Work-Based Learning: What is the Current Reality in Arkansas?

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Introduction

Background

The evolving landscape of the nation's economic environment demands a diverse, highly-skilled workforce that can creatively solve problems and adapt to ongoing technological advances. Equitable access to postsecondary education and training that leads to marketable skills and increased earning potential are critical components to develop this future workforce. Work-based learning (WBL) is a key strategy to address the skills gap by directly aligning education and training to business and industry needs while engaging students in authentic work experiences. One type of WBL, apprenticeship, is defined as, "an industry-driven, high-quality career pathway where employers can develop and prepare their future workforce, and individuals can obtain paid work experience, classroom instruction, and a nationally-recognized, portable credential" (U.S. Department of Labor, n.d.a, para 2). A Registered Apprenticeship (RA) program is a WBL model validated by the U.S. Department of Labor or a State Apprenticeship Agency and can be customized to meet the needs of employers across multiple industries. In Arkansas, the Office of Apprenticeships in the Office of Skills Development (OSD) oversees RA and promotes this WBL model to business leaders and career seekers for in-demand jobs, such as advanced manufacturing, construction, information technology, and healthcare.

The socioeconomic status and demographics of Arkansans vary, are often interrelated, and may be associated with one's city, county, or region. Economic and employment opportunities vary across the state, with more metropolitan and higher population areas often thriving with business and industry, while rural areas are lacking or losing employers. Some cities in the Arkansas Delta, such as Pine Bluff, have experienced a significant decline in population. Pine Bluff's metro area saw a 12.5% decline in

population between 2010 and 2020, contributing to the demise of their economy. This may impact equitable access to WBL, particularly RA, which further exacerbates socioeconomic disparities.

Literature Review

Although RA participation and annual earnings vary across states, they have been shown to be highly correlated and statistically significant (Reed et al., 2012). Opportunities for quality WBL are lacking in rural and high-poverty regions for opportunity youth (young adults ages 16 to 24 who are out of school and unemployed), and for historically marginalized communities (Altstadt et al., 2020). This limits the career prospects and economic mobility of those individuals and can stifle local, state, and national economic growth (Cahill, 2016).

Increasing diversity of the United States workforce using WBL is identified as a priority at the federal level as demonstrated in the following acts: *Strengthening Career and Technical Education for the 21st Century Act (Perkins V)*, the *Every Student Succeeds Act* (2015), and the *Workforce Innovation and Opportunity Act (WIOA)*. In an effectiveness assessment and cost-benefit analysis of RA in 10 states, fewer than 9% of RA participants were female, the lowest share being in the skilled trades occupations. The 10-state cohort of RA participants was more racially diverse than the general population in the study states, 68% white apprentices compared to 79% white in the general population (Reed et al., 2012).

Research Questions

This project sought to answer the following questions:

- What is the existing work-based learning landscape in Arkansas?
- Do all Arkansans have equitable access to WBL opportunities? If not, for what subpopulations and/or regions are there disparities?

Data/Model

This project leveraged publicly available data from the Registered Apprenticeship Partners Information Database System (RAPIDS) (U.S. Department of Labor, n.d.b), the U.S. Census Bureau (U.S. Census Bureau, n.d.), and the North American Industry Classification System (NAICS) (NAICS Association, (n.d.). Data were collected and analyzed outside of the Administrative Data Research Facility (ADRF) platform.

Participant-level RA data from RAPIDS included location, start and end dates, gender, race, ethnicity, and NAICS codes. Three cohorts were selected from the 2021

RAPIDS data:

- All RA participants in 2021
- RA participants that started in 2021
- RA participants that finished in 2021

The number of participants for each cohort was disaggregated by county. Using 2020 U.S. Census data, the most recent year available, the RA participants per capita (per 100,000) was calculated for each county. The per capita calculation allowed for comparison among counties while controlling for differences in the magnitude of the county populations.

Demographic characteristics—gender, race, ethnicity—of each cohort were analyzed at the state and county levels and compared to the same variables from the U.S. Census data for the total population at the same levels.

North American Industry Classification System (NAICS) codes were tabulated and the top five reported at the state and county levels.

Analysis

R and RStudio statistical software along with various packages were used to analyze the data. The data were first subsetted to gather only individuals with Arkansas location codes who started, left, or were active RA participants in 2021. This resulted in 8,704 individual participants in the RAPIDS data. One individual was removed because the county they were associated with was not an Arkansas county. Of those who were 2021 participants, 2,924 started and 1,893 left. RA count data was calculated for each county as well as per 100k using county census data. Finally, RAPIDS data was used to gather demographic data and compare to the county and state as a whole. The R code for these calculations is linked here: https://docs.google.com/document/d/164lMHwL4uRjBFwmaHGKI4ZQ4zTwJKep2ithfvmNrI3g/edit?usp=sharing.

Dashboard

In order to make the resultant data easily accessible, an interactive dashboard was created using the Shiny and Flexdashboard R packages. The dashboard includes an Arkansas state map as well as data tables (see Appendix A). Users can select a map view (raw counts or per 100k), as well as select the cohort they want to view in the map and data tables (Starters, Exiters, Participants). This allows users to see the landscape of RA in Arkansas. Further, users can select a location to view.

The dashboard landing page begins with the state view. The user has the ability to

choose to view information for an individual county. Demographics and NAICS prevalence are provided on the right side of the dashboard. Demographic data is provided to allow users to see where equity gaps may exist across the state and by county. Additionally, the NAICS table displays information on the top five industries that provided RA opportunities in 2021 at the state and county levels.

Results/Findings

Dashboard

Sample screen shots and a link to the interactive dashboard are provided in Appendix A.

Results

Based on that data as it currently appears in the dashboard we find that:

- The Central and Northwest regions, which include the largest metropolitan areas of our state, have more RA opportunities.
- The Delta region and similar rural and high-poverty counties have minimal to no RA opportunities.
- Following national trends, women are vastly underrepresented in the RA opportunities compared to their representation in the state (5% vs 51%).
- Statewide, white participants are overrepresented in RA opportunities relative to their statewide population (79% vs 73%), while black and multiple race participants are underrepresented (5% vs 14% and 1% vs 6%).
- Proportions for gender, race, and ethnicity demographics are comparable across the cohorts.
- According to NAICS Coding, the most prevalent RAs in the state of Arkansas were:
    - Electrical Contractors and Other Wiring Installation Contractors
    - Plumbing, Heating, and Air-Conditioning Contractors
    - Commercial and Institutional Building Construction

Limitations

During the project, several limitations were identified, requiring caution when interpreting the results. The limitations that were discovered helped inform recommendations for the future.

WBL includes various models, including internships, apprenticeships, and on-the-job training; however, this project only analyzed data from a WBL subset—RA captured in RAPIDS. Many WBL opportunities are not currently well-documented or formally tracked, such as summer internships for high school and college students or

apprenticeships that are not registered. The Arkansas Department of Education's Division of Career and Technical Education (DCTE) specifies requirements for credit-bearing WBL opportunities for high school students and recently began a new tracking system, but ample and accurate data were not yet available for meaningful analysis.

The RAPIDS data exhibited missingness. This was especially noted early in the project when also using the Arkansas RAPIDS Crosswalk (ar_rapids_xwalk) within the ADRF. The total number of participants varied demonstrably between the RAPIDS data with Arkansas as the Program State and the Arkansas RAPIDS Crosswalk. Only the publicly available RAPIDS data were utilized. Employer data was missing for 80% of participants. The OSD confirmed that the Employer Name is not a required field in RAPIDS. This limited analysis based on specific businesses and industries. Other missing data were found but did not significantly impact the overall analysis performed for this project.

An outlier in the data was the high number of RA participants in Clark County. Clark County has a population of around 22,000 and had 1,801 participants, which resulted in the highest per capita value (10,350 per 100K). Clark County is considered a more rural county, yet the RAPIDS data indicated it was second in total number of participants. Compare this to Pulaski County with a population of nearly 400,000 and 2,054 participants. Discussions with OSD revealed that the state's largest intermediary is located within Clark County and that their RA may be around the state but are tied back to their home office location. The website for this organization lists 18 counties as service areas, but RAPIDS does not list RA participants for eight of these counties. This may skew the data significantly.

Of the 75 counties in Arkansas, 44 did not have RA participants, 46 did not have RA starters, and 47 did not have RA completers during 2021. The Director of the Arkansas Community Colleges Center for Workforce was consulted about this finding and stated that the data does not reflect her observations and knowledge of RA in multiple counties where community colleges are located. This points to missing data, but the root cause cannot be determined.

Recommendations for Future Work

To paint a more complete picture of the WBL opportunities in Arkansas, data from other WBL outside of RA must be collected and analyzed. One source of data could be DCTE WBL data from the new Seamless system that records internships, career practicums, and pre-apprenticeships for high school students enrolled in DCTE WBL courses. Also, the OSD plans to develop and launch an Arkansas platform to track WBL. This future system is expected to more accurately capture RA in Arkansas. It would be

advantageous to broaden the data collection system to track other WBL as well.

With the current data from RAPIDS, efforts could be taken to account for the Clark County data outliers to distribute those RA accordingly. For example, RA could be analyzed by participant home location rather than location of apprenticeship program as reported in RAPIDS. Additionally, the 44 counties that are “missing” apprenticeships could be compared to data from NATF to determine if some of the RA showing in Clark County are actually located elsewhere.

Once there is a more complete picture of WBL opportunities across the state, the disparities between and among counties as well as between and among demographic groups could be analyzed. Unemployment insurance (UI) wage data could be utilized to determine how participation in WBL opportunities influences wages for participants compared to those who don’t participate during that time. Ultimately, a meaningful WBL equity dashboard would include multiple outcomes, beyond participation and completion of RA.

In terms of dashboard functionality, future efforts could focus on the ability to click on a place on the map to reveal pop-up charts with more detail about the population and topic of interest. Additionally, the dashboard could incorporate additional filters to allow for cross-tabulation across demographics, industries, employers, programs of study, and differences among employers, intermediaries, and training providers.

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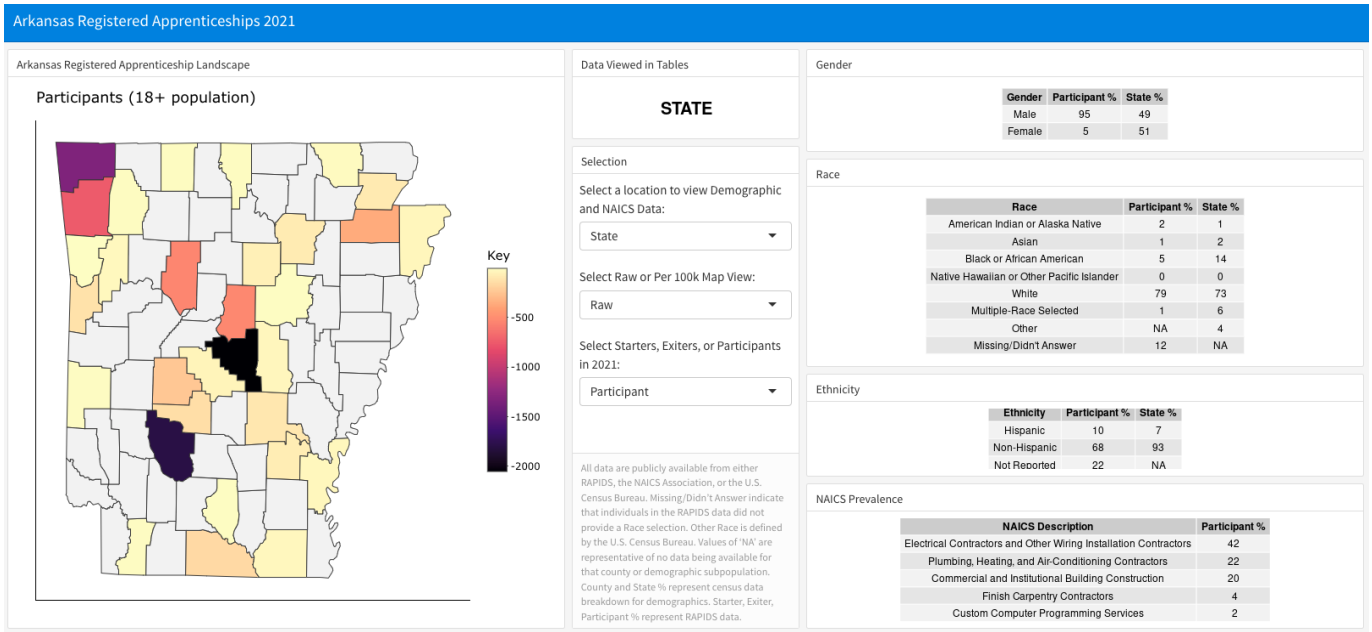
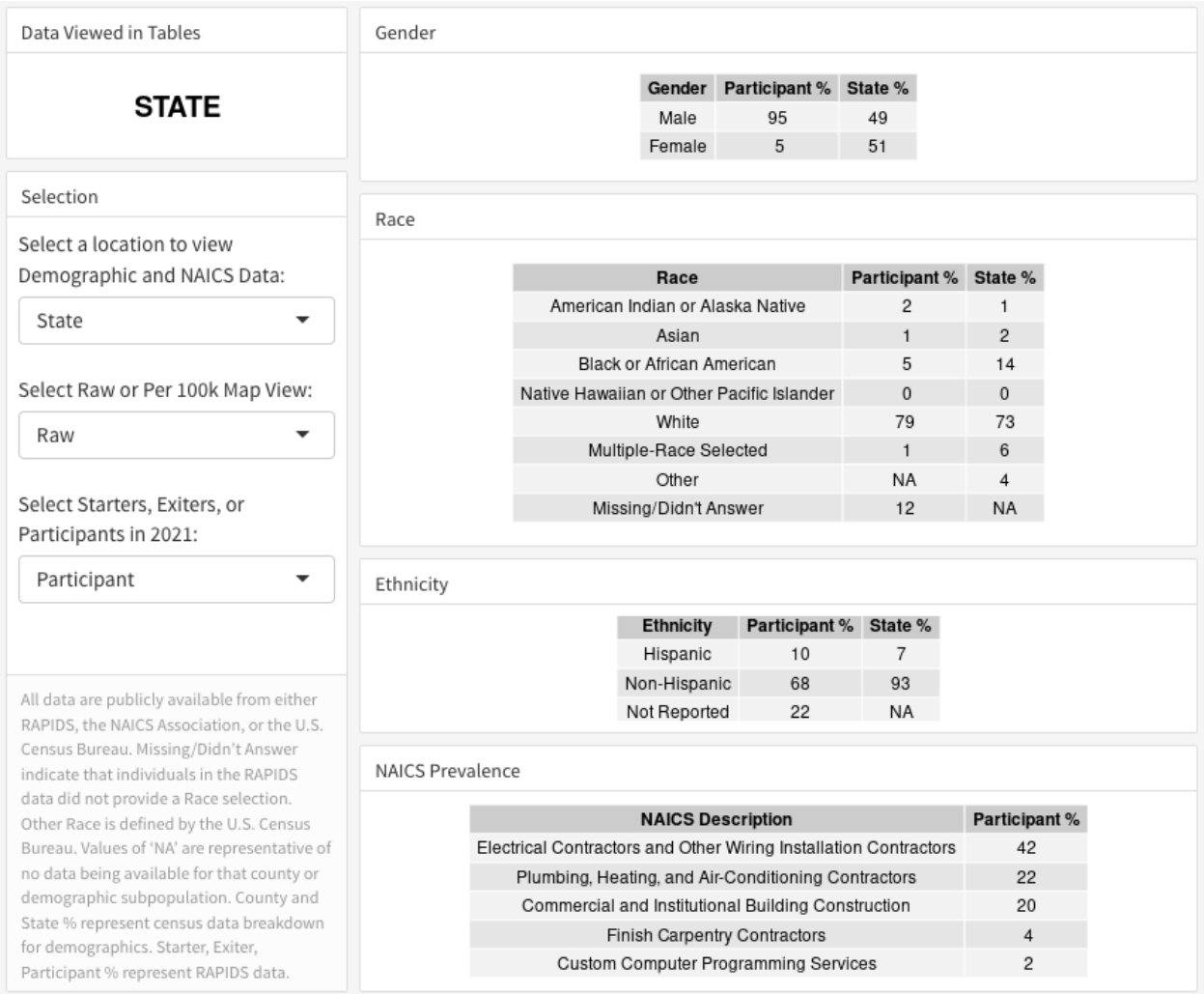
Appendix A

Link to interactive dashboard: https://jamesweese.shinyapps.io/final_dashboard/

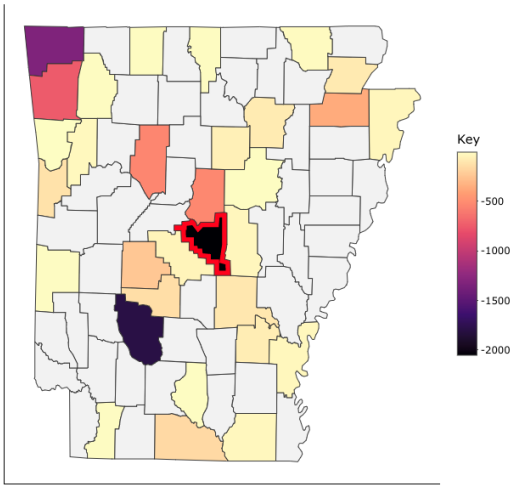




Arkansas Registered Apprenticeships 2021

Arkansas Registered Apprenticeship Landscape

Participants (18+ population)



Data Viewed in Tables

PULASKI COUNTY

Selection

Select a location to view Demographic and NAICS Data:

Pulaski

Select Raw or Per 100k Map View:

Raw

Select Starters, Exiters, or Participants in 2021:

Participant

All data are publicly available from either RAPIDS, the NAICS Association, or the U.S. Census Bureau. Missing/Didn't Answer indicate that individuals in the RAPIDS data did not provide a Race selection. Other Race is defined by the U.S. Census Bureau. Values of 'NA' are representative of no data being available for that county or demographic subpopulation. County and State % represent census data breakdown for demographics. Starter, Exiter, Participant % represent RAPIDS data.

Gender

Gender	Participant %	County %
Male	92	48
Female	8	52

Race

Race	Participant %	County %
American Indian or Alaska Native	1	1
Asian	1	3
Black or African American	9	34
Native Hawaiian or Other Pacific Islander	0	0
White	78	54
Multiple-Race Selected	1	5
Other	NA	4
Missing/Didn't Answer	9	NA

Ethnicity

Ethnicity	Participant %	County %
Hispanic	9	7
Non-Hispanic	71	93
Not Reported	20	NA

NAICS Prevalence

NAICS Description	Participant %
Commercial and Institutional Building Construction	56
Plumbing, Heating, and Air-Conditioning Contractors	14
Custom Computer Programming Services	10
Electrical Contractors and Other Wiring Installation Contractors	5
Hydroelectric Power Generation	4

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Select Raw or Per 100k Map View:

Raw

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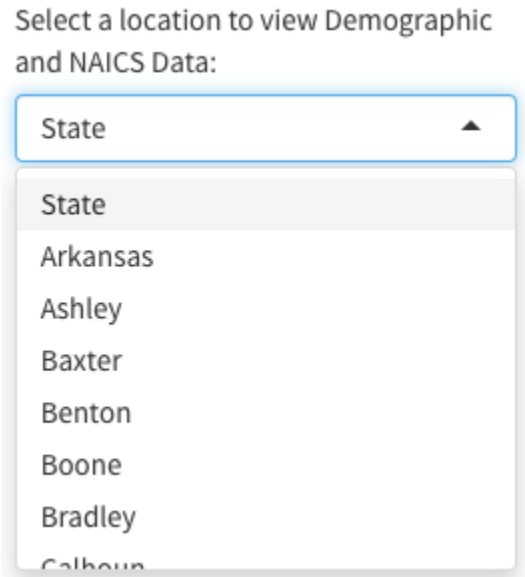
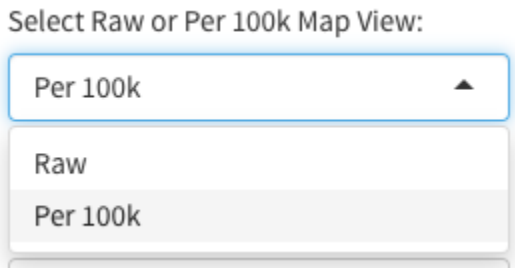
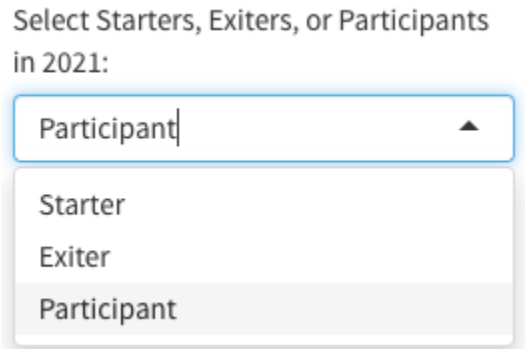
Data viewed in tables has three selection categories.







The top five North American Industry Classification System (NAICS) codes are listed for the state and county levels for each participation category.

State Level

NAICS Prevalence

NAICS Description	Starter %
Commercial and Institutional Building Construction	34
Electrical Contractors and Other Wiring Installation Contractors	32
Plumbing, Heating, and Air-Conditioning Contractors	17
Finish Carpentry Contractors	5
Custom Computer Programming Services	4

NAICS Prevalence

NAICS Description	Exiter %
Electrical Contractors and Other Wiring Installation Contractors	41
Plumbing, Heating, and Air-Conditioning Contractors	21
Commercial and Institutional Building Construction	18
Custom Computer Programming Services	5
Finish Carpentry Contractors	4

NAICS Prevalence

NAICS Description	Participant %
Electrical Contractors and Other Wiring Installation Contractors	42
Plumbing, Heating, and Air-Conditioning Contractors	22
Commercial and Institutional Building Construction	20
Finish Carpentry Contractors	4
Custom Computer Programming Services	2

While in STATE viewing mode, hovering over a county on the map displays county-level data but does not change table data.