consistently seen employers looking for."

– Survey respondent

"The journeyman's card is all I will need."

– Survey respondent

"I already own an AAS Degree in CNC Machining, that isn't why I got hired though, I got hired because of my skills/ability to understand what I was doing. Not my certificate."

– Survey respondent

Funding models

This section describes funding models for postsecondary credentials for apprentices - reimbursement systems, tuition waivers, startup grants, and financial aid. One of the foundational sources funding models is New America's Center on Education and Labor 2019 report *Solid Foundations: Four State Policy Approaches for Supporting College Connected Apprenticeships*. The report's author, Michael Prebil, interviewed staff from state government agencies and colleges across 12 states to summarize their apprenticeship-related instructional funding approaches.

Reimbursement systems

Reimbursement systems allocate state funding to cover instructional costs for education providers (Wilson & Mehta, 2017; Prebil, 2019). This process involves establishing a formula based on RSI contact hours or a full-time equivalent student rate. Throughout the year, local education agencies report the hours of RSI they provide, and in turn, they receive reimbursement from the state. One significant advantage of using state appropriations is that it effectively reduces the instructional costs for both apprentices and employers. However, providing these appropriations can be costly for states (Prebil, 2019).

Additionally, a key challenge arises in the difference between contact hours and credit hours. Contact hours refer to the actual time a student spends in scheduled instruction, and it is measured in minutes. For example, if a student attends a class for 60 minutes, that would be one contact hour. Apprenticeships usually require around 144 contact hours, meaning students spend a total of approximately 144 hours in scheduled instruction to complete the apprenticeship. On the other hand, college degrees are usually measured in credit hours. For an associate degree, students typically need around 60 semester credit hours, and for a bachelor's degree, they typically need 120 semester credit hours. Credit hours represent the amount of credit a student receives for completing a course. A standard course generally includes one contact hour per week and two preparation hours per week.

The problem arises when colleges receive different funding rates for contact hours compared to credit coursework. This means that when a student takes a course with a certain number of contact hours, the college may receive less funding for that course than if the same course was taught with the equivalent credit hours. To address this funding difference, Texas and California have implemented a solution that allows colleges to choose the rate they prefer.

States that allocate funds for apprenticeship instruction include Texas, California, and Wisconsin (table 3).

Table 3. State examples of reimbursement systems

	Policy	Description
 Texas	TX Educ Code § 133, 2022	Provides state appropriations to local educational agencies and independent apprenticeship committees to support the costs of classroom instruction in registered apprenticeship programs.
 California	CA Educ Code § 79149, 2018	Allocates related supplemental instruction funding to local K–12 education agencies and community college districts.
 Wisconsin	WI Stat § 106.05, 2021	Provides a completion award to an apprentice or apprentice sponsor equal to 25 percent of the cost of tuition incurred by the apprentice or sponsor or $1,000, whichever is less.

Under Texas Education Code Chapter 133, the Texas Workforce Commission (TWC) has the authority to allocate state funds to support the costs of related supplemental instruction in registered apprenticeship programs. The state provides an annual notice to sponsoring local education agencies about the available funds for the year, the qualifications required to apply, and the application procedures. The TWC calculates a contact hour reimbursement rate by dividing the total available funds by the statewide total number of contact hours of the related apprenticeship training instruction. In 2020, TWC supported 6,810 apprentices for a total of $4.8 million in funding. The final contact hour rate was $4.00 (Texas Workforce Commission, 2021).

California provides reimbursement to K–12 districts and community colleges based on the hours of related supplemental instruction they offer. The chancellor of the California Community Colleges provides an estimate of the funding needs for RSI, and the state Department of Finance determines the funding allotment and the hourly reimbursement rate. The chancellor then assigns RSI funding hours based on past use and the allotment available. At the end of the year, K–12 districts and community college districts report their actual RSI hours, and the chancellor completes the process by reimbursing them. Initially, the state reimbursed an hourly rate of RSI funding starting at $6.77. However, in 2022, they increased the reimbursement rate to $8.82 to align with the credit-hour reimbursement rate established by the legislature. In fiscal year 2022-23, approximately $88 million was appropriated to support community colleges and K–12 districts to deliver RSI (California Community Colleges, 2022).

Wisconsin follows a different approach, providing reimbursement either to the apprentice or their sponsor. The reimbursement takes the form of a completion award and aims to subsidize tuition for apprenticeships. Specifically, Wisconsin pays 25 percent of the total tuition cost or up to $1,000, whichever amount is lower, as a completion award.

Tuition waivers

States such as North Carolina, Maine, Washington, and Florida have implemented tuition waiver programs for apprentices (Prebil, 2019; table 4). Tuition waivers benefit apprentices by either reducing or eliminating their tuition expense and encourages employers and colleges to cooperate on RSI coursework (Prebil, 2019).

In North Carolina, students who begin a registered apprenticeship within 120 days of completing high school can take advantage of the Youth Apprenticeship Tuition waiver. This waiver provides coverage for tuition expenses throughout their program. Meanwhile, in Maine, the Department of Labor plays a pivotal role in supporting apprentices. It underwrites 50 percent of the tuition costs incurred by apprentices attending public educational institutions.

Table 4. State examples of tuition waivers

	Policy	Description
 **North Carolina**	North Carolina Youth Apprenticeship Tuition waiver	Provides funding for tuition waivers that cover tuition and registration fees for high school students who enter a pre-apprenticeship or apprenticeship program while they are in high school.
 **Maine**	Maine Revised Statutes Title 26, §3211, 6-A	Covers 50% of tuition costs for apprentices.
 **Washington**	State Board for Community and Technical Colleges Tuition Waiver Resolution	Requires colleges to waive 50% of the tuition and fees for apprentices.
 **Florida**	Florida Statute 1009.25 Fee Exemptions	Requires colleges to waive 100% of the tuition and fees for apprentices.

In Washington and Florida, colleges and universities are required to waive tuition and fees for eligible individuals pursuing apprenticeships. In Washington, a 50 percent tuition waiver significantly reduces the financial burden on apprentices. Florida goes a step further by offering a 100 percent tuition waiver to eligible apprentices.

While tuition waivers have clear benefits in terms of reducing or eliminating the financial costs associated with apprenticeships, concerns have been raised about "unfunded" waivers (Prebil, 2019). One of the main concerns is that colleges and universities may be disincentivized to provide coursework when the tuition revenue is waived. This makes building college-connected apprenticeships difficult unless colleges receive incentives to participate (Prebil, 2019).

Start-up grants

To encourage college participation in apprenticeship programs, particularly in nontraditional fields, several states have established start-up grants for educational institutions (Prebil, 2019). These grant programs serve as financial incentives and support the integration of apprenticeships into college education. However, grants may not provide sufficient long-term support for programs and instead encourage the proliferation of short-lived programs (Prebil, 2019).

States such as New Jersey and Pennsylvania have implemented grant programs (table 5) for colleges and universities, enabling them to expand their apprenticeship offerings and increase participation in nontraditional fields. One innovative example of a partnership between a registered apprenticeship and higher education is provided by Thomas Edison State University in New Jersey (Harmon, 2022). In 2021, they received a NJ Place grant in the amount of $849,000 from the New Jersey Department of Labor to fund student/apprentices in completing their associate degree.

Table 5. State example of start-up grants

	Grant	Description
 New Jersey	NJ Pathways Leading Apprentices to a College Education (NJ Place)	Provides funding to cover the costs of a degree apprenticeship program, including related supplemental instruction tuition.
 New Jersey	Growing Apprenticeships in Nontraditional Sectors (GAINS) and Pre-Apprenticeship in Career Education (PACE)	Offers two competitive grants ($7 million total) that cover training costs for registered apprenticeship programs, including related supplemental instruction.

 Pennsylvania	The Pre-Apprentice and Apprenticeship Grant Program	This grant program provides funding to eligible applicants for expenses related to apprenticeship instruction up to $3,000 per apprentice per year (not to exceed three years).

Financial aid

Apprentices can be integrated into existing student financial aid programs (McCarthy et al., 2017; Prebil, 2019). This allows apprentices to access various forms of financial assistance to support their education and can integrate with dual enrollment and college promise initiatives (Prebil, 2019).

Kentucky and Georgia, for example, include apprentices in their statewide scholarships, which are typically offered to high school students (table 6). Washington offers financial aid to low- and middle-income families to help cover college costs. The Washington College Grant for Apprenticeship is one of the most generous financial aid programs for apprentices in the country.

Table 6. State examples of student financial aid

	Policy	Description
 Kentucky	Kentucky General Assembly Senate Bill 54	Allows apprentices to be eligible for the Kentucky Educational Excellence Scholarship (KEES), a statewide scholarship awarded to high school students each year they attain a 2.5 GPA or better to be used for tuition at a Kentucky college.
 Georgia	HOPE grant and HOPE scholarship	Awards funding for students to earn a certificate or diploma. The HOPE scholarship is a merit-based scholarship to use for a degree.
 Washington	Washington College Grant for Apprenticeship	Awards money to recent high school graduates and working-age adults from low- and middle-income families to pay for tuition, fees, and materials.

Tax credits

Some states have also implemented tax credits to incentivize employers who fund their apprentices' education (Wilson & Mehta, 2017), offsetting some of the costs associated with supporting apprenticeships (Uranis & Davis, 2020).

Illinois uses tax incentives to support apprenticeship programs (table 7). Through their tax credit program, employers can receive up to $3,500 per apprentice.

Table 7. Examples of tax credits

	Policy	Description
 Illinois	Illinois General Assembly Public Act 101-0207 Section 229. Apprenticeship education expense credit	Provides employers a tax credit of up to $3,500 per apprentice for educational expenses.

Additional sources of funding

The federal government plays a significant role in providing funds for apprenticeship programs. The Department of Labor's **Federal Resources Playbook for Registered Apprenticeship** (2021) outlines various funding sources available to support companies, employers, labor organizations, apprenticeship sponsors, educators, workforce professionals, intermediaries, and community-based organizations engaged in apprenticeship initiatives.

One prominent funding source highlighted in the playbook is the Workforce Innovation and Opportunity Act (WIOA). WIOA funds are allocated to support workforce development programs, including apprenticeships, with the goal of enhancing employment opportunities and promoting economic growth. WIOA mandates that states strategically coordinate their primary workforce development programs to address the needs of both job seekers and employers through a combined four-year state plan (Department of Labor, n.d.c). Washington's workforce plan, Talent and Prosperity for All, aims to strengthen business engagement, streamline customer service, broaden system accessibility, and build a next-generation performance accountability system (Washington Workforce Training and Education Coordinating Board, n.d.). Common ways to use WIOA funding for apprenticeship include related supplemental instruction, on-the-job training, and supportive services such as transportation and childcare (U.S. Department of Labor, 2021)

Employers can also cover the education costs of their sponsored apprentices. This involves creating a combined program that provides apprentices with on-the-job training and the opportunity to earn an academic degree or certification. Table 8 showcases examples of companies that have implemented such work and education programs for their apprentices. One notable example is the Aon U.S. Apprenticeship Program, which goes beyond providing workplace training and extends its support to cover the expenses of apprentices pursuing an associate degree at a local community college.

Table 8. Examples of employer funding

Company	Program	Description
Aon	Aon Apprenticeship Program	Aon, a global professional services firm, provides a two-year, full-time apprenticeship program that combines work and education; apprentices attend classes at an Aon-partnered community college three days a week to earn their associate degree. Aon pays for their time in the office and in the classroom as well as for tuition, books, and fees.
Stadler	Talent Ready Apprenticeship Connection	Stadler, a railroad equipment manufacturing company, has a three-year apprenticeship program for high school juniors or seniors to finish high school and attend courses at a local community college to earn their associate degree debt-free.
Zurich	Zurich Apprenticeship Program	Zurich, a major insurance company, has a two-year apprenticeship program that covers tuition and fees for apprentices to complete either an associate degree or bachelor's degree.

National best practices

As the integration of higher education and apprenticeship is an emerging research topic in the U.S, current research and best practices are limited. What does emerge from the literature are suggested approaches and recommendations that focus on collaboration, clear definitions for student-apprentices, creating clear career pathways, and ensuring equitable opportunities for participation.

Collaboration between apprenticeship programs and educational institutions

Collaboration among colleges, employers, registered apprenticeship programs, accrediting bodies, and state agencies is critical for delivering credentials to apprentices. Identifying clear roles and responsibilities among stakeholders is important, as is creating structures and processes for collaboration. One nationally recognized model of collaboration is **Apprenticeship Carolina,** a program within the South Carolina Technical College System that supports and promotes development of registered apprenticeship programs throughout South Carolina. The program works to ensure all employers in the state have access to the information and technical assistance they need to create registered apprenticeship programs.

Recommendations for collaboration include:

- **Engage key stakeholders,** including industry and professional associations and accrediting bodies, to design competency-based curricula for the on-the-job learning components of an apprenticeship, and to develop quality principles to guide the development of programs in high-demand fields such as engineering and health care (McCarthy et al., 2017).
- **Create sector councils** that enable employers, unions, and higher education representatives to interact on a range of sector-specific policies and practices (Goger, 2020). This working group can assess quality standards and approve training providers and programs in priority occupations.
- **Identify a lead employer-serving state agency** to ensure there is a clear entry point for employers to access resources and to gather direct employer input on training programs or other services (Goger, 2020).
- **Partnerships between colleges and universities and apprenticeship programs** are necessary to foster credentials for apprentices. The **Registered Apprenticeship-College Consortium (RACC),** run by the U.S. Departments of Labor and Education, strengthens relationships among registered apprenticeship and two- and four-year post-secondary

institutions across the nation. There are currently 340 member colleges in RACC who work through a recognized third-party evaluator (e.g., the **American Council on Education)** to facilitate the transfer of registered apprenticeship completion certificates to college credit (Klor de Alva & Schneider, 2018).

Define and track student-apprentices

There is currently little data on the enrollment of apprentices in higher education, making it difficult to track these students for financial support, student support, or to reward institutions for creating those opportunities (McCarthy et al., 2017). Creating well-coordinated platforms for data-sharing, research, and information among state labor and education agencies can help track participation and outcomes, as well as providing important feedback for continuous improvement (Goger, 2020).

McCarthy et al. (2017) recommends making these apprentices visible in higher education data systems by creating distinct categories of "student-apprentice" and "degree apprentice." Creating clear definitions can allow states to recognize, track, and support these students and programs through public policy.

> ***"A 'student-apprentice' is a student or apprentice who meets the definition of "regular student," as defined by the Higher Education Act, 34 CFR Part 600, and "apprentice" as defined by the National Apprenticeship Act, 29 CFR Part 29.2."***
>
> ***"A 'Degree Apprenticeship' is an apprenticeship program that meets the standards established in the National Apprenticeship Act 29 CFR Part 29 and the requirements of a postsecondary degree program as established by the relevant state education agency in the state where the program is delivered."***
>
> **– McCarthy et al., 2017**

Create clear career pathways

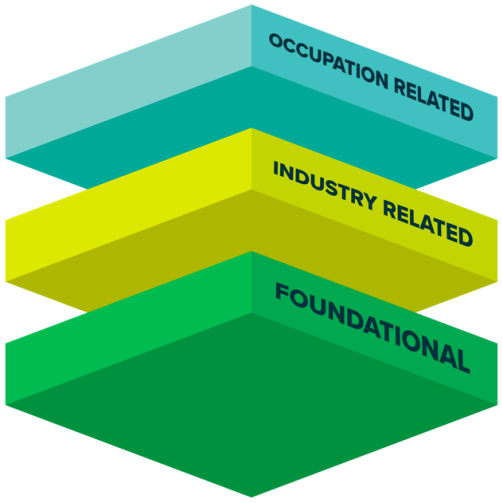
Goger (2020) recommends that state-level policy implement a policy framework that allows learners to "stack" their learning and be able to switch between pathways without having to start over. To do so, states can formalize the recognition of multiple ways of learning by establishing credit equivalencies, offering more flexible course options that align better with the needs of many students and employers, and systemizing prior learning assessment (Goger, 2020).

Examples of flexible course options include:

1. **Competency-based curricula.** This approach requires students to master clearly defined and measurable learning outcomes ("competencies") in a time-variable environment. This departs from traditional time-based models in which all students have a defined amount of time and may experience different learning outcomes (Mathematica, 2015). The Urban Institute is building **national competency-based frameworks** for registered apprenticeships across occupations, which can be used to develop or refine curriculum.
2. **Micro-credentials.** These are short, competency-based recognitions that demonstrate mastery in a particular area (National Educational Association, n.d.). For example, SUNY Ulster offers several advanced manufacturing micro-credentials: pre-apprenticeship, computer numerical control (CNC) programmer, CNC operator, and computer-aided design (CAD) (SUNY Ulster, n.d.). These micro-credentials consist of several courses and can be stacked towards a degree.
3. **Modularized curricula.** This means breaking the course into smaller segments of instruction. Students accumulate credits for modules which can lead to a specific qualification (Dejene, 2019).

Because there are many possible credentials, creating a clear career pathway or ladder can be difficult. One tool that can help provide a guide to existing career pathways is the **Competency Model Clearinghouse** (CMC) site sponsored by the U.S. Department of Labor. On the site, you can view the latest industry models or build your own. Models are based on a tiered "building block" framework (figure 12) that represents the skills, knowledge, and abilities needed in an industry or occupation.

Figure 12. Competency model



Source: Adapted from CareerOneStop. (n.d.). *The "Building Blocks" for Competency Models.* https://www.careeronestop.org/CompetencyModel/pyramid_definition.aspx

Ensuring equitable opportunities for participation

While apprenticeship has a proven track record of advancing workers' careers, it has historically been and continues to be less accessible to women and people of color (Toglia, 2017). In 2016, 5.6 percent of active apprentices in federally registered programs were women, 22.3 percent identified as Hispanic, and 10.1 percent as Black. Additionally, both women and people of color are overrepresented in the lowest-wage apprenticeship programs (Toglia, 2017). Unpredictable schedules, jobsites far from home, seasonal furloughs and slowdowns, and costs of schooling and tools can be challenging for all apprentices, but particularly for those with caregiving responsibilities and limited household budgets. Adding to these challenges are workplace cultures—particularly in the construction industry—characterized by hostility and harassment based on gender, race and ethnicity, sexual identity, age, and level of experience (Burd-Sharps, Lewis, & Kelly, 2014).

Equity in apprenticeships means that "learning is accessible to every student, with targeted supports for those adversely impacted by long-standing inequities in our education system and labor market" (Partnership to Advance Youth Apprenticeship, 2019). The three main components of equity, as described by the Partnership (2019), are access, inclusion, and continuous improvement.

- **Access** ensures every student can participate, which may include support for transportation and internet access.
- **Inclusion** supports diverse learners through accommodations to meet students' linguistic, physical, educational, or mental health needs. Inclusion also means all students are aware of the opportunities available through apprenticeship and encouraged to consider it as a career pathway.
- **Continuous improvement** means that programs are using data to continually evaluate their progress toward equitable outcomes, such as gaps in participation, retention, and completion.

Wraparound support services help ensure all apprentices can access and succeed in earning college credit. Example of supports can include (Tesfai, 2019):

- Free or subsidized child care
- Transportation assistance
- Financial assistance
- Academic and/or career advising
- Worksite-based classroom instruction
- Online classroom instruction (as appropriate)

Conclusion

Washington State Senate Bill 5764 set the foundation for research and collaboration to develop and improve opportunities for apprentices to receive credit towards degrees. In Washington State, most apprentices are enrolled in community or technical colleges, but do not complete a degree. However, based on the results from our survey, many apprentices show interest in a certificate or degree.

Building pathways to credentials requires ongoing connection between the higher education and apprenticeship systems. Collaborative work involves recognizing the competencies gained through apprenticeship training and providing flexible and clear pathways that accommodate the diverse needs of apprentices. Various funding models such as reimbursement systems, tuition waivers, financial aid programs, and start-up grants can support the integration of higher education and apprenticeship.

Specific opportunities for further research include conducting deeper analyses of college-connected apprenticeship programs in peer states, following up on specific research needs identified through the collaborative process facilitated by the William D. Ruckelshaus Center, and continued collection and analysis of state-level data to better capture trends in apprenticeship in Washington. Additionally, a broader distribution of our apprenticeship survey, potentially supplemented with focus groups, could help better assess apprentices' demand for credentials from a more generalizable sample.

References

Burd-Sharps, S., Lewis, K., & Kelly, M. (2014). *Building a More Diverse Skilled Workforce in the Highway Trades: Are Oregon's Current Efforts Working?* Final report submitted to the Oregon Bureau of Labor and Industries and Oregon Department of Transportation. **https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1017&context=soc_fac**

California Community Colleges. (2022). *Formal Notification of Related and Supplemental Instruction Fiscal Year 2022-23 Initial Allocations*. **https://www.cccco.edu/-/media/CCCCO-Website/Files/Workforce-and-Economic-Development/WEDD-Memo/rsi--2022-23-allocation-notification-apprenticeship-july-2022-a11y.pdf**

Camardelle, D. A. (2023). *Five Charts to Understand Black Registered Apprentices in the United States.* Joint Center. **https://jointcenter.org/five-charts-to-understand-black-registered-apprentices-in-the-united-states/**

Career Connect Washington (n.d.). *Our Work and Impact.* **https://careerconnectwa.org/our-work-and-impact/**

CareerOneStop. (n.d.). *The "Building Blocks" for Competency Models.* **https://www.careeronestop.org/CompetencyModel/pyramid_definition.aspx**

Decker, D. (2019). *Student Perceptions of Higher Education and Apprenticeship Alignment*. Education Sciences. **https://www.mdpi.com/2227-7102/9/2/86**

Dejene, W. (2019). The practice of modularized curriculum in higher education institution: Active learning and continuous assessment in focus. *Cogent Education*, 6(1), Research Article. **https://doi.org/10.1080/2331186X.2019.1611052**

Goger, A. (2020). *Desegregating work and learning through 'earn-and-learn' models* (Brookings Blueprints for American Renewal & Prosperity). Brookings. **https://www.brookings.edu/research/desegregating-work-and-learning/**

Harmon, J. (2022). *Can You Earn College Credit from an Apprenticeship?* **https://blog.tesu.edu/can-you-earn-college-credit-from-an-apprenticeship**

IBM. (2021). *American Council on Education Validates IBM Apprenticeship Program, Recommends College Credit to Participants.* **https://newsroom.ibm.com/2021-08-19-American-Council-on-Education-Validates-IBM-Apprenticeship-Program,-Recommends-College-Credit-to-Participants**

Jones, D. A. (2011). Apprenticeships Back to the Future. *Issues in Science and Technology*, *4*. **https://issues.org/auer_jones/**

Jones, J., & DeCarlo, C. (2021). *Equity Snapshot: Apprenticeships in America*. U.S. Department of Labor. **https://sites.ed.gov/hispanic-initiative/2021/11/equity-snapshot-apprenticeships-in-america/**

Klor de Alva, J., & Schneider, M. (2018). *Apprenticeships and Community Colleges: Do They Have a Future Together?* American Enterprise Institute. **https://www.aei.org/research-products/report/apprenticeships-and-community-colleges-do-they-have-a-future-together/**

Mathematica. (2015). *Implementation of Competency-Based Education in Community Colleges: Findings from the Evaluation of a TAACCCT Grant.* **https://www.mathematica.org/publications/implementation-of-competencybased-education-in-community-colleges-findings-from-the-evaluation**

McCarthy, M. A., Palmer, I., & Prebil, M. (2017). *Eight Recommendations for Connecting Apprenticeship and Higher Education*. New America. **http://newamerica.org/education-policy/policy-papers/eight-recommendations-connecting-apprenticeship-and-higher-ed/**

National Education Association. (n.d.). *Microcredentials*. **https://www.nea.org/professional-excellence/professional-learning/micro-credentials**

Neuber-Pohl, C. (2021). *Apprenticeship non-completion in Germany: A money matter?* Empirical Research in Vocational Education and Training, 13(1), 12. **https://doi.org/10.1186/s40461-021-00115-1**

Partnership to Advance Youth Apprenticeship. (2019). *Equity in Youth Apprenticeships: Access, Inclusion, and Continuous Improvement.* **https://www.newamerica.org/education-policy/edcentral/equity-youth-apprenticeships-access-inclusion-and-continuous-improvement/**

Powell, A. (2023). *Apprenticeships policy in England*. House of Commons Library. **https://researchbriefings.files.parliament.uk/documents/SN03052/SN03052.pdf**

Prebil, M. (2019). *Solid Foundations: Four State Policy Approaches for Supporting College-Connected Apprenticeships*. New America. **http://newamerica.org/education-policy/reports/solid-foundations-four-state-policy-approaches-supporting-college-connected-apprenticeships/**

Rasmussen, K., Dziadon, A., & Northrup, P. (2015). *The Status of Prior Learning Assessments in Florida Colleges and Universities*. **https://dlss.flvc.org/documents/210036/1833344/V1_PLA_Florida_2015.pdf/512f68c5-3b85-1ef8-5642-060f4a2e4fd8**

South Seattle College. (n.d.). *Multi-Occupational Trades (MOT).* **https://southseattle.edu/programs/multi-occupational-trades-mot**

SUNY Ulster. (n.d.). *Microcredentials.* **https://www.sunyulster.edu/academics/microcredentials.php**

Swiss Confederation. (2023). *Vocational Education and Training & Apprenticeships.* **https://www.eda.admin.ch/countries/usa/en/home/representations/embassy-washington/embassy-tasks/scienceoffice/vocational-education-and-training_apprenticeships.html**

Tesfai, L. (2019). *Creating Pathways to College Degrees Through Apprenticeships*. **https://www.jstor.org/stable/resrep34360**

Texas Workforce Commission. (2021). *Apprenticeship Related Instruction Cost Study.* **https://www.twc.texas.gov/files/agency/2021-apprenticeship-cost-study-twc.pdf**

Toglia, J. (2017). *What we Know About Equity and Diversity in Apprenticeship*. Jobs for the Future. **https://jfforg-prod-new.s3.amazonaws.com/media/documents/Lit-Review-091517.pdf**

U.S. Department of Labor. (n.d.a). *What is a Registered Apprenticeship Program?* **https://www.apprenticeship.gov/employers/registered-apprenticeship-program**

U.S. Department of Labor. (n.d.b). *The Roles That Colleges and Universities Play in Apprenticeship.* **https://www.apprenticeship.gov/educators/post-secondary-education**

U.S. Department of Labor. (n.d.c). *Workforce Innovation and Opportunity Act.* **https://www.dol.gov/agencies/eta/wioa**

U.S. Department of Labor. (2010). *Increasing Credential, Degree, and Certificate Attainment by Participants of the Public Workforce System.* **https://oui.doleta.gov/dmstree/tegl/tegl2k10/tegl_15-10.pdf**

U.S. Department of Labor. (2021a). *FY 2021 Data and Statistics.* **https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2021**

U.S. Department of Labor. (2021c). *The Federal Resources Playbook for Registered Apprenticeship*. **https://www.apprenticeship.gov/sites/default/files/playbook.pdf**

U.S. Department of Education. (2021). *Graduation Rates.* National Center for Education Statistics, Integrated Postsecondary Education Data System. **https://nces.ed.gov/ipeds/TrendGenerator**

U.S. Department of Education. (2023). *Undergraduate Enrollment.* National Center for Education Statistics. **https://nces.ed.gov/programs/coe/indicator/cha/undergrad-enrollment**

Universities U.K. (2017). *Degree apprenticeships: Realizing opportunities.* **https://dera.ioe.ac.uk/id/eprint/28772/1/degree-apprenticeships-realising-opportunities.pdf**

Uranis, J., & Davis, V. L. (2020). *Recent Developments in Prior Learning*. Western Interstate Commission for Higher Education. **https://www.wiche.edu/wp-content/uploads/2020/11/Recent-Developments-in-Prior-Learning.pdf**

Voss, E., & Schoneberg, K. (2018). *Germany: Policy developments on apprenticeship*. The European Foundation for the Improvement of Living and Working Conditions. **https://euagenda.eu/upload/publications/untitled-185267-ea.pdf**

Washington State Apprenticeship and Training Council. (2023a). *Apprenticeship Preparation Program Recognition*. **https://lni.wa.gov/licensing-permits/apprenticeship/agenda-docs/Policy2012-03PreparatoryProgramRecognitionRevised1-1-23.pdf**

Washington State Apprenticeship and Training Council. (2023b). *First Quarterly Report 2023.* **https://lni.wa.gov/licensing-permits/apprenticeship/agenda-docs/April_2023_Quarterly_Report.pdf**

Washington State Board for Community and Technical Colleges. (2022). *Registered Apprenticeship.* **https://www.sbctc.edu/resources/documents/about/facts-pubs/apprenticeships.pdf**

Washington State Board for Community and Technical Colleges. (2023). *Apprenticeships*. **https://www.sbctc.edu/becoming-a-student/train-for-job/apprenticeships-student**

Washington State Department of Labor and Industries. (n.d.a). *Apprenticeship Funding Opportunities.* **https://lni.wa.gov/licensing-permits/apprenticeship/apprenticeship-funding-opportunities**

Washington State Department of Labor and Industries. (n.d.b). *Offer a Registered Apprenticeship.* **https://lni.wa.gov/licensing-permits/apprenticeship/offer-a-registered-apprenticeship**

Washington Student Achievement Council. (2017). *STEM Alliance Meeting Packet: Career Connected Learning in Washington State: Learnings and Recommendations* **https://wsac.wa.gov/sites/default/files/STEM%20Alliance%20Meeting%20Packet%203-1-2017.pdf**

Washington Student Achievement Council. (2023). *Washington College Grant for Apprenticeship.* **https://wsac.wa.gov/wcg-apprentices**

Washington Workforce Training and Education Coordinating Board. (n.d.). *Talent and Prosperity for All.* **https://wtb.wa.gov/planning-programs/washington-state-workforce-plan/**

Wilson, B., & Mehta, S. (2017). *Work-Based Learning Policy: 50-State Scan*. National Skills Coalition. **https://nationalskillscoalition.org/wp-content/uploads/2020/12/WBL-Learning-Policy-50-State-Scan.pdf**

Appendix A. Apprenticeship survey

Introduction

We are interested in your opinion about apprenticeships in Washington State. Your responses will be anonymous and used to help improve apprenticeships.

To find out more about why we reached out to you, click **here** (opens a PDF).

4. Are you at least 18 years of age?

[ ] Yes

[ ] No

5. Are you currently participating in a registered apprenticeship program in Washington State?

[ ] Yes

[ ] No

About Your Apprenticeship Program

6. What industry is your apprenticeship in?

[ ] Advanced manufacturing

[ ] Agriculture

[ ] Construction Trades

[ ] Cybersecurity

[ ] Education

[ ] Energy

[ ] Financial Services

[ ] Healthcare

[ ] Hospitality

[ ] Information Technology

[ ] Personal Services- Cosmetology, Barber, Esthetics, Manicuring

[ ] Telecom

[ ] Transportation

[ ] Other (please describe): _____

7. How did you learn about the education, training, and/or experience needed to start a career, including your apprenticeship? Select all that apply.

[ ] School counselor

[ ] School teacher
[ ] Family
[ ] Friends or acquaintances
[ ] WA Department of Labor & Industries (L&I) website
[ ] Career Connect Washington website
[ ] Labor Union
[ ] Business
[ ] Social media
[ ] Google searches
[ ] Word of mouth
[ ] Other (please describe): _____

8. What credential(s) will you receive after completing your registered apprenticeship program? Select all that apply.

[ ] Nationally recognized Certificate of Completion of Apprenticeship
[ ] Industry certification
[ ] State license
[ ] Certificate from a college or university
[ ] Associate degree from a college or university
[ ] Bachelor's degree from a college or university
[ ] Other - Please describe: _____

9. What are you planning to do after completing your apprenticeship program? Select all that apply.

[ ] Work part-time
[ ] Work full-time
[ ] Pursue an industry certification
[ ] Pursue a college or university certificate
[ ] Pursue an associate's degree
[ ] Pursue a bachelor's degree
[ ] Other - Please describe: _____

College Credits

10. Did you earn any college credit prior to your apprenticeship?

[ ] Yes
[ ] No
[ ] I don't know

11. Have you earned (or will you earn) any college credit during your apprenticeship? This could be credit earned for either class instruction or on-the-job training.

[ ] Yes
[ ] No
[ ] I don't know

12. Would this credit apply towards a college credential, such as a certificate or degree?

[ ] Yes
[ ] No
[ ] I don't know

13. How did you find out that you could earn college credit through your apprenticeship?

_____
_____
_____
_____

Interest in Credentials

14. How interested would you be in receiving college credit as part of your apprenticeship program?

[ ] Very interested
[ ] Interested
[ ] Somewhat interested
[ ] Not interested

15. How interested would you be in receiving the following credentials as part of your apprenticeship program?

	Very interested	Interested	Somewhat interested	Not interested
An industry certification	( )	( )	( )	( )
A college or university certificate	( )	( )	( )	( )
An associate degree	( )	( )	( )	( )

A bachelor's degree	( )	( )	( )	( )

16. In your view, would earning a college degree or certificate improve your chances for employment and career advancement?

[ ] Yes
[ ] No
[ ] Unsure

17. Can you say why or why not?

_____
_____
_____
_____

Additional Apprenticeship Information

18. How have you paid for expenses related to your apprenticeship program? Select all that apply.

[ ] I paid out of pocket
[ ] My employer paid
[ ] I received state grants/loans
[ ] I received federal grants/loans
[ ] Other (please describe): _____

19. Have you experienced difficulties in participating in your apprenticeship program? Select all that apply.

[ ] Challenges with employer
[ ] Life expenses
[ ] Apprenticeship program expenses
[ ] Family issues and obligations
[ ] Transportation
[ ] Health issues
[ ] Access to childcare
[ ] Quality of instruction
[ ] Difficulties with related supplemental instruction
[ ] Concern about being locked into one employer or industry
[ ] Other (please describe): _____

Demographics

20. What is your gender?

[ ] Man
[ ] Woman
[ ] Nonbinary
[ ] Other (please describe): _____

21. What is your race/ethnicity? Select all that apply.

[ ] American Indian or Alaska Native
[ ] Asian
[ ] Black/African American
[ ] White/Caucasian
[ ] Hispanic/Latino
[ ] Native Hawaiian or Pacific Islander
[ ] Other (please describe): _____

22. Which of the following describes your age?

[ ] Under 20 years
[ ] 20 to 24 years
[ ] 25 to 29 years
[ ] 30 to 34 years
[ ] 35 to 39 years
[ ] 40 to 44 years
[ ] 45 to 49 years
[ ] 50 to 54 years
[ ] 55 to 59 years
[ ] 60 to 64 years
[ ] 65 years and over

23. What formal education have you had?

[ ] Some high school
[ ] High school diploma or GED
[ ] Some college
[ ] Associate degree
[ ] Bachelor's degree
[ ] More than a bachelor's degree

24. What is your ZIP code?

_____