AI-Enhanced Education in Nevada and its Transformative Impact on Workforce Development, Employment Prospects, and Tomorrow's Job Market Proficiencies

NEVADA P-20 TO WORKFORCE RESEARCH (NPWR) GRANT REPORT

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Table Of Contents

1. Executive Summary

The integration of Artificial Intelligence (AI) in Nevada's education system holds transformative potential for workforce development, economic growth, and job market readiness. This report examines the state's current educational and workforce infrastructure to assess Nevada's preparedness for an AI-driven economy, and identifies areas where policy interventions could enhance AI and computer science literacy among students.

Nevada is making strides in incorporating AI and STEM education at various levels. The state has established foundational computer science standards in K-12 schools, with a notable achievement of nearly 96% of high schools offering at least one comprehensive computer science course, positioning Nevada as a national leader. However, disparities remain, particularly between urban and rural areas, where limited resources and teacher availability hinder uniform access to computer science education. Addressing these inequalities requires targeted investments and expanded educational partnerships to ensure that all students, regardless of location, have equal opportunities in AI literacy.

Higher education institutions in Nevada, such as the University of Nevada, Las Vegas (UNLV) and the University of Nevada, Reno (UNR), play a critical role in advancing AI education. These universities have developed robust computer science programs and are fostering partnerships with tech industry leaders to align their curricula with workforce needs. The report highlights successful initiatives, such as the Generative AI Fellows Pilot Program at UNLV, which equips faculty and students with AI tools for teaching and research. Additionally, collaborations with industry, like the partnership between Black Fire Innovation and AI Foundation, have led to valuable resources, such as digital wellness tools for students. However, expanding these initiatives to include Nevada's community colleges is essential to increase access to AI training in rural regions.

The report also addresses Nevada's evolving AI workforce needs. As tech industries increasingly invest in the state, there is growing demand for workers skilled in AI and computer science. Programs like the Transmosis Initiative (2017-2018), which provided cybersecurity training to displaced workers, exemplify the effectiveness of targeted upskilling. Yet, Nevada's job market still suffers from significant gaps in qualified candidates for advanced AI roles. Expanding flexible and remote training opportunities, like that of UNLV's Tech Bootcamps, can help bridge these gaps and enable more individuals to transition into AI-related careers.

To address these challenges and support Nevada's AI-driven future, several policy recommendations are outlined. First, enhancing STEM education at the K-12 level and introducing computer science curricula at the elementary level are crucial for building a strong foundation. Second, expanding partnerships between K-12 schools and higher education institutions can promote greater access to AI education in underserved areas. Third, increasing online degree offerings and creating remote learning opportunities would allow students across Nevada to participate in high-quality AI programs.

In conclusion, Nevada has made considerable progress in building an AI-competent workforce, yet further investment and strategic policy changes are needed to fully realize its potential. By strengthening educational pathways, expanding public-private partnerships, and enhancing workforce training programs, Nevada can position itself as a leader in the AI economy and provide a sustainable talent pipeline for the state's burgeoning technology sector.

2. Background

2.1. AI and Nevada: Positioning for a Tech-Driven Future

Artificial Intelligence (AI) is poised to reshape the global economic system as we know it, including in Nevada, a state traditionally reliant on tourism and entertainment. As AI technologies rapidly penetrate industries from healthcare to hospitality, a pressing question emerges: Is Nevada adequately prepared to seize the opportunities presented by this technological revolution? This report evaluates Nevada's readiness for AI-driven employment across three pivotal dimensions: computer-related curriculum and instruction at the secondary education level, collegiate program offerings and graduation rates, and the alignment between the current and anticipated AI workforce within the state. By examining these educational and workforce considerations within the broader context of Nevada's economic and societal development, this study aims to identify both challenges and opportunities as the state navigates the AI landscape.

2.2. AI's Role in Shaping Nevada's K-12 Classrooms

In Nevada, the incorporation of AI and computer science in K-12 education has been gaining momentum. The Nevada Department of Education (NDOE) has recognized the importance of STEM education and has been actively working to implement curricula that include a strong emphasis on computer science and technology. The state has introduced **standards for computer science education**, which are designed to provide students with foundational skills in computer programming, cybersecurity and data analysis, as well as give them a deeper understanding of the impacts of AI on society (Nevada Department of Education, 2019).

However, the implementation of these standards varies significantly across school districts, often depending on the resources available at individual schools. While some schools in urban areas like Las Vegas and Reno are able to offer advanced computer science courses and AI-related activities, rural schools frequently struggle with limited access to technology and qualified teachers (Henderson & Goldstein, 2021). This disparity highlights a critical area where state policy and investment could help bridge the gap, ensuring that all students, regardless of their geographic location, have equal opportunities to acquire these essential skills.

2.3. AI and the Transformation of Higher Education in Nevada

Nevada's higher education institutions are pivotal in advancing the state's AI and computer science agenda. Universities such as the University of Nevada, Las Vegas (UNLV), and the University of Nevada, Reno (UNR) have developed robust computer science departments that not only offer undergraduate and graduate programs but are also involved in ground-breaking AI research and development. In addition, recent initiatives like **UNLV's 2024 Generative AI Fellows Pilot Program** serve as a resource for faculty and staff, giving them the tools to leverage AI technologies for "teaching, research, and innovation" (UNLV News, 2024).

These institutions also collaborate with industry partners to align their curriculum with the needs of the workforce, thereby enhancing the employability of their graduates (Miller & Smith, 2019). One example of a successful public-private collaboration involves Black Fire Innovation and the AI Foundation, the latter of which is managed by UNLV alumni. This partnership led to the innovative creation of the **Digital President Whitfield**, a tool that provides mental health and wellness services, as well as advising resources to UNLV students on their smartphones.

2.4. Nevada's AI Workforce Evolution

The integration of AI in Nevada's workforce is influenced significantly by the state's strategic push towards becoming a tech hub. In recent years, Nevada has seen considerable investment from tech industries, which has created a demand for a workforce skilled in AI and computer science. The state has responded by supporting workforce development initiatives that focus on continuous learning and re-skilling. For example, the Nevada Governor's Office of Economic Development offers grants and programs that facilitate AI training and certifications for the existing workforce (Nevada Governor's Office, 2021). One successful initiative was the **Transmosis Program**, which received a STEM Workforce Challenge Grant (2017-2018) to provide cybersecurity training primarily to displaced workers to transition those workers into the cybersecurity field. Furthermore, training was also provided to those selected incumbent workers and postsecondary students seeking skill enhancement.

Despite these efforts, there remains a critical need for broader, more integrated policies that can keep pace with rapid technological advancements and their effects on the job market. While, **efforts to enhance worker skills are underway**, there is a noticeable lack of robust, sustained and timely support systems for transition programs that can help workers from declining industries move into tech-oriented careers.

What is evident is that Nevada's prospects for workforce development in the AI sector are both promising and challenging, reflecting the broader dynamics of a state transitioning from more traditional industries to embracing technological innovation. However, as AI transforms industries worldwide, Nevada is actively positioning itself to capitalize on these advancements, even as it struggles to educate and train an AI competent workforce that is sizeable enough to fill the rapidly growing number of positions in this sector.

2.5. Conclusion

Technological advances which have precipitated the need for AI skills and literacy presents Nevada with unparalleled opportunities. Generative AI has the potential to boost labor market productivity substantially, with estimates suggesting that automation could increase domestic productivity growth to upwards of 3 to 4 percent annually (McKinsey Global Institute, 2023).

If Nevada is invested in developing an AI-driven economy, then it must produce a workforce that is not only technically proficient but also capable of swiftly growing and transitioning its skill sets, critically thinking, and innovative problem-solving. Central to developing this type of workforce is a robust education system, that establishes a strong foundation in STEM subjects at the K-12 level, which then supports the acquisition of advanced education and training in computer science and technology at the post-secondary level. Driven by these goals, this report evaluates Nevada’s educational and workforce infrastructure in an effort to identify the areas where Nevada has been successful at cementing its AI education to workforce pipeline, as well as those areas where the state has notable weaknesses that require specific policy action and government or industry investment to shore up these gaps.

3. Study Findings

3.1. AI Integrated K-12 Education in Nevada

For Nevada to be competitive it ideally needs to educate and train a workforce with AI competency and skills. Alternatively, in the absence of producing enough workers to fill AI-related occupations, Nevada must recruit and attract these workers, thereby making the state an attractive hub for tech related companies and startups. Therefore, Nevada must provide a broad spectrum of benefits in the areas of cost of living, employment opportunities, education, and healthcare to bring workers and their families to the state. Further, if Nevada wants to expand and diversify its economy by attracting more companies from the computer science and technology sectors, then producing a supply of workers in these fields is one of the ways to do this. That is why our first objective is to assess, Nevada's status with regard to educating and training an AI competent workforce; and to do this we utilize educational data from the Nevada P-20 to Workforce Research Data System (NPWR) and the National Assessment of Educational Progress (NAEP) to examine Nevada's K-12 education system alongside measures of computer science readiness.

Mathematics Proficiency as a Measure of Computer Science Readiness

Math proficiency at the primary and secondary education level is a critical measure of readiness for computer science because of the strong overlap in foundational skills required by both disciplines. Mathematics, particularly subjects like that of algebra, calculus, and logic, serve as the basis for computer science concepts such as algorithms, computational thinking, and programming. A solid understanding of mathematical concepts allows students to think abstractly, recognize patterns, and develop solutions in a logical sequence, all of which are essential in writing efficient code and solving computational problems. Research indicates that students who demonstrate higher math proficiency in K-12 education are better equipped to succeed in computer science courses and careers (Ericson, et al., 2016).

Moreover, many of the key areas in computer science, such as artificial intelligence, data science, and cryptography, rely heavily on mathematical principles. For instance, algorithms, which are central to computer programming, are essentially a step-by-step application of mathematical logic to solve problems. Without a firm grasp of these principles, students may struggle to comprehend the more abstract and technical aspects of computer science. Additionally, mathematics aids in the development of critical thinking skills, which are essential to optimizing code.

The significance of math proficiency is further underscored by standardized testing data. In a recent study, the authors determined high school students who scored in the top quartile in math were significantly more likely to pursue and succeed in computer science-related fields in college (Liao, et al., 2021). This correlation suggests that improving math education in K-12 could be a strategy for broadening participation in computer science and ensuring students are better prepared for the technological demands of the AI driven, 21st century workforce.

When examining Nevada's efforts to prepare K-12 students for computer science readiness through the lens of math proficiency, the outcomes are mixed. Given that math proficiency is recognized as a key predictor of computer science success, Nevada's recent trends reveal both promising advancements and concerning setbacks. Although the state showed initial strength in math performance relative to the national average, the subsequent years reflect a decline that raises questions about the effectiveness of current strategies, particularly in the wake of the COVID-19 pandemic.

Table 1 reports the percentage of Nevada's K-12 students that demonstrated math proficiency across the school years of 2018-2024. Due to the pandemic and changes to how NAEP data are collected, the most complete comparison data are at the elementary and middle school levels, which are presented in Figure 1 and Figure 2. Nonetheless, the most recent comparison data (from 2019) for the high school level are presented in Figure 3.

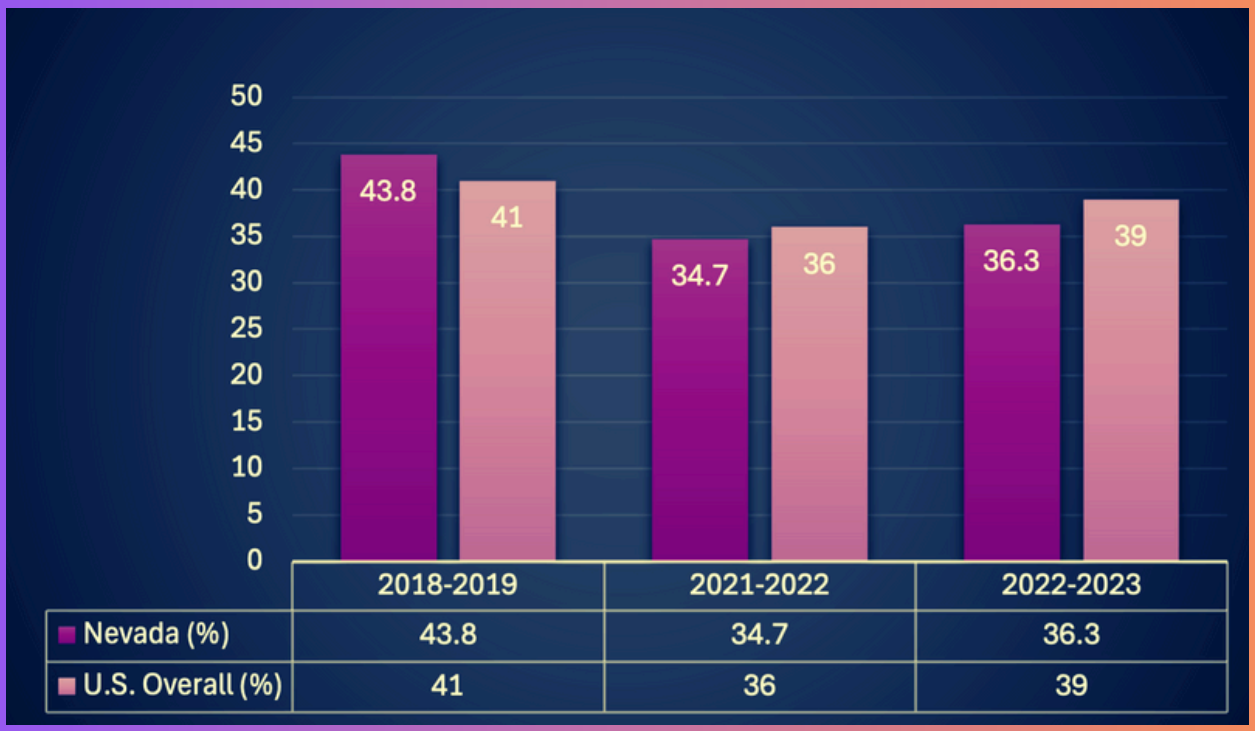
Table 1: Percent of Nevada K-12 Students in Comparison to U.S. Average that Demonstrated Proficiency in Math as a Measure of Computer Science Readiness, School Years: 2019-2024

School Year	Level	Nevada (%)	U.S. Overall (%)
2018-2019	Elementary	43.8	41
	Middle School	33.2	34
	High School	26.3	24
2019-2020	Elementary	0	N/A (COVID)
	Middle School	0	N/A (COVID)
	High School	0	N/A (COVID)
2020-2021	Elementary	28.7	ND
	Middle School	24.2	ND
	High School	22.6	ND
2021-2022	Elementary	34.7	36
	Middle School	24.5	27
	High School	20.4	ND
2022-2023	Elementary	36.3	39
	Middle School	25.8	29
	High School	19.6	ND
2023-2024	Elementary	38	ND
	Middle School	26.8	ND
	High School	19.4	ND

Source: National Assessment of Educational Progress (NAEP) Data. Retrieved from https://nces.ed.gov/nationsreportcard/data/; Compiled by author

Figure 1 compares the math proficiency rates for elementary students in Nevada against the national U.S. average over three school years: 2018-2019, 2021-2022, and 2022-2023. In the 2018-2019 school year, Nevada had a higher percentage of students proficient in math (43.8%) compared to the national average (41%), indicating that Nevada outperformed the nation. However, by the 2021-2022 school year, both Nevada and the national proficiency rates dropped, with Nevada's proficiency decreasing to 34.7%, which was slightly below the national average of 36%. Although, this drop more than likely reflects the nationwide impact of the pandemic on student learning. By 2022-2023, Nevada saw a slight improvement, with proficiency rising to 36.3%, although it still trailed behind the national average of 39%.

Figure 1: Percent of Nevada Elementary Students in Comparison to U.S. Average that Demonstrated Proficiency in Math as a Measure of Computer Science Readiness, School Years: 2019, 2022, 2023



Source: National Assessment of Educational Progress (NAEP) Data. Retrieved from https://nces.ed.gov/nationsreportcard/data/; Compiled by author

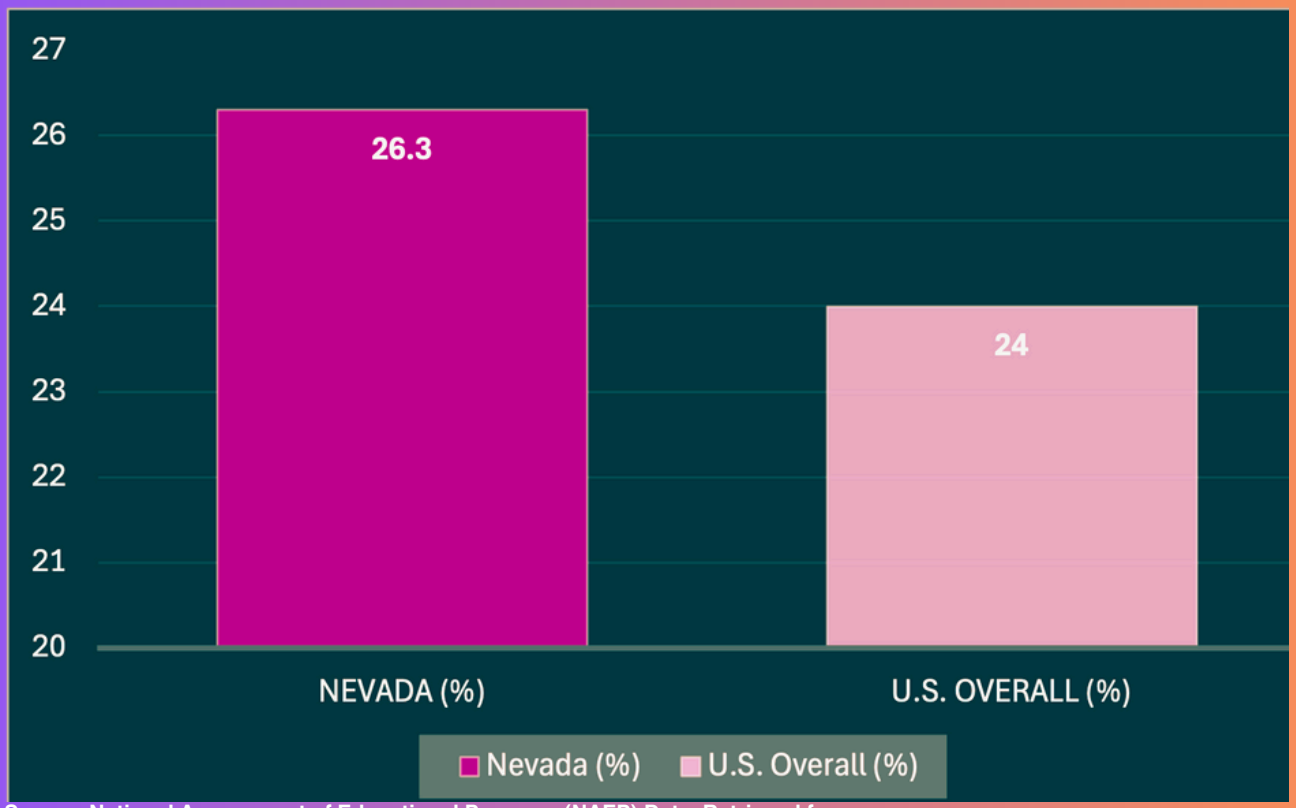
Figure 2 presents the percentage of middle school. students demonstrating proficiency in mathematics in Nevada compared to the national average across the following academic years: 2018-2019, 2021-2022, and 2022-2023. In 2018-2019, the proficiency rate in Nevada was 33.2%, which was only marginally below the national average of 34%. In subsequent years, and as noted, undoubtedly due to the pandemic, there was a discernible decline in proficiency for both Nevada and the United States, with Nevada's rate dropping to 24.5% and the national rate to 27% by 2021-2022. By 2022-2023, both Nevada's and the national average experienced a slight uptick, with Nevada rising to 25.8% and the national average increasing to 29%. While Nevada consistently lags the national average for math proficiency among middle schoolers, the overall trend suggests a gradual recovery in proficiency rates post-2021, though they still remain below pre-pandemic levels.

Figure 2: Percent of Nevada Middle School Students in Comparison to U.S. Average that Demonstrated Proficiency in Math as a Measure of Computer Science Readiness, School Years: 2019, 2022, 2023

Source: National Assessment of Educational Progress (NAEP) Data. Retrieved from https://nces.ed.gov/nationsreportcard/data/; Compiled by author

Figure 3 indicates the percentage of Nevada high schoolers demonstrating math proficiency in comparison to the overall national average. Nevada's proficiency rate for the 2019 school year was 26.3%, which was slightly higher than the U.S. overall rate of 24%. These data suggest that Nevada high school students are relatively stronger in mathematics, in comparison to the average U.S. high schooler. An important caveat about these findings; however, is that they are pre-COVID, and the national data are not available post-COVID to make appropriate comparisons. Therefore, while this outcome suggests that Nevada's efforts in mathematics education may be more effective compared to national benchmarks, these findings are incomplete without post-COVID data.

Figure 3: Percent of Nevada High School Students in Comparison to U.S. Average that Demonstrated Proficiency in Math as a Measure of Computer Science Readiness, School Year: 2019



Source: National Assessment of Educational Progress (NAEP) Data. Retrieved from https://nces.ed.gov/nationsreportcard/data/; Compiled by author

Computer Science Education and Training

While math proficiency is often viewed as a key indicator of computer science readiness, it alone does not provide a complete picture, nor does struggling in math doom students to failure in computer science. Studies have shown that gaps in mathematical preparation can be closed when students are exposed to computer science curricula, especially at a young age (Grover and Pea, 2013). This suggests that early exposure to computer science can mitigate weaknesses in math, providing students with alternate ways of thinking and problem-solving that complement their math skills. That's because, in reality, it is computer science proficiency in itself—encompassing the skills of logical reasoning, algorithmic thinking, and coding—that is the most direct measure of readiness for the field.

According to NDOE, in 2018, Nevada produced 199 computer science high school graduates, out of a total of 30,204 graduating students.[1],[2] That translates into less than 1% of Nevada's high school graduates achieving at least a basic level of proficiency in computer science as measured by Advanced Placement (AP) and/or International Baccalaureate (IB) exam scores, passing with a B or better in a continuing education computer science course or a series of courses at one of the local colleges or universities, or graduating with a Certificate of Achievement in Computer Science from the College of Southern Nevada while still a high school student.[3]

In 2019 the Governor's Office, in collaboration with Nevada state legislators and NDOE took action to address the lack of computer competency among Nevada's students with the adoption of **K-12 Computer Science and Integrated Technology academic standards**,[4] with the goal that all Nevada high school students attend a school that offers foundational computer science by July 1, 2022.[5],[6]. This initiative led to NDOE's **implementation of the curriculum requirement for all Nevada students to take at least a half credit in computer science instruction.To support student learning, the state also requires all of its teachers to complete continuing education courses in computer science and computer literacy**. As a result of NDOE's efforts, Nevada now ranks third in the nation with 96% of its high schools offering a foundational computer science course, far exceeding the national average of 57.5% (See Table 2). The expectation is that forthcoming data in the near future will demonstrate that 100% of all Nevada's high schools have met this goal.[7]

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[1]https://doe.nv.gov/offices/office-of-teaching-and-learning/computer-science/
[2]https://nevadareportcard.nv.gov/DI/MoreDownload?filename=4%20Year%20Graduation%20Rates%20for%20the%20Class%20of%202018-2019.PDF
[3]https://www.csn.edu/schools/school-of-advanced-and-applied-technologies/department-of-computing-and-information-technology/computing-and-information-technology-program,

A robust and future-proof workforce begins with a solid educational foundation. **NDOE continues to actively explore various strategies and initiatives in order to prepare students for a workforce increasingly influenced by artificial intelligence (AI)**, and to enhance educational outcomes. These efforts reflect a broader understanding of the importance of integrating technology and AI literacy into the educational curriculum to ensure students are well-prepared for future careers in a digitally driven economy.

At the same time, while Nevada is certainly taking important strides and moving in the right direction, there is still a great deal of work to be done at the K-12 level to prepare primary and secondary students for higher education studies and careers in AI and AI related fields. The K-12 findings suggest that Nevada continues to face significant challenges in improving math proficiency and preparing K-12 students for computer science readiness in the post-pandemic landscape. Given that elementary education forms the foundation for future academic and career success, this gap is especially concerning. Studies underscore the critical role of early education in shaping enthusiasm for learning and building the fundamental skills required for success in mathematics and computer science (Bers & Horn, 2010; Clements & Sarama, 2016; Duncan et. al., 2016). At this stage, students are most receptive to acquiring foundational knowledge that supports future competencies in STEM fields.

The challenges Nevada is experiencing could hinder the development of a strong pipeline for students entering computer science fields later in their academic careers. Without substantial intervention to close this gap, the state risks leaving students unprepared for the demands of the modern workforce, where computational thinking and technological literacy are becoming essential. Addressing these early educational deficiencies is crucial not only for academic achievement, but for Nevada's long-term workforce development and economic growth.

In the policy recommendations section of this report, we expand upon this discussion and highlight specific areas where Nevada can address these deficits in its K-12 pipeline by building upon existing programs and initiatives already in place.

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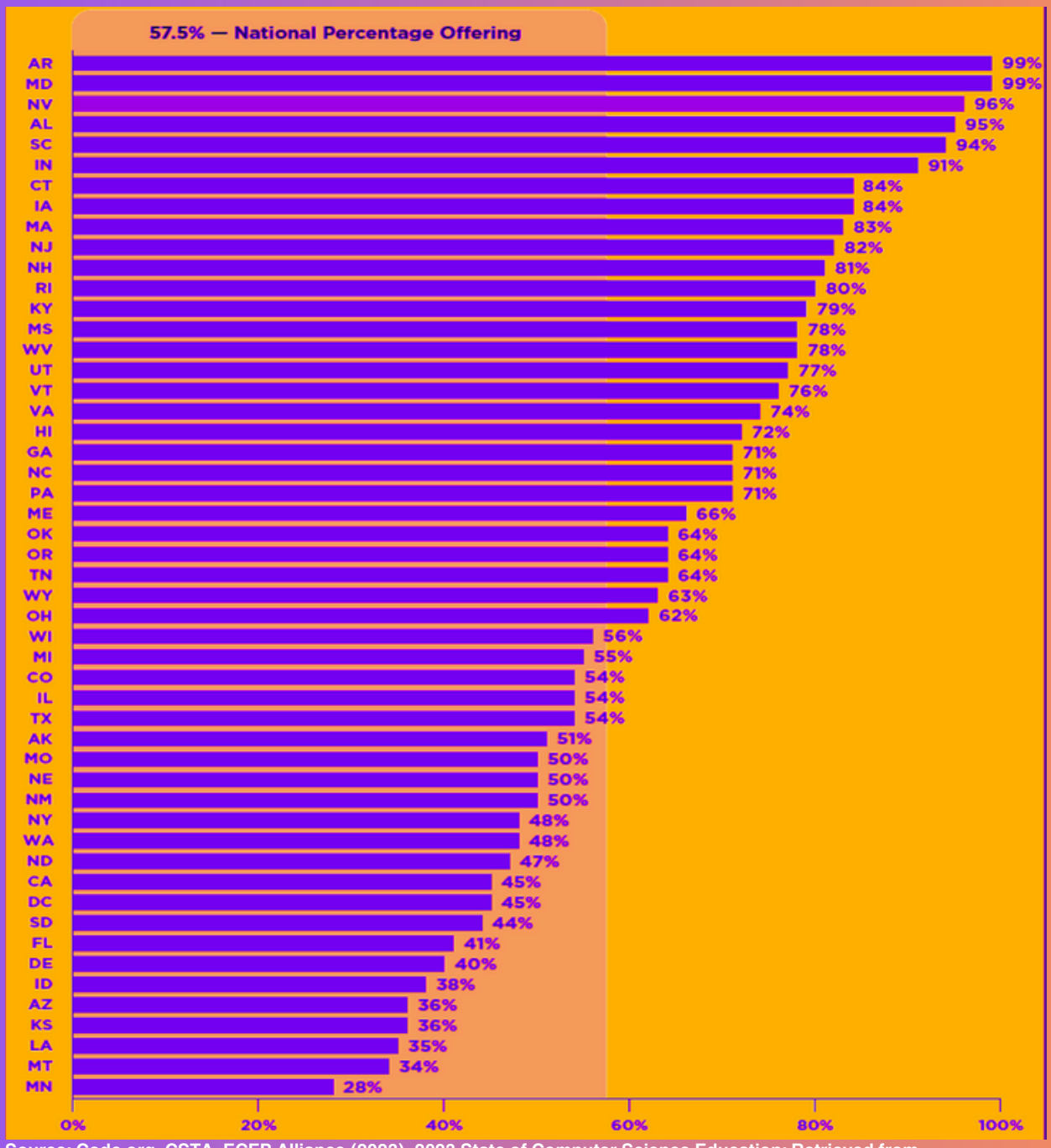
[4]https://doe.nv.gov/offices/office-of-teaching-and-learning/computer-science/
[5]https://nevadareportcard.nv.gov/DI/MoreDownload?filename=4%20Year%20Graduation%20Rates%20for%20the%20Class%20of%202018-2019.PDF
[6]https://www.csn.edu/schools/school-of-advanced-and-applied-technologies/department-of-computing-and-information-technology/computing-and-information-technology-program,
[7]https://doe.nv.gov/news-media/press-releases/2022/2022-state-of-computer-science-report-highlights-nevada-s-achievements/

Table 2: Nationwide Percentage of Public High Schools Offering Foundational Computer Science, 2023



Source: Code.org, CSTA, ECEP Alliance (2023). 2023 State of Computer Science Education: Retrieved from https://advocacy.code.org/stateofcs

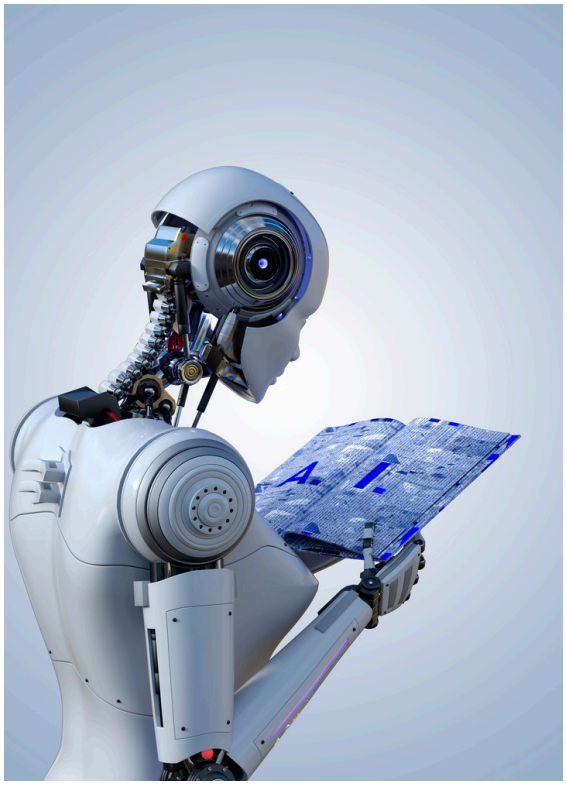
3.2. AI Integrated Higher Education in Nevada

Nevada's institutions of higher education have a pivotal role to play in preparing the next generation of professionals to navigate and lead in an increasingly digital world. **College graduates with expertise in AI and related fields command significantly higher salaries, with median annual wages in computer and information technology jobs more than double the median wage for all other occupations.** By focusing on these fields, Nevada's higher education system can help bridge the gap between workforce needs and the talent pool, ensuring that students are not only employable but are also capable of contributing meaningfully to technological advancements that shape the future. In preparing students for careers in AI and computer science, Nevada can leverage education as a powerful tool for both individual economic mobility and statewide economic resilience.

Utilizing data from the Nevada P-20 to Workforce Research Data System (NPWR), we assess the effectiveness of Nevada's institutions of higher education in producing graduates in AI-related fields. Figure 4 represents those findings and illustrates the total number of students graduating in AI-related fields from all Nevada institutions of higher education between 2018 and 2022. What Figure 4 reveals is that over the five-year period, there has been notable growth across several categories, with significant increases among students with no college education and/or those pursuing certifications.

In 2022, the "No College" category exhibited a substantial rise, climbing to 730 students, compared to 483 in 2018. This sharp increase highlights the growing interest in AI-related fields among individuals without formal college education, potentially indicating a rise in the demand for non-traditional educational pathways, such as vocational programs or industry-specific training.

Similarly, the "Some College/Certification" category experienced a consistent upward trend, reaching 267 students in 2022, indicating a shift towards shorter, more targeted learning paths that align with rapidly evolving technological skill requirements.



The number of students attaining AA and BA degrees remained relatively stable over the five-year period, with the AA degree category peaking at 82 graduates in 2020 before declining to 57 in 2022. In contrast, BA degrees in AI-related fields saw significant, albeit fluctuating, growth, culminating in 371 graduates by 2022, up from 115 in 2018. This trend suggests a steady but restrained interest in four-year programs in AI, which may reflect a preference for faster, more flexible options among prospective students seeking entry into the workforce.

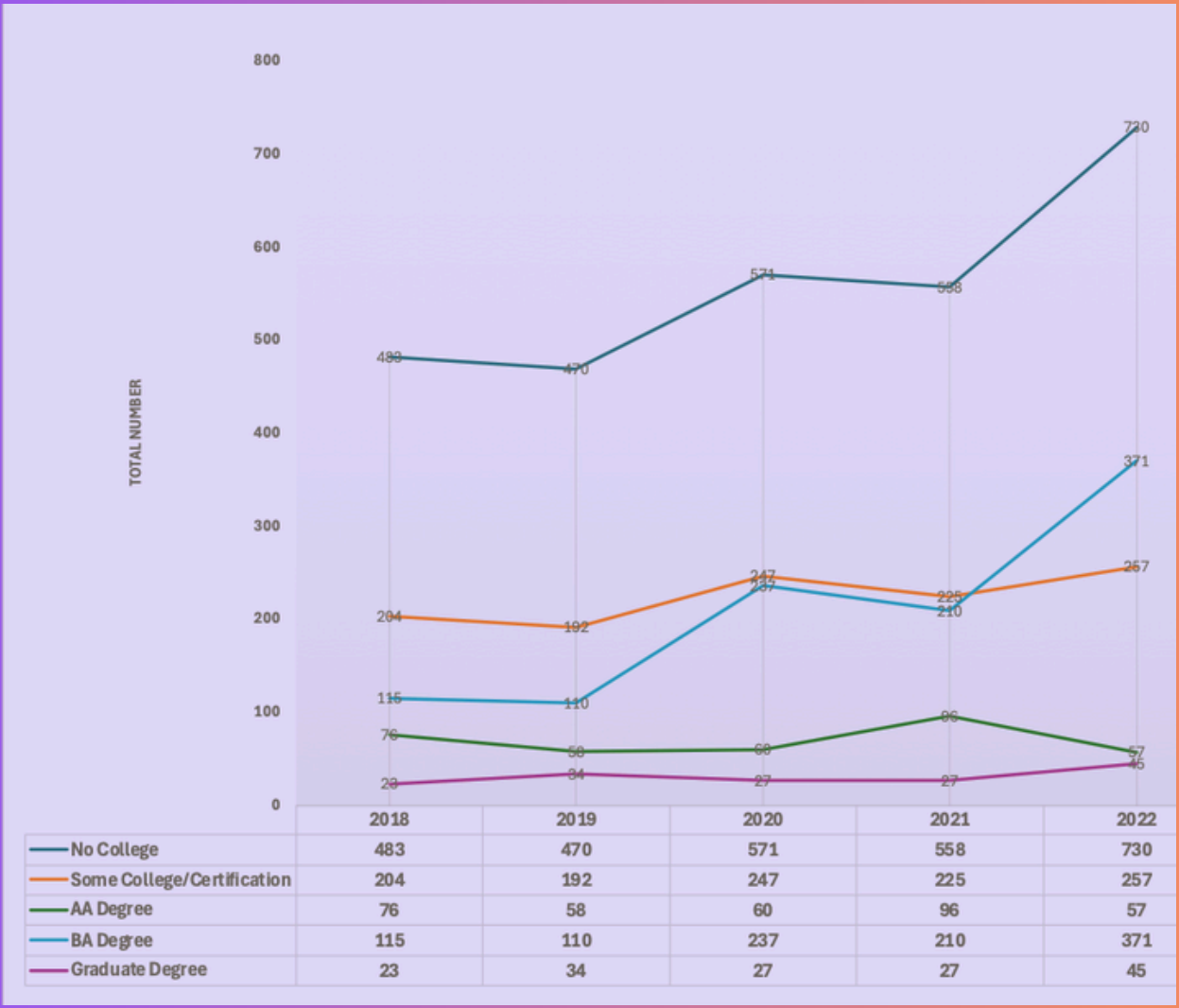
Finally, the graduate degree category, encompassing master's and doctoral students, effectively doubled, rising from 23 in 2018 to 45 in 2022. This increase indicates a burgeoning interest in advanced, specialized knowledge in AI-related disciplines, aligning with the growing complexity and sophistication of AI technologies. However, the relatively smaller numbers in this category reflect the challenges associated with advanced study, such as time commitment, cost, and the rigor of graduate programs.

Overall, the data suggest an expanding interest in AI-related fields, particularly among students opting for non-traditional educational pathways. This trend reflects broader shifts in the educational landscape, where flexibility, practical skills, and alternative credentials are becoming increasingly important in order to meet the demands of a dynamic and evolving job market. This is especially important for Nevada given that **28.7% of its adult population hold a bachelor's degree or higher**, which is almost ten percentage points lower than **the national average at 37.7%.**

Figure 4 illustrates a growing trend of non-college-educated Nevadans entering AI-related fields. This is a positive development, as it aligns with broader shifts showing a significant increase in job openings within these sectors. The data suggest that the AI industry is attracting an expanding workforce, underscoring its role as a major employment driver in the state.

At the same time, the AI and computer science fields are highly specialized, with a strong demand for professionals possessing advanced degrees and skills. This demand is largely driven by the complex and evolving nature of AI technologies, which require a deep understanding of algorithms, data analysis, and machine learning. **Careers in AI often necessitate at least a bachelor's degree in computer science, data science, or a related field, with many roles—such as machine learning engineer or AI research scientist—requiring master's or doctoral degrees for advanced positions.** The data presented in Figure 5 are consistent with these assertions.

Figure 4: Total Number of Students Graduating with Degrees* from All Nevada Institutions of Higher Education in AI Related Fields, 2018-2022



	2018	2019	2020	2021	2022
No College	483	470	571	558	730
Some College/Certification	204	192	247	225	257
AA Degree	76	58	60	96	57
BA Degree	115	110	237	210	371
Graduate Degree	23	34	27	27	45

Source: Nevada P-20 to Workforce Research Data System. 2024. Retrieved from https://mynpwr.nv.gov/; Compiled by author. *Note: For the No College Category that number was calculated by taking the total number of workers in the selected occupations without a completed degree or certification.

Figure 5: AI Postsecondary Education to Occupation Difference, 2020*

	Computer and Information Systems Managers	Computer Network Architects (+)	Computer Network Support Specialists** (AA)	Computer Occupations, All Other	Computer Programmers (+)	Computer Systems Analysts	Computer User Support Specialists* (S/NC)	Network and Computer Systems Administrators
Avg Annual Openings	210	40	160	220	70	170	580	120
Completed Min Ed Req, 2020	95	161	33	161	161	3	216	5
Education to Occupation Difference	-115	121	-127	-59	91	-167	-364	-115

Source: Nevada P-20 to Workforce Research Data System. 2024. Retrieved from https://mynpwr.nv.gov/; Compiled by author.

***Note: For the occupation Computer User Support Specialists, where Some or No College is the minimum education requirement, this figure was calculated by taking the total number of workers in this occupation in 2020 that did not hold a completed degree or certification. Therefore, this figure does not align with the data in Figure 4, because Figure 4 also includes workers in other AI related occupations outside of the Computer User Support Specialist occupation that report Some or No College.**

Figure 5 displays the alignment between average annual job openings and the number of individuals completing minimum educational requirements for the most popular or most in demand computer and IT-related occupations in 2020[8]. It highlights the existing gaps and surpluses of qualified workers in each occupation, which is crucial for understanding workforce preparedness in the AI and computer science sectors in Nevada. The findings for the selected occupations are outlined below.

1.Computer and Information Systems Managers:
In 2020, there were approximately 210 average annual job openings, but only 95 individuals completed the minimum education requirements (i.e. bachelor's) in that year. The education-to-occupation difference was -115, indicating a shortfall in educational completers relative to job openings. This trend reflects a broader issue in the technology industry, where demand often outpaces the supply of qualified candidates, especially in high-level roles that typically require a four year degree or more.

2.Computer Network Architects:
There were roughly 40 annual openings and 161 completers, resulting in a surplus of 121 individuals with the required minimum education (i.e. bachelor's). What this finding suggests is that there is a more competitive job market for individuals in this field. Such oversupply can lead to more rigorous hiring practices, as employers have a larger pool of qualified candidates to select from.

3.Computer Network Support Specialists:
There was an average of 160 annual openings, but only 33 individuals completed the minimum education requirements (i.e. associates degree) resulting in a deficit of 127 workers, highlighting a shortage of qualified candidates. Such deficits highlight the demand for hands-on network support skills, which are essential as companies expand their IT infrastructure to support digital advances and growth.

4.Computer Programmers:
With 70 openings and 161 completers (minimum education requirement is a bachelor's) there was a surplus of 91 workers, which could point to occupation over saturation.The upside is that the requisite skills for a programmer are transferable to other related occupations, allowing these surplus workers to fill positions with significant deficits.

5.Computer Systems Analysts:
In 2020 there was a critical need for computer systems analysts, with 170 job openings, but only 3 completers with the minimum education requirement (i.e. bachelor's), thereby leaving a shortage of 167 positions to fill. This shortage indicates a crucial demand for professionals capable of analyzing and improving computer systems, which is essential as businesses increasingly rely on efficient and secure IT infrastructure. The shortage could be attributed to the specialized skills required for this occupation, such as understanding complex systems, data analysis, and proficiency in specific software, which typically necessitates advanced education, training and experience.

6.Computer User Support Specialists:
There was also a significant deficit in the number of available positions for computer user support specialists in comparison to the number of degree completers, with 580 job openings but only 216 completers, leaving a gap of 364. Given that the minimum education requirement for this occupation is 'some or no college', and that there has been a steady rise in the number of Nevada workers in AI and computer related fields without a completed degree or certification, one would not expect such a significant deficit. Therefore, such disparities in entry-level positions could reflect a lack of accessible educational pathways or awareness about the demand in this area, which is key as these roles are often foundational to broader technological advancements and upward economic mobility.

7.Network and Computer Systems Administrators:
With 120 openings and only 5 completers (minimum education requirement is a bachelor's), there was a deficit of 115 workers for these positions in 2020, underscoring a high demand for individuals skilled in maintaining and administering networked systems.

[8] The NPWR Nevada Department of Employment, Training & Rehabilitation (DETR) data include a catch-all measure for computer science occupations. This variable was consistent with the occupational trends in Figure 5 in that the minimum education requirement is a bachelor's and that in 2020 there was a worker shortage, leaving approximately 59 positions unfilled. However, since we do not know which occupations are captured in this measure, the decision was made not to include it in the discussion of the findings.

Overall, analysis of the Nevada higher education data emphasizes the high demand for well-educated and well-trained professionals in the computer and AI fields, particularly in roles that support network and systems infrastructure, aligning with national trends that highlight the growing need for higher education and technical expertise across the computer science occupational sector. However, there is also a growing availability of AI-related jobs that do not necessarily require a college degree, particularly in support roles and entry-level technical positions. Despite this, the substantial shortages in workforce supply suggest that there may be a lack of awareness or accessibility to these positions among non-college-educated individuals.

This trend points to a broader issue that high school career counselors, computer science educators, and job recruiters in Nevada should be alert to. By enhancing awareness of these opportunities among high school graduates who have foundational skills in computer science, the workforce could better meet the demand for these roles without the need for students to acquire extensive post-secondary education.

3.3. AI-Integrated Nevada Workforce

As more businesses adopt AI technologies, the computer science and AI sectors are projected to experience substantial growth, with an estimated annual expansion rate of 37.3% through 2033. This growth is expected to generate approximately 356,700 job openings each year, making it an attractive field for those with the requisite education and expertise.

In addition, the financial prospects within these occupations are significant. As of May 2023, the median annual salary for the computer science and AI-related field was $104,420 (See Table 3), more than twice that of the median salary for all other job industries ($48,060). This wage differential underscores the value placed on technological skills and highlights the lucrative opportunities available for those equipped with expertise in areas of need, like that of digital infrastructure, cybersecurity, artificial intelligence, and data management. The projected job growth and competitive salaries further reinforce the appeal of these careers in the evolving job market, emphasizing the role of technology professionals in shaping the future economy, and potentially dominating the workforce.

This section evaluates Nevada's current workforce trends using data from the Nevada P-20 to Workforce Research Data System (NPWR), the Bureau of Labor Statistics (BLS), and the American Community Survey (ACS). The goal is to pinpoint areas where Nevada excels in building a robust, AI-integrated workforce. Specifically, it examines the state's success in attracting AI and computer science industries, as well as its effectiveness in recruiting and retaining diverse workers with AI expertise and computer science skills. With this analysis, this section highlights Nevada's strategic positioning in fostering a technologically advanced workforce and sustaining industry growth.

Table 3: Computer Science and Information Technology Nationwide Occupational Outlook, 2023

Occupation	Occupation Summary	Entry-Level Education	Median Salary (2023)
Computer and Information Research Scientists	Computer and information research scientists design innovative uses for new and existing computing technology	Bachelor's degree	$145,080
Computer Network Architects	Computer network architects design and implement data communication networks, including local area networks (LANs), wide area networks (WANs), and intranets.	Bachelor's degree	$129,840
Computer Programmers	Computer programmers write, modify, and test code and scripts that allow computer software and applications to function properly.	Bachelor's degree	$99,700
Computer Support Specialists	Computer support specialists maintain computer networks and provide technical help to computer users.	Associate's degree	$60,810
Computer Systems Analysts	Computer systems analysts study an organization's current computer systems and design ways to improve efficiency.	Bachelor's degree	$103,800
Database Administrators and Architects	Database administrators and architects create or organize systems to store and secure data.	Bachelor's degree	$117,450
Information Security Analysts	Information security analysts plan and carry out security measures to protect an organization's computer networks and systems.	Bachelor's degree	$120,360
Network and Computer Systems Administrators	Network and computer systems administrators install, configure, and maintain organizations' computer networks and systems.	Bachelor's degree	$95,360
Software Developers, Quality Assurance Analysts, and Testers	Software developers design computer applications or programs. Software quality assurance analysts and testers identify problems with applications or programs and report defects.	Bachelor's degree	$130,160
Web Developers and Digital Designers	Web developers create and maintain websites. Digital designers develop, create, and test website or interface layout, functions, and navigation for usability.	Bachelor's degree	$92,750

Source: U.S. Bureau Labor of Statistics. Occupational Outlook Handbook: Computer and Information Technology Occupations. https://www.bls.gov/ooh/computer-and-information-technology/home.htm

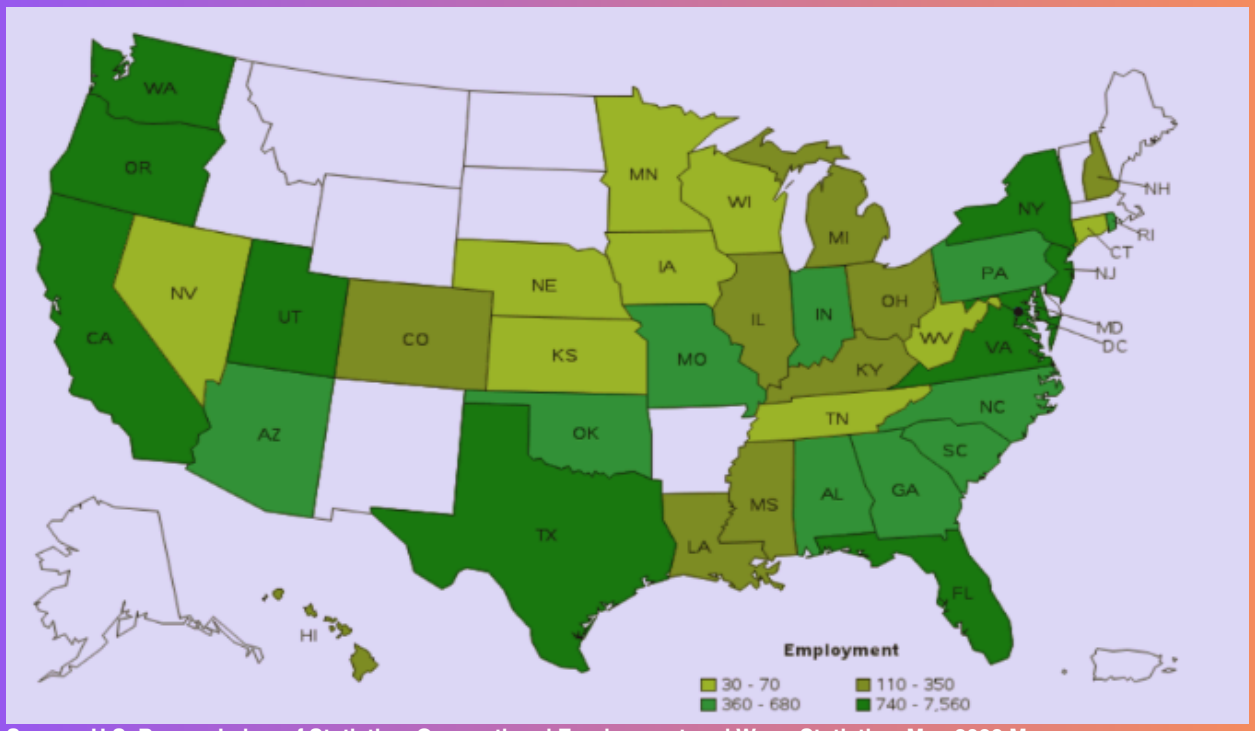
Nevada has the potential to become a key hub for technology companies, driven by factors such as a favorable business environment, strategic location, and relatively affordable real estate. With no corporate or personal income tax, Nevada offers cost savings that attract tech companies, especially those relocating from high-cost areas like Silicon Valley. Major cities like Las Vegas and Reno have modern infrastructure, including data centers and research facilities, which support tech firms' operational needs. Nevada also benefits from a growing talent pool, with universities such as the University of Nevada, Las Vegas and the University of Nevada, Reno, providing specialized programs in technology and engineering. Efforts to enhance the quality of life and offer incentives for tech professionals have contributed to an increasing number of skilled workers in the state. Nevada's tech appeal extends across various industries, including gaming, renewable energy, and aerospace, which offer opportunities for innovation. For example, advancements in virtual and augmented reality in Las Vegas's gaming sector have drawn tech companies interested in immersive technologies.

A supportive ecosystem of business organizations, incubators, and networking events also plays a key role in Nevada's attractiveness. Events like the Consumer Electronics Show (CES) help make the case for Nevada's status as the next tech hub. Major companies, like that of Tesla, Switch, Google, and Amazon, have also established significant operations in the state, emphasizing its potential as a base for technology and innovation.

The computer and tech sector employment maps presented in Figure 6 and Figure 7, support this theme that Nevada is a burgeoning tech hub in the Southwest and Mountain West regions, with the potential to become the preferred regional destination for tech companies looking to expand outside of traditional hub areas like that of California and Texas. Both Figure 6 and Figure 7 provide a snapshot of two key AI-related occupations (Computer and Information Research Scientist and Data Scientist) by highlighting employment levels for these occupations across various U.S. states. Categorized by shades of green, darker shades represent higher employment levels in these occupations, while lighter shades represent lower levels of employment. For Nevada, the map indicates moderate employment levels, particularly when compared to California and Texas.

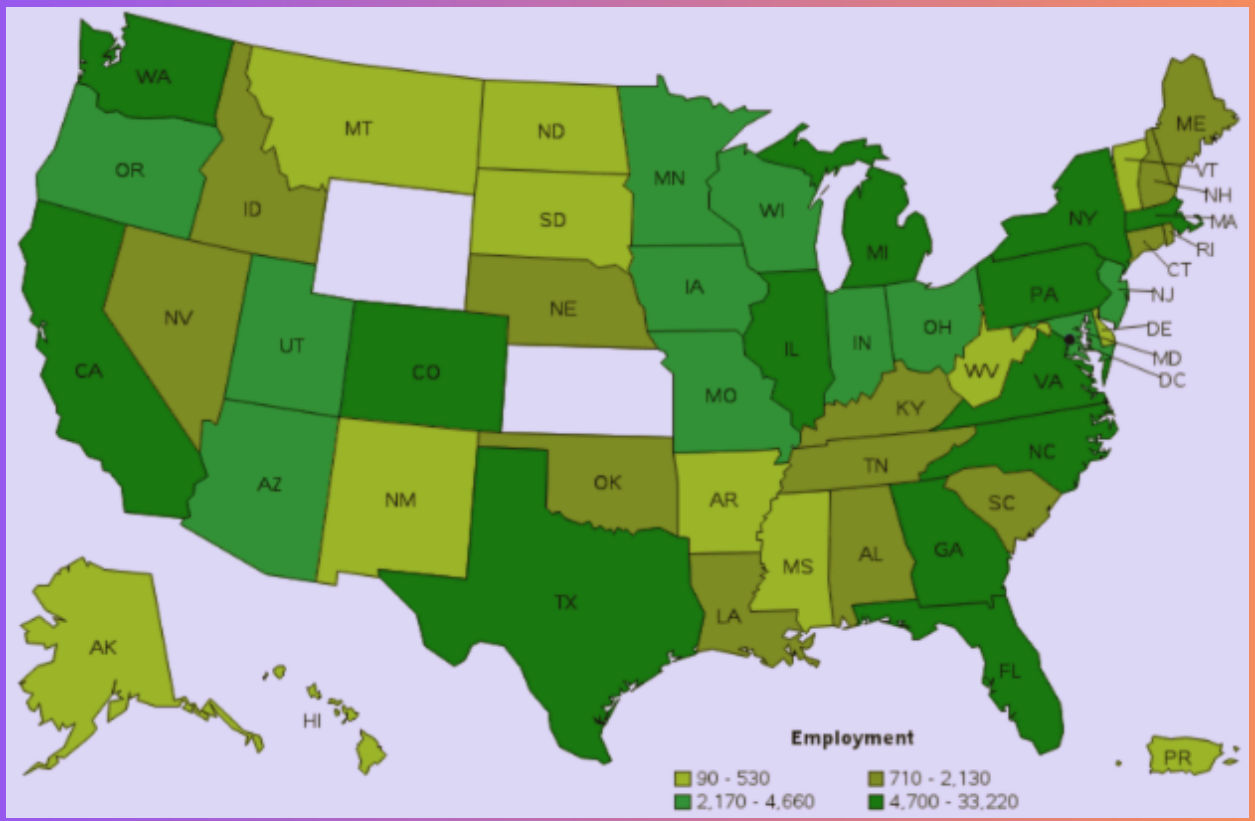
In Nevada, the employment range is in the mid-tier, suggesting a growing but not saturated job market. This mid-range employment level suggests that while there are job opportunities, particularly in emerging fields, there is also room for growth. The surrounding states, such as Arizona and Utah, also display moderate employment levels, indicating similar market conditions where there is a demand for skilled professionals. In contrast, states like Wyoming and Montana, which are lighter in shade, show relatively low employment levels, indicating limited job markets, potentially due to smaller populations and economies focused on other sectors. For Nevada, these figures suggest a strategic opportunity for career growth in technology and AI-related fields, where the state’s ongoing efforts to bolster workforce development and education could meet rising industry demands.

Figure 6: Employment of Computer and Information Research Scientists by State, 2023 (Total Number)



Source: U.S. Bureau Labor of Statistics. Occupational Employment and Wage Statistics: May 2023 Maps.
https://www.bls.gov/oes/current/map_changer.htm
*Note: No available data for states in white

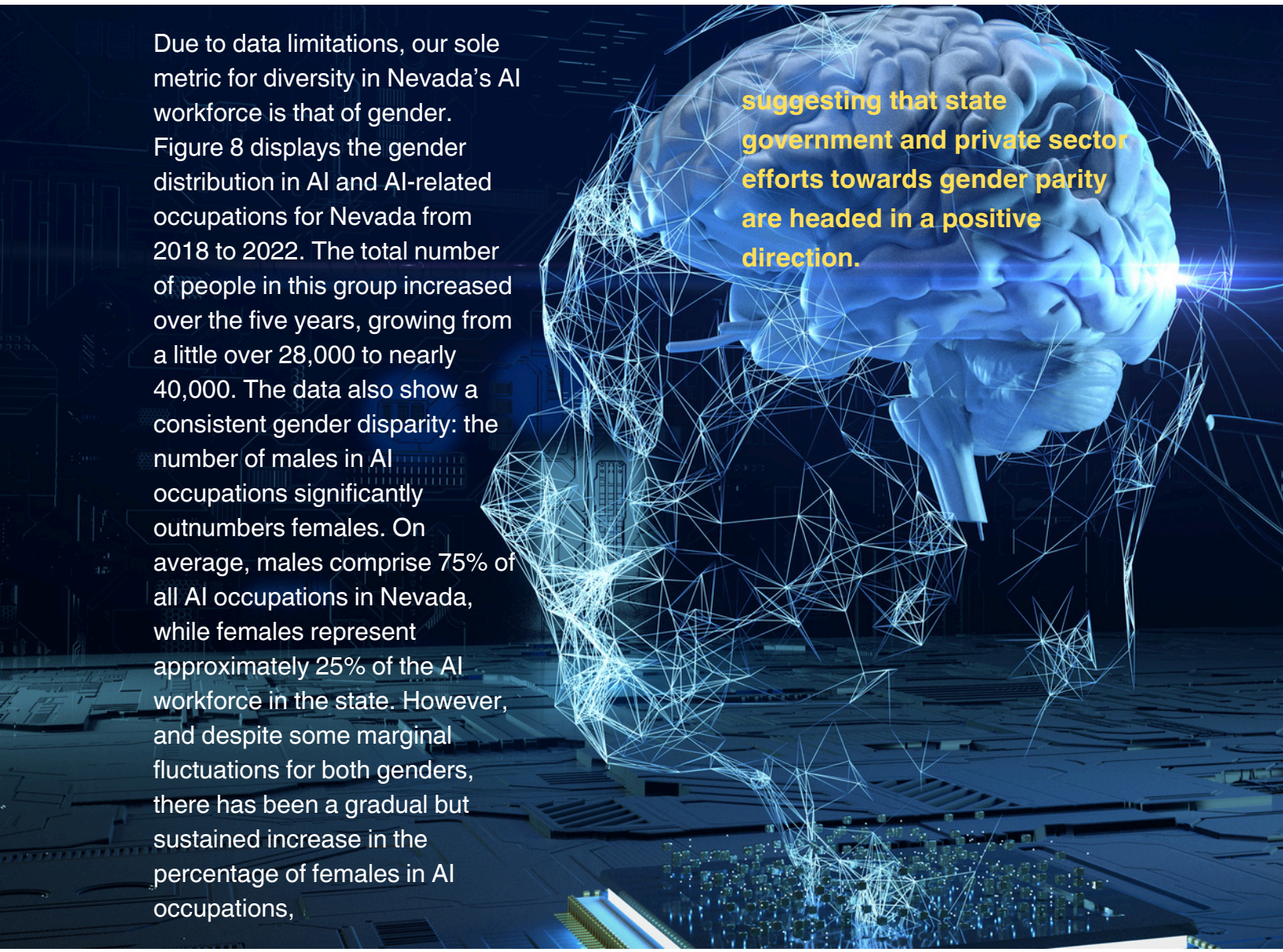
Figure 7: Employment of Data Scientists by State, 2023 (Total Number)



Source: U.S. Bureau Labor of Statistics. Occupational Employment and Wage Statistics: May 2023 Maps.
https://www.bls.gov/oes/current/map_changer.htm
*Note: No available data for states in white

Diversity in the workforce, fosters creativity and innovation, which are invaluable to the ever-changing, dynamic field of AI. Different perspectives contribute to the development of unique solutions that are more reflective of a varied consumer base, which can address a larger range of challenges (Tuman et al., 2021; Hunt, Layton, & Prince, 2015).

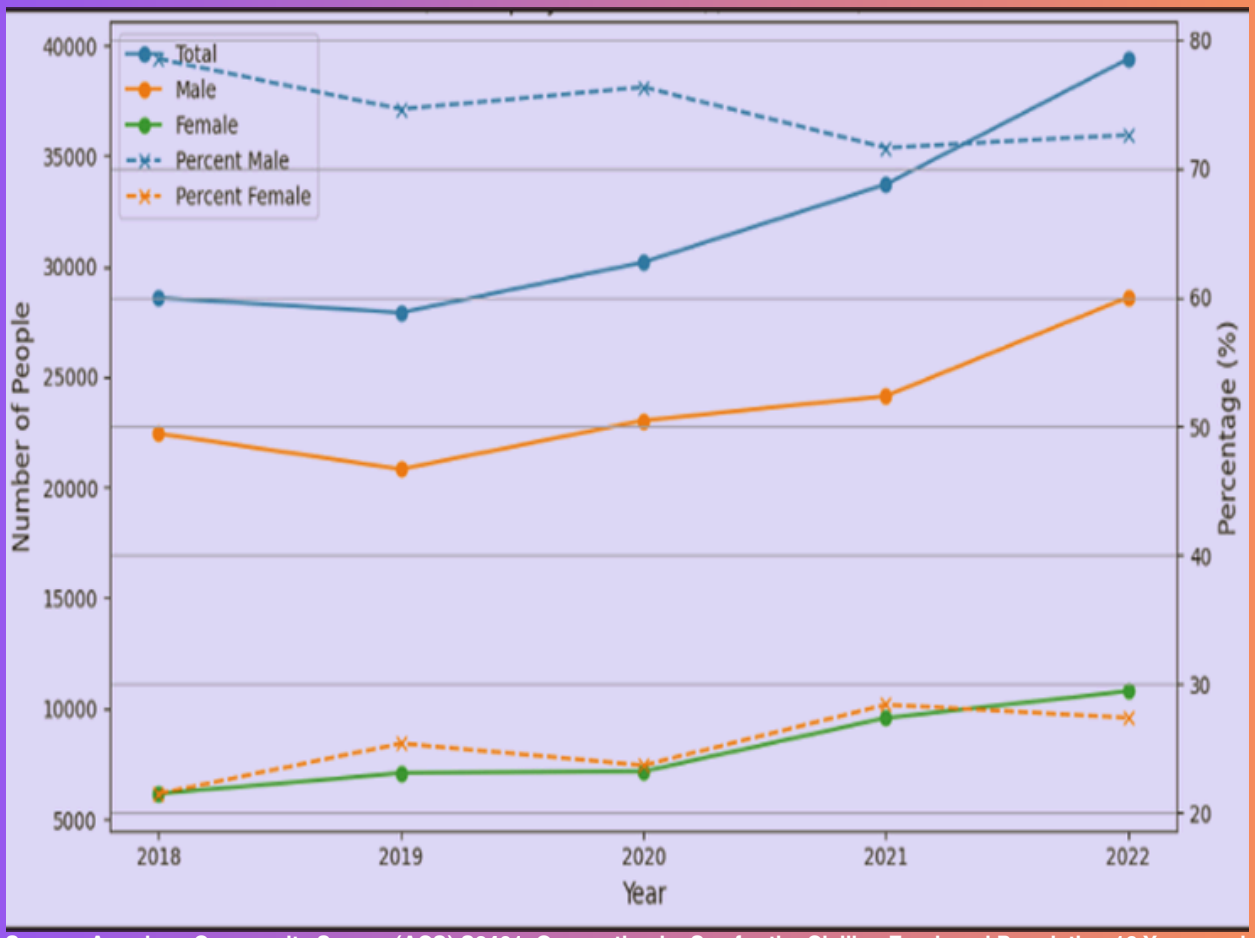
Studies show that companies with a more diverse workforce perform better financially and are more responsive to consumer needs. According to a report by McKinsey, companies in the top quartile for racial/ethnic and gender diversity are 35% more likely to have financial returns above their respective national industry medians (2019). This indicates that diversity is not just a metric to be achieved but is integral to the economic success of businesses.



Due to data limitations, our sole metric for diversity in Nevada's AI workforce is that of gender. Figure 8 displays the gender distribution in AI and AI-related occupations for Nevada from 2018 to 2022. The total number of people in this group increased over the five years, growing from a little over 28,000 to nearly 40,000. The data also show a consistent gender disparity: the number of males in AI occupations significantly outnumbers females. On average, males comprise 75% of all AI occupations in Nevada, while females represent approximately 25% of the AI workforce in the state. However, and despite some marginal fluctuations for both genders, there has been a gradual but sustained increase in the percentage of females in AI occupations,

suggesting that state government and private sector efforts towards gender parity are headed in a positive direction.

Figure 8: Gender Breakdown Across AI Occupations in Nevada (All Employed Civilians), 2018-2022



Source: American Community Survey (ACS) S2401: Occupation by Sex for the Civilian Employed Population 16 Years and Over. https://data.census.gov/table/ACSST1Y2018.S2401?q=occupations&g=040XX00US32&y=2018; Compiled by author.

3.4. AI Education to Workforce Pipeline Projections for Nevada

The data presented in Figure 9 provides a comprehensive analysis of the number of students that completed the minimum education requirements for some of the most in-demand computer science and AI-related occupations in Nevada. We assess the figures from 2020 alongside projections for 2030, which includes a review of the projected net changes over the decade.

In 2020, the number of students that completed the minimum education requirements for the **Computer and Information Systems Managers** occupation was relatively modest at 95, with projections indicating a slight increase to 106 by 2030, resulting in a net change of +11.

A pronounced change is observed for the occupation of **Computer Network Architects.** Initially, in 2020, there were 161 completers, but the projected number of completers for 2030 skyrockets to 620, resulting in a net change of +459. This dramatic increase signifies a substantial surge in educational output to meet the escalating demand for skilled professionals capable of designing and implementing complex network infrastructures.

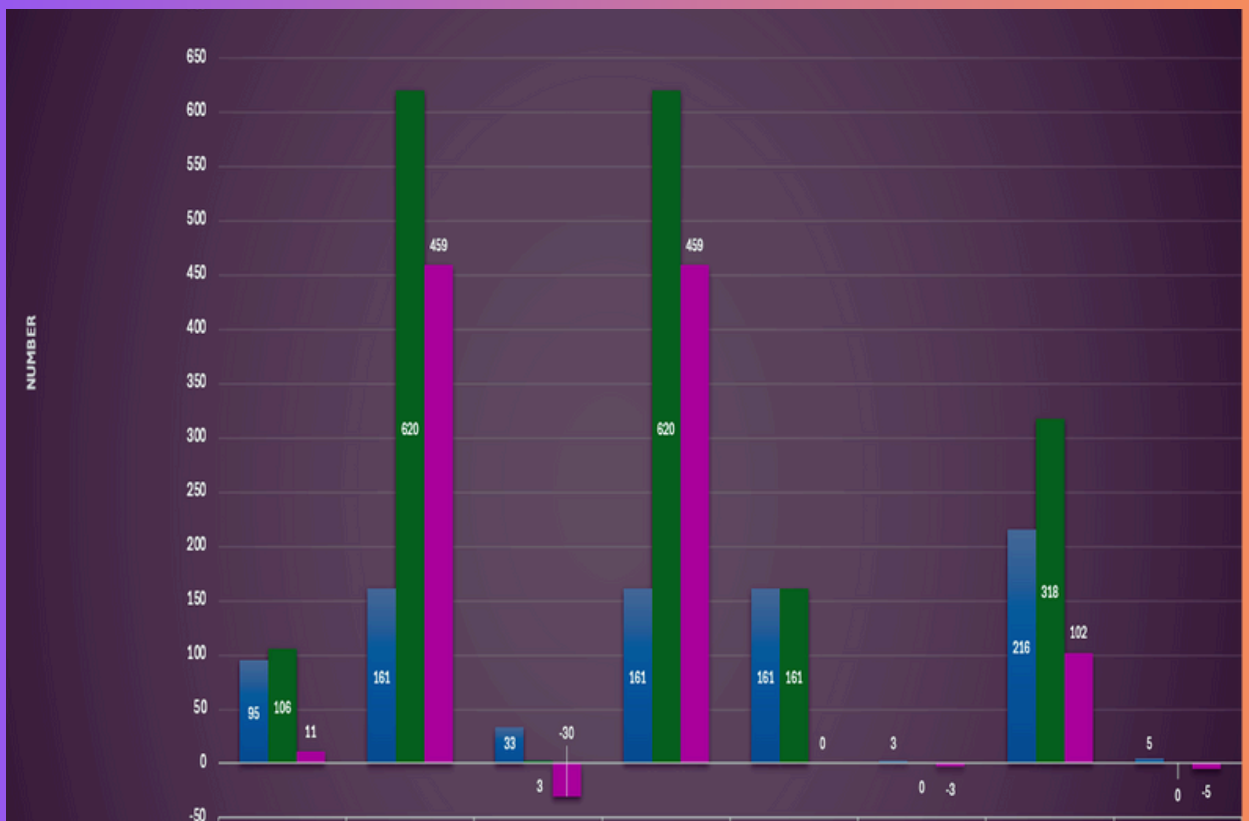
For **Computer Network Support Specialists**, the net change shows a significant decrease from 33 in 2020 to a projected 3 in 2030, a net change of -30. This could suggest automation or improvements in technology that reduce the need for such roles or a shift in industry requirements that focus more on advanced skills beyond traditional support functions. For **Computer Programmers** we see no change in the number of students completing the minimum education requirements, with the figure remaining stable at 161 from 2020 to 2030. This stability could indicate a saturation in the market or a balance between educational output and job market needs.

As for **Computer Systems Analysts**, there is a decrease in the number of degree completers from 3 in 2020 to none projected in 2030, resulting in a net change of -3. This drop could reflect a shift towards more specialized or updated roles that encompass system analysis functions within broader tech positions. With regard to **Computer User Support Specialists**, this field is projected to increase, from 216 completers in 2020 to 318 in 2030, a net change of +112. Lastly, the field of **Network Computer Systems Administrators** shows a concerning decrease, from only 5 completers in 2020 to 0 in 2030, a net change of -5.

What Figure 9 tells us is that in some key occupations, like that of Computer Network Architects and Computer User Support Specialists, Nevada's efforts to align educational programs with job market needs appears to be effective. However, overwhelmingly the occupations that require more specialized skills and advanced education experience substantial decreases in the number of students graduating with the requisite skill set, which could have significant implications as Nevada looks to establish an AI driven economy. The data presented in Figure 10 helps shed light on Nevada's economic prospects in the technology sector given its projected AI education to workforce pipeline.

Figure 10 provides a detailed analysis of the post-secondary education to occupation difference in Nevada for some of the high demand computer-related occupations in 2020 in comparison to the projected education to occupation differences by 2030. It effectively illustrates which occupations are expected to expand, and which ones are expected to contract, given the availability of AI competent workers.

Figure 9: Number of Postsecondary Students that Completed the Minimum Education Requirements for Each Occupation in 2020 in Comparison to the Projected Number of Students that Completed the Minimum Education Requirements for Each Occupation in 2030, with Net Change



	Computer and Information Systems Managers	Computer Network Architects	Computer Network Support Specialists (AA)	Computer Occupations, All Other	Computer Programmers	Computer Systems Analysts	Computer User Support Specialists (S/NC)	Network and Computer Systems Administrators
2020 Completed Min Ed Req.	95	161	33	161	161	3	216	5
2030 Projected to Complete Min Ed Req.	106	620	3	620	161	0	318	0
Net Change	11	459	-30	459	0	-3	102	-5

Source: Nevada P-20 to Workforce Research Data System. 2024. Retrieved from https://mynpwr.nv.gov/; Compiled by author.

Figure 10: Post-secondary Education to Occupation Difference in 2020 and Projected Post-secondary Education to Occupation Difference by 2030, with Net Change

	Computer and Information Systems Managers	Computer Network Architects	Computer Network Support Specialists (AA)	Computer Occupations, All Other	Computer Programmers	Computer Systems Analysts	Computer User Support Specialists (S/NC)	Network and Computer Systems Administrators
Education to Occupation Difference (2020)	-115	121	-127	-59	91	-167	-364	-115
Education to Occupation Difference (2030)	-104	580	-165.8	400	550	-173	-262	-115
Net Change	11	459	-38.8	459	459	-6	102	0

Source: Nevada P-20 to Workforce Research Data System. 2024. Retrieved from https://mynpwr.nv.gov/; Compiled by author.

In 2020, there was a -115 deficit in the number of individuals who were qualified to fill **Computer and Information Systems Managers** positions.By 2030, it is estimated that there will still be a significant shortage in the number of qualified workers, with a slight decrease to -104, resulting in a net change of +11.

Computer Network Architects see a substantial increase, moving from a surplus of 121 in 2020 to an even larger one of 580 in 2030, with a net change of +459. This significant increase in the surplus suggests a growing output from educational institutions that at this time is projected to exceed job demand, which could result in oversaturation for this occupation.

In contrast, **Computer Network Support Specialists** are expected to experience a worsening scenario, going from a deficit of -127 to a larger deficit of -165.8, resulting in a net change of -38.8. This trend indicates that the existing shortage of qualified professionals for this occupation will only become worse.

Computer Programmers go from a modest surplus of 91 in 2020 to one that is exponential with more than 550 qualified workers in 2030, a net change of +459. This indicates a significant increase in the number of graduates compared to job openings, which could result in an oversaturated market for this field.

For **Computer Systems Analysts**, the job market was nearly at equilibrium with a surplus of +3 in 2020, and by 2030 it is projected that the market will be in complete alignment and that all available open positions in this field will be occupied by qualified personnel.

For **Computer User Support Specialists,** the data show a reduction in deficits, moving towards better alignment between educational outputs and job market demands. However, these changes are relatively modest compared to other fields, especially considering that there remains a significant shortage in the number of qualified workers filling the available positions.

Finally, for **Network and Computer Systems Administrators** there is no change over the decade, which reveals ongoing educational challenges given that there is a deficit of -115 in 2020. This finding points to a lack of responsiveness to the needs of the market, or a failure in educational efforts to tackle this misalignment.

In summary, the data in Figure 10 echoes that of Figure 9, and together they depict a mixed landscape where some computer-related occupations in Nevada will address its labor market shortages, to the point of achieving an equilibrium between job demand and worker supply. However, the consensus is that the majority of these AI and computer-based occupations will still face significant labor market deficits, while a few will experience market oversaturation, indicating the importance of continuous monitoring and adjustment of educational programs to ensure they are responsive to the evolving needs of the technology sector.

4. Policy Recommendations

In this section we discuss several strategic recommendations to address some of the challenges Nevada currently faces with establishing a sustainable AI education to workforce pipeline. These recommendations focus on potential policy solutions and public and/or private sector initiatives capable of filling in the existing gaps. The goal is to build upon current programs and initiatives that have been effective in order to provide actionable insights.

4.1. Primary and Secondary Education

- ***STEM-focused Curriculum Implementation:*** Nevada has been proactive in incorporating **STEM education into its K-12 curricula.** It has even gone so far as to establish computer science standards, that require foundational instruction in computer science for all high school students. Therefore, our recommendation here is that NDOE expands its curricular offerings beyond a foundational course at the secondary level and introduce students to computer science instruction at the primary level.

- ***AI Enhanced Primary Education:*** One way to promote AI and computer science literacy at the primary level is to adopt the usage of AI tools in the K-5 classroom. There are **already several free and low-cost resources that can be utilized by teachers.** The biggest obstacle to doing this is determining how best to promote AI enhanced instruction and learning in the K-5 classroom in a uniform way to meet the AI literacy needs of all of Nevada's primary education students.

- ***Expand K-12 and Higher Education Partnerships:*** The two flagship institutions in Nevada, UNLV and UNR, have both been instrumental in fostering AI and computer literacy among Nevada's K-12 students by establishing engagement initiatives like that of **UNR's K-12 Robotics Center** and **UNLV's hosting of technology camps by iD Tech.** These two programs serve as prime models, which can either be adapted to include **Nevada's network of community colleges and smaller institutions,** or replicated at these institutions with the goal of meeting the needs of K-12 students in rural settings. The K-12 Robotics Center at UNR exemplifies a successful engagement strategy by actively involving local students in robotics and STEM fields, which are crucial for developing a foundation in AI literacy. By replicating such a program across community colleges in Nevada, there is potential to make robotics and AI education more accessible to rural students, who often face barriers such as limited access to specialized STEM resources. Community colleges, with their local ties and flexibility, can adapt these models to fit the specific needs and contexts of rural areas, thus broadening the impact of such programs. Similarly, UNLV's collaboration with iD Tech to offer technology-focused summer camps provides a scalable model for introducing younger students to computer science and AI concepts in a hands-on, engaging manner.

Alternatively, community colleges, should also have the flexibility to develop their own original initiatives that meet the needs of their communities by operating on a smaller scale. For example, this could involve holding **after-school programs** that focus on coding, machine learning, and practical applications of AI. Expanding this model of K-12 and higher education partnerships to community colleges can provide continuity in AI and computer literacy education throughout a student's K-12 journey.

4.2. Higher Education

- ***Expand Online Degree Offerings and Remote Learning Opportunities***: At present, only UNLV and UNR offer four-year degrees in computer science. As a result, students outside of the metropolitan hubs of Las Vegas and Reno have limited options if they wish to earn a bachelor's in computer science. They either must pursue an online computer science degree or explore participating in student exchange programs and **reciprocity agreements** under the **Western Interstate Commission for Higher Education**. Regarding online degree offerings, Nevada has laid the groundwork to meet the needs of students across the state, but simply lacks a comprehensive system-wide strategic plan. The NSHE Sponsored Programs and EPSCoR office, maintains the **Opportunities in STEM Nevada** website as a resource to inform students, teachers, parents, and the community about opportunities in STEM education and employment. Given the expansiveness of the Opportunities in STEM Nevada network, NSHE could work with its higher education institutions to establish virtual labs and remote learning opportunities, thereby ensuring that high-quality computer science and AI education is accessible statewide, irrespective of geographical limitations.

4.3. Nevada Workforce

- ***Build Upon Industry Partnerships:*** Nevada is at the forefront of integrating AI innovations to enhance workforce efficiency and address state-wide challenges. This proactive approach can be further augmented by expanding successful initiatives, partnering with tech industry leaders, and developing new strategies to build an AI-competent, computer literate workforce. The **state government's recent implementation of a generative AI system developed by Google to analyze and generate recommendations for unemployment appeals hearings** is a pioneering example of how AI can streamline state operations. This initiative not only boosts operational efficiency but also sets a benchmark for integrating AI in public administration. Nevada can build on this by fostering similar partnerships with other tech giants and startups to tackle a number of complex issues such as funding for education, medical professional shortages, and the lack of affordable housing.

- ***Targeted and Flexible Upskilling Programs:*** The success of the **Transmosis Program,** which was initiated with a STEM Workforce Challenge Grant (2017-2018) to provide cybersecurity training to displaced workers, incumbents, and postsecondary students, underscores the potential of targeted upskilling initiatives. Nevada can expand this model to include AI and computer literacy, which are essential skills for the modern workforce. To enhance accessibility and reach, these training programs could be modeled after **UNLV's Tech Bootcamps** format, which offers remote learning options catering to various needs, including those transitioning to new careers or enhancing existing skills.

- ***Remote Workforce Recruitment and Scalability:*** The scalability of remote work should also be considered as a strategic advantage. By promoting remote-friendly job opportunities, Nevada can attract a wider pool of talent who are proficient in AI technology, that can then work from different locations, effectively addressing workforce gaps in critical areas. **This strategy has been used with a great deal of success by companies struggling to fill a large number of vacant positions**. This approach would not only address immediate labor market needs, but would also promote Nevada as a flexible and technologically adaptive employment hub.

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