

PSEO
COALITION

Nationwide Employment of Montana University System Graduates

Eric Meredith

This project was funded by a grant from the Postsecondary Employment Outcomes (PSEO) Coalition, made possible with support from Strada Education Foundation. The [PSEO Coalition](#) generates, analyzes, and shares employment data that demonstrates the value of higher education. The data are publicly available through a [dashboard](#) and [downloadable dataset](#) on the U.S. Census Bureau's website.

Nationwide Employment of Montana University System Graduates

Research Brief

By Eric Meredith

This brief was written as part of a project funded by a PSEO Coalition grant. The project included updating the Montana University System Workforce Dashboard with PSEO data. That dashboard can be accessed on the Montana University System Student Success Dashboard by clicking on “Nationwide Employment”. That dashboard is available at this link:

<https://mus.edu/data/WorkforceTool/index.html>

I. Introduction

Linking education and workforce data at the individual level enables a more nuanced understanding of how post-secondary experiences translate into economic outcomes. This integrated approach allows researchers and policymakers to move beyond aggregated statistics and examine the specific ways in which educational attainment shapes career opportunities, earnings potential, and labor market alignment. This data-driven framework offers an evidence-based foundation for evaluating the effectiveness of education and training programs to provide success in the workforce.

The purpose of this project is to examine the relationship between post-secondary education outcomes and labor market performance in Montana. By integrating data from the U.S. Census Bureau’s Postsecondary Employment Outcomes (PSEO) program with student records from the Montana University System and state earnings data from the Montana Department of Labor and Industry, this research provides a comprehensive, longitudinal view of how educational pathways influence earnings trajectories and employment patterns across the state and nation. The analysis focuses on variables such as credential type, field of study, and location of employment to offer detailed insights that can inform higher education policy, workforce development, and economic planning in Montana.

At the core of this project is the thesis that PSEO data, when combined with state-specific education and labor records, can illuminate critical trends in educational achievement, employability, and earnings outcomes both within and beyond Montana’s borders. By tracking graduates as they enter the workforce this analysis provides a broader understanding of the value and mobility associated with Montana’s post-secondary credentials.

II. Background Information

The Postsecondary Employment Outcomes (PSEO) initiative is a program developed by the U.S. Census Bureau to support research and policymaking related to education and workforce development. It reflects a broader federal effort to improve the understanding of how postsecondary education influences labor market outcomes across states and institutions. PSEO is part of the Census Bureau's work to provide transparency and accountability in higher education by enabling comparisons of employment results for graduates. It supports evidence-based decision-making at the intersection of education, economics, and public policy.

The Montana University System (MUS) comprises sixteen public colleges and universities organized into two main categories: four-year institutions and two-year/community colleges. The flagship campuses, University of Montana and Montana State University, offer a broad array of undergraduate, graduate, and professional programs. Additionally, several regional four-year institutions contribute to specialized and applied education offerings. Montana's two-year and community colleges provide critical access to workforce training, associate degrees, and transfer pathways. The diversity and geographic distribution of institutions within MUS are essential to expanding access to post-secondary education across urban and rural areas of the state.

The Montana Department of Labor & Industry is the state agency tasked with administering programs that promote economic security and workforce development. Its responsibilities include managing unemployment insurance, enforcing labor laws, providing job training and placement services, and supporting economic research. DLI works closely with employers, educational institutions, and state policymakers to align workforce supply with demand, support job seekers, and enhance the state's labor market resilience. Through its research and employment services divisions, the department plays a vital role in shaping labor policy and responding to economic trends in Montana.

III. Methodology

This analysis integrates three administrative and statistical datasets to examine postsecondary education and labor market outcomes for individuals in Montana. Each dataset contributes unique dimensions of information. A tableau dashboard was then

created using linkages between each dataset while ensuring confidentiality of the individuals in the data.

1. Postsecondary Employment Outcomes (PSEO) – U.S. Census Bureau

The PSEO dataset comprises de-identified, longitudinal microdata generated through the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program. It links postsecondary student records from participating institutions with national Unemployment Insurance (UI) earnings records, enabling the measurement of median earnings and interstate employment outcomes by institution, degree field, and graduation cohort. The PSEO provides external benchmarking data, allowing for comparative analysis of Montana graduates' labor market outcomes relative to national trends.

2. Montana University System (MUS) Data

The MUS dataset is a longitudinal, student-level administrative database maintained by the Montana Office of the Commissioner of Higher Education. It includes detailed records on enrollment status, degree and certificate completion, academic program codes (CIP codes), credits earned, demographics (e.g., age, gender, race/ethnicity), residency status, and financial aid receipt. This dataset is used to construct entry and exit cohorts, define program-level variables, and serve as the primary source for linking education histories to earnings and employment records.

3. Montana Department of Labor & Industry (DLI) Earnings Records

The Montana Department of Labor & Industry (DLI) oversees the administration of the state's Unemployment Insurance (UI) program, which includes the collection of quarterly earnings records from employers subject to UI tax. These records contain granular information on individual earnings, employment by quarter, employer industry (classified by NAICS codes), and employer location. While the dataset excludes federal employees, self-employed individuals, and out-of-state employment, it provides robust coverage of Montana's earnings and employment landscape. When linked to higher education data, UI earnings records offer critical insight into graduates' labor market outcomes, including industry placement, earnings progression, and in-state workforce retention.

To support accessible and interactive exploration of the data, a Tableau dashboard has been developed. This visual tool allows users to dynamically engage with the analysis by filtering results across multiple dimensions, including institution, degree level, field of study, and geographic employment outcomes. The dashboards are designed to display trends in graduate employment and earnings over time. By presenting the results visually, the dashboards facilitate stakeholder engagement and enable

policymakers, educators, and the public to better understand the economic outcomes of Montana's postsecondary graduates.

The analysis applies a comparative framework across several key dimensions: degree level, two-digit Classification of Instructional Programs (CIP) codes, institution within the Montana University System, and employment geography. Median earnings and employment patterns are examined across these categories to identify variation in labor market outcomes. This approach helps isolate how educational program type, credential level, and institutional differences relate to workforce placement and earnings potential.

While the analysis leverages robust administrative datasets, several limitations must be acknowledged. The Unemployment Insurance (UI) earnings data do not capture earnings from federal employment, military service, self-employment, some tribal employment or work outside of Montana, which may result in undercounts for some graduate populations. Participation in the PSEO program is limited to certain institutions and states, restricting the scope of national comparisons. The PSEO data, while valuable for national benchmarking, includes added statistical noise to protect individual privacy and institutional confidentiality. Additionally, due to data privacy protections and the de-identification process, individual-level linkages may occasionally miss matches or exclude outlier cases. These constraints should be considered when interpreting the findings and drawing conclusions about the broader labor market outcomes of Montana graduates.

IV. Findings and Discussion

In-State Employment Trends

The data reveals that a significant proportion of Montana graduates remain employed within the state post-graduation. Among bachelor's recipients 1 year after graduation, their in state retention is particularly notable among graduates from certain fields such as Health Sciences (72.8%), Education (73.8%), Public Administration (85.0%) and Family

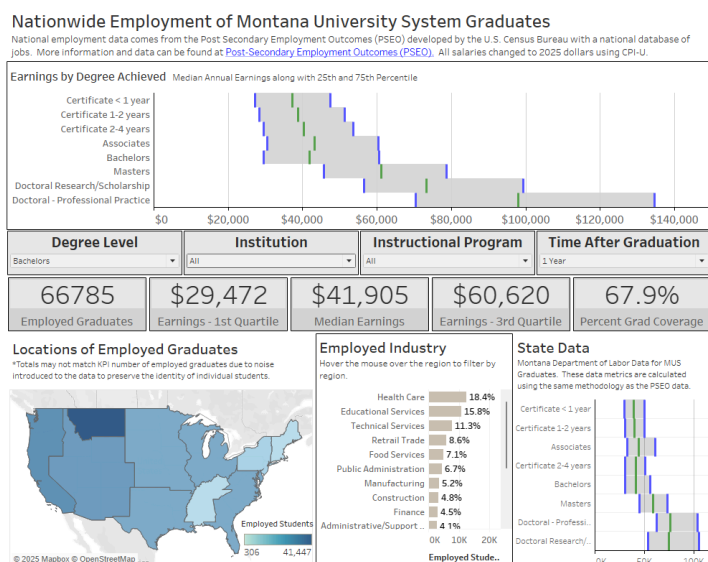


Figure SEQ Figure 1* ARABIC 1: Tableau Dashboard displaying data from PSEO and Montana education and workforce data sources.

and Consumer Sciences (76.9%). Among associate degree recipients this trend is even stronger with 73.5% of all associate students remaining in Montana 1 year after graduation. This trend underscores the importance of aligning academic programs with state labor market needs to enhance graduate retention.

Out-of-State Employment Patterns

Conversely, certain disciplines exhibit higher out-of-state employment rates. Graduates in fields like Information Technology and STEM-related areas often find opportunities beyond Montana's borders. Degree recipients with a bachelor's in engineering (41.4% employed in Montana) and mathematics (35.3% employed in Montana), show many students leaving Montana for employment 1 year after graduation. The dashboard highlights that graduates from these instructional programs are more likely to relocate for employment, reflecting national demand in these sectors and the lure of higher salaries in other states. This pattern suggests that while Montana's educational institutions provide quality training, the state's labor market may not fully absorb the supply of graduates in high-demand fields.

Generally, the higher the degree level, the more likely a student is to leave the state of Montana for employment. While 73.5% of all students receiving an associate degree are employed in the state during the next year, this number decreases steadily as the degree level increases and leads to only 33.0% of students receiving a Doctoral Research/Scholarship degree remaining in Montana for employment.

Earnings Growth by Degree Level

The Tableau dashboard illustrates clear differences in earnings outcomes by degree level. Graduates with bachelor's degrees generally earn higher median earnings over time compared to those with associate degrees or certificates. This earnings premium becomes more pronounced as time after graduation progresses, reflecting greater earnings growth potential for higher level degrees.

In both the PSEO data and the State of Montana data an associate degree graduate has a slightly higher median salary after 1 year than that of a bachelor's degree graduate. In Montana, the higher first-year earnings of associate degree holders compared to bachelor's degree holders can be attributed to the state's economic structure, workforce shortages in specific sectors, and the alignment of associate degree programs with high-demand, well-paying jobs. Individuals pursuing associate degrees in fields like healthcare, skilled trades, and technical services are well-positioned to capitalize on these opportunities. However, by 10 years after graduation the bachelor's degree graduate has a much higher median salary than an associate degree graduate. These patterns reinforce the economic value of higher

levels of credential attainment and highlight the importance of long-term tracking when assessing the return on educational investment.

Earnings by Field of Study

Earnings trends also vary substantially by major or field of study. Graduates in technical and professional programs—such as Engineering, Computer Science, and Health Professions—consistently report higher median earnings compared to those in Liberal Arts or Education. These differences appear early in the post-graduation period and tend to persist over time. This finding suggests that labor market demand and skill specialization play a significant role in shaping earnings outcomes, and it underscores the need for academic advising and career planning aligned with economic realities.

In-State vs. Out-of-State Earnings

A notable trend emerging from the dashboard is the earnings differential between in-state and out-of-state employment. Graduates working outside Montana often report higher earnings than their in-state counterparts, particularly in high-demand, high-wage sectors.

For example, a student that graduates with a bachelor's degree in engineering has a median salary of \$64,195 while that same graduate has a median salary of \$75,755 when looking at the PSEO data, which includes out of state data. This same earnings gap exists for master's degree graduates in engineering with Montana employees earning less than their out of state counterparts. Other instructional programs, such as education, appear to be very similar in salary when comparing in-state to out of state employment in Montana. A bachelor's degree recipient in education in Montana has a median salary of \$38,154 compared to PSEO data median salary of \$38,122. It is of note that while the medians are very close for education majors, the 3rd quartile is higher for the PSEO data.

While Montana retains a large share of its graduates, this earnings gap may influence decisions to relocate for better paying opportunities. This trend raises important considerations for state policymakers aiming to improve workforce retention, such as investing in higher-paying industries and expanding opportunities for career advancement within Montana.

V. Conclusion

The integration of PSEO data with Montana's education and earnings records reveals clear connections between postsecondary credentials, employment geography, and long-term earnings potential. The findings confirm that while many Montana graduates

remain in-state, particularly those in applied, community-centered fields like health, education, and social sciences, graduates from high-demand, high-earnings fields such as engineering and computer science often pursue opportunities elsewhere, drawn by more competitive salaries. Additionally, while associate degree holders may initially out-earn bachelor's graduates, the long-term earnings trajectory strongly favors higher educational attainment.

These trends highlight both strengths and challenges for Montana's education-to-workforce pipeline. The state benefits from high retention of graduates in key service sectors, but it also faces outmigration of talent in technical disciplines and a persistent earnings gap between in-state and out-of-state employment. As Montana seeks to build a resilient and competitive workforce, aligning academic programs with economic demand, improving earnings competitiveness, and supporting regional job growth will be critical. This research underscores the value of linked data systems in guiding such strategic efforts and informing policies that support both educational achievement and economic development across the state.

VI. References

1. U.S. Census Bureau. (2025). *LEHD Public Use Data Schema (V4.12.0)*. U.S. Department of Commerce. Retrieved May 15, 2025, from https://lehd.ces.census.gov/data/schema/latest/lehd_public_use_schema.html
2. U.S. Census Bureau. (2020). *Post-Secondary Employment Outcomes (PSEO)*. U.S. Department of Commerce. Retrieved May 15, 2025, from https://lehd.ces.census.gov/data/pseo_experimental.html
3. Montana University System. (2025). *MUS Student Success Dashboard* [Tableau dashboard]. Montana University System. Retrieved May 15, 2025, from <https://mus.edu/data/WorkforceTool/index.html>