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# Investing in Workforce Growth Through Targeted Programs

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Workforce Solutions

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Report by David Idah, Oliver Jimenez, Jessica Le, Laura Lozano, Jake Schwartz

# Contents

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<b>Introduction</b>	3
<b>Economic Performance Methods</b>	4
0.1 Net Present Value (NPV 1.1)	4
0.2 Net Present Value (NPV 1.2)	4
0.3 Internal Rate of Return (IRR)	5
<b>Healthcare Programs</b>	7
0.4 Bachelor of Science Nursing Degree - Prairie View AM University	8
0.5 Associates in Nursing - San Jacinto College District	9
0.6 Associates in Physical Therapy Assistants - Wharton County Junior College	11
0.7 Associates in Diagnostic Medical Sonography - San Jacinto College District Lone Star College-CyFair	12
<b>Computer and Mathematical Programs</b>	13
0.8 Computer Science, Bachelor of Science – Texas A&M University San Antonio	14
0.9 Computer Numeric Control Operator Programmer Level I	15
<b>Management Programs</b>	16
0.10 Bachelor's in Business Administration-Management	17
<b>Construction and Extraction Programs</b>	18
0.11 Research on Construction Step Up Supervisor Program at San Jacinto College District	18
<b>Production Programs</b>	19
0.12 Industrial Maintenance Engineering Technician (Certificate)	19
0.13 Process Technology Degree (AAS)	19
<b>Internal Rate of Return Findings</b>	20
<b>Net Present Value (NPV) Findings</b>	22
<b>Conclusion</b>	23
<b>Appendix A</b>	24
<b>Reference List</b>	31

## Introduction

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The Gulf Coast Workforce serves as the local board of directors for Workforce Solutions, overseeing the 13-county Houston-Galveston region. Their primary goal is to set a direction for the regional workforce system, aiming to achieve four key outcomes: competitive employers, an educated workforce, more and better jobs, and higher incomes. As part of their initiative, Workforce Solutions offers annual scholarships of up to \$6,000 for two years to support eligible students. In collaboration with Workforce Solutions, we aim to enhance the targeting and effectiveness of these scholarships.

The objective of this project is to carefully select programs that align with sectors demonstrating high growth, high demand, and promising prospects over the next ten years. It includes identifying the top ten growing industries in the 13-county Houston-Galveston region, determining ten career fields within these industries, and assessing which programs best align with these fields for potential inclusion on the Eligible Training Provider List (ETPL). The ETPL is a public resource that provides a list of approved training programs available through funds from the Individual Training Accounts (ITA). The accounts are funded by the government and designed to support job seekers and employed individuals by covering the costs of career training.

However, our selection process encountered several challenges: limited access to detailed program data due to confidentiality constraints and government restrictions on raw data, a small and restrictive ETPL list that limits the specific programs eligibility for state funding, not enough variety in bachelor degree programs, differences in student aid eligibility, and strict loan rules. Additionally, reviews of programs offered by technical schools and family businesses often did not meet students' career expectations, primarily due to the lack of instructors and certifications that offered limited long-term career potential.

Our approach involved performing a descriptive statistical analysis using data on the success of various programs. Using datasets from the Bureau of Labor Statistics, we developed models in Python, such as regression and classification models, to analyze growing career opportunities across different industries. We also incorporated factors such as the locations of the counties, the reputations of the programs within the counties, and the age demographics of the local population to evaluate the demand for specific professions and employment outcomes post-graduation. Finally, we assessed financial metrics, such as Net Present Value (NPV) and Internal Rate of Return (IRR), to formulate recommendations that align with the Gulf Coast Workforce's goals.

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## Economic Performance Methods

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### 0.1 Net Present Value (NPV 1.1)

Net Present Value (NPV) is a financial metric that evaluates the profitability of an investment or project by calculating the difference between the present value of cash inflows and the present value of cash outflows over some time. In educational programs, NPV represents the monetary value of the benefits gained from completing a program, such as increased earnings minus the costs incurred, including tuition fees and potentially lost wages during the study period. A positive NPV indicates that the program is more likely to generate more income than the costs, making it a financially viable option. Conversely, a negative NPV suggests that the costs outweigh the benefits. By using NPV to assess each program, students and policymakers can make informed decisions about which educational paths offer the best financial returns and overall outcomes, ensuring that investments in education lead to substantial economic benefits and improved career prospects.

$$NPV = \left( \sum_{t=1}^{10} \frac{S(1+f)^t}{(1+r)^t} \right) - C \quad (1)$$

where:

- ( $S$ ) is the annual salary (\$)
- ( $f$ ) is the fringe benefit rate (20% or 0.20)
- ( $r$ ) is the discount rate (3% or 0.03)
- ( $t$ ) is the time period in years (25 years)
- ( $C$ ) is the total cost of the program (\$)

### 0.2 Net Present Value (NPV 1.2)

The NPV 1.2 formula assesses the financial viability of educational programs by considering several key factors that influence Net Present Value. It includes direct costs such as tuition fees, rent, and transportation. It also accounts for projected salary increases that typically continue until around 45 years old, after which significant raises become less likely.

The formula subtracts opportunity costs, which shows the earnings missed out on by choosing education over immediate employment. Additionally, it incorporates estimated fringe benefits like health

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insurance, retirement contributions, and job stability that can increase an individual's annual salary by approximately 20% post-education.

$$NPV = \left( \sum_{t=t_e+1}^T \frac{S_2 \cdot (1 + 0.03 \cdot t) \cdot (1 + f_2)}{(1 + r)^t} \right) - \left( \sum_{t=1}^T \frac{S_1 \cdot (1 + 0.03 \cdot t) \cdot (1 + f_1)}{(1 + r)^t} \right) - \left( \sum_{t=1}^{t_e} \frac{CE}{(1 + r)^t} \right) \quad (2)$$

where:

- $(S_1)$  is the annual salary before education or without education (\$)
- $(S_2)$  is the annual salary of the individual after education (\$)
- $(f_1)$  is the fringe benefit rate of the individual before education, or had they not sought education (10% or 0.10)
- $(f_2)$  is the fringe benefit rate of the individual after education (20% or 0.20)
- $(r)$  is the discount rate (3% or 0.03)
- $(t)$  is the time in years until the individual turns 45 (years of education/years of non-education)
- $(CE)$  is the total cost of education, tuition, supplies, transportation, living costs and personal expenses incurred during the education period (\$)
- $(t_e)$  is the duration of the education

### 0.3 Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is another financial metric used to evaluate how profitable an investment is, including educational programs. It does this by finding the discount rate that makes the net present value (NPV) of cash flows equal to zero. For academic programs, the IRR shows the rate at which the costs, like tuition fees and lost earnings during the study, are matched by the benefits, such as increased earnings after graduation.

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The amount initially invested plays a role in the IRR calculation. A greater initial cost requires the IRR to balance this significant expense against future returns. If those returns are smaller than expected, the IRR might be lower. It happens because IRR gives more importance to returns that come earlier due to the time value of money, meaning the money you have now is worth more than the same amount in the future.

Additionally, the size of the cash flows compared to the initial investment influences IRR. For example, a program requiring a \$ million investment that returns \$1.2 million might have a lower IRR than a program needing \$100,000 but returning \$150,000, even though the total dollar return is higher in the first case. As a result, IRR provides a different perspective than just looking at the total return on investment.

$$0 = \sum_{t=1}^T \frac{E_t}{(1+r)^t} - C \quad (3)$$

where:

- $(E_t)$  is the earnings in year  $(t)$  (% growth in salary annually)
- $(r)$  is the internal rate of return
- $(T)$  is the number of years over which the returns are calculated (25 years)
- $(C)$  is the cost of the investment (tuition and other expenses (\$))

## Healthcare Programs

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The Gulf Coast Region boasts a diverse array of options and opportunities in Health Care and Social Assistance Programs. Health care occupations are on the rise with expected growth from 2022 to 2023 being 13%—much faster than the average for all occupations. The increasing demand for healthcare professionals is emphasized by the projected changes in the United States age structure, showing a significant increase in the elderly population leading up to 2050. Specifically, the U.S. Census Bureau predicts a dramatic rise in the population aged 85 and older between 2020 and 2050.

Healthcare and Social Assistance occupations are evenly distributed across various age groups, particularly between ages 25 and 64. Analysis of data from the U.S. Department of Labor reveals that job changes in healthcare follow a normal distribution over a ten-year trajectory, excluding promotions (see Appendix Figure 1). This equal age distribution and job stability data suggest that healthcare jobs provide a secure, long-term career worth the investment in education (*Career Pathways Descriptive and Analytical Study Data*. U.S. Department of Labor).

At the state level, health care and support service occupations are on the rise, with an expected percentage change from 2016 to 2026 projected at 27.63 percent in Texas (Gulf Coast Regional Data, Workforce Solutions). Texas is renowned for its significant elderly population growth, driven by retirees attracted to the state’s warmer climate, cheap housing, and absence of state income tax, which reduces retirement burdens. In 2010, Texas’s population was around 29 million, and by 2024, it has grown to approximately 30.97 million. This substantial influx of residents, including a growing number of older adults, valuing the increasing demand for healthcare services in Texas. This demand supports well-funded healthcare facilities that offer competitive wages to attract and retain skilled healthcare professionals.

**Figure 3: Comparison of Projected United States Age Structure, 2020-2050**

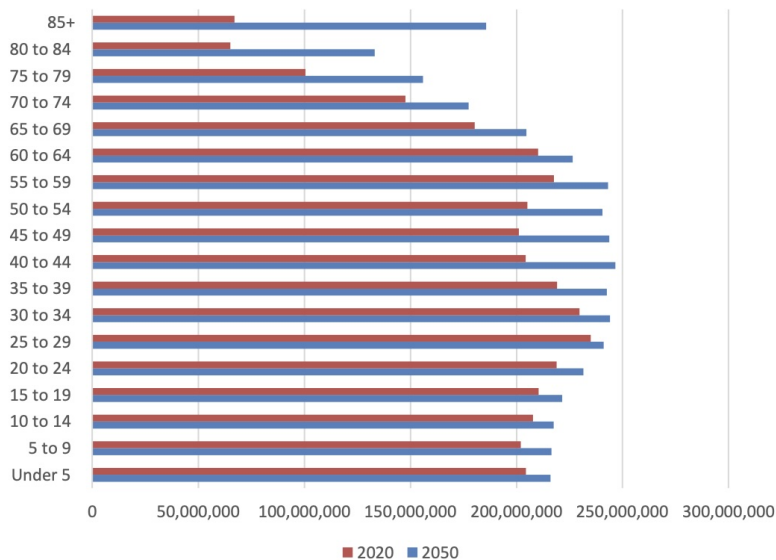


Figure notes: Projected Population Size and Births, Deaths, and Migration: Main Projections Series for the United States, 2017-2060. U.S. Census Bureau, Population Division: Washington, D.C.

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#### **0.4 Bachelor of Science Nursing Degree - Prairie View AM University**

Prairie View AM University's BSN program prepares students for professional nursing practice in a variety of clinical settings as well as graduate studies. The program places an emphasis on academic rigor, cultural competence, and lifelong learning, which is consistent with the university's dedication to excellence. PVAMU's BSN program is a four and a half year program with an average yearly cost of \$25,634 across fees such as books, transportation, etc., totaling \$115,353 by the end of the program. PVAMU's nursing program begins with fundamental courses in biology, anatomy, chemistry, and psychology. Students proceed to core nursing studies, which include theory, health assessment, pharmacology, and clinical practice. They receive hands-on experience by rotating across various healthcare settings, focusing in pediatric, maternity, psychiatric, and geriatric nursing. The program includes simulation labs and prepares students for the NCLEX exam and licensing by providing training in ethics, legal standards, and evidence-based practice.

The BSN Program at PVAMU receives approximately 30-50 applications each fall and spring semester, with about 20 students admitted per semester. Applicants must complete 60 transferable college-level prerequisite hours (45 at the time of application) with no more than two repeated courses. They must also maintain a minimum cumulative GPA of 3.0 and meet the required GPA in support areas on a 4.0 scale.

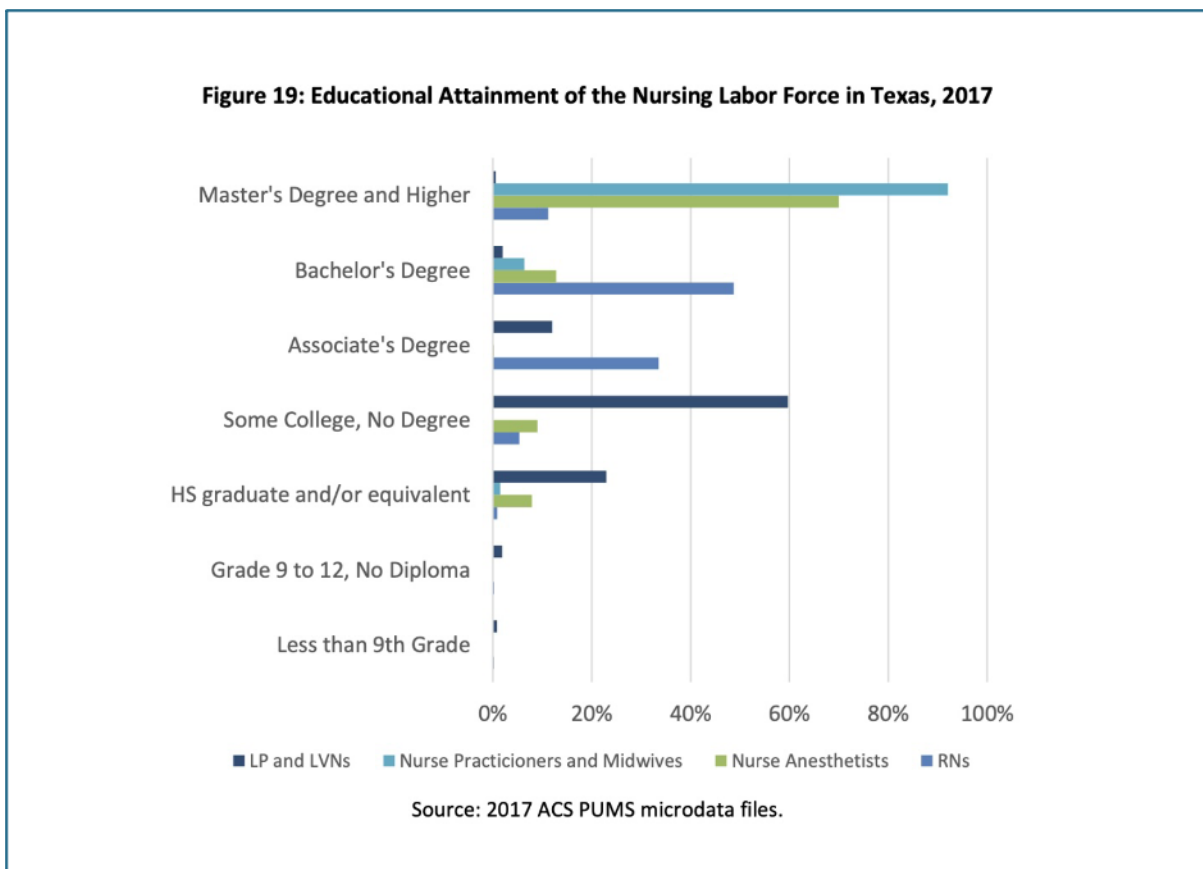
The U.S. Bureau of Labor Statistics lists the average hourly wage for registered nurses at \$43.37, way above the \$21.68 livable hourly wage in Texas. According to the Texas Health and Human Services prediction models, demand for registered nurses will surpass supply every year until 2032, the expected shortage of registered nurses means that graduates from this program will have plenty of opportunities. They should expect considerable demand in healthcare environments such as hospitals, clinics, and long-term care institutions. This provides prospects for steady employment, competitive compensation, and professional progression while also addressing the growing demand for nurses.



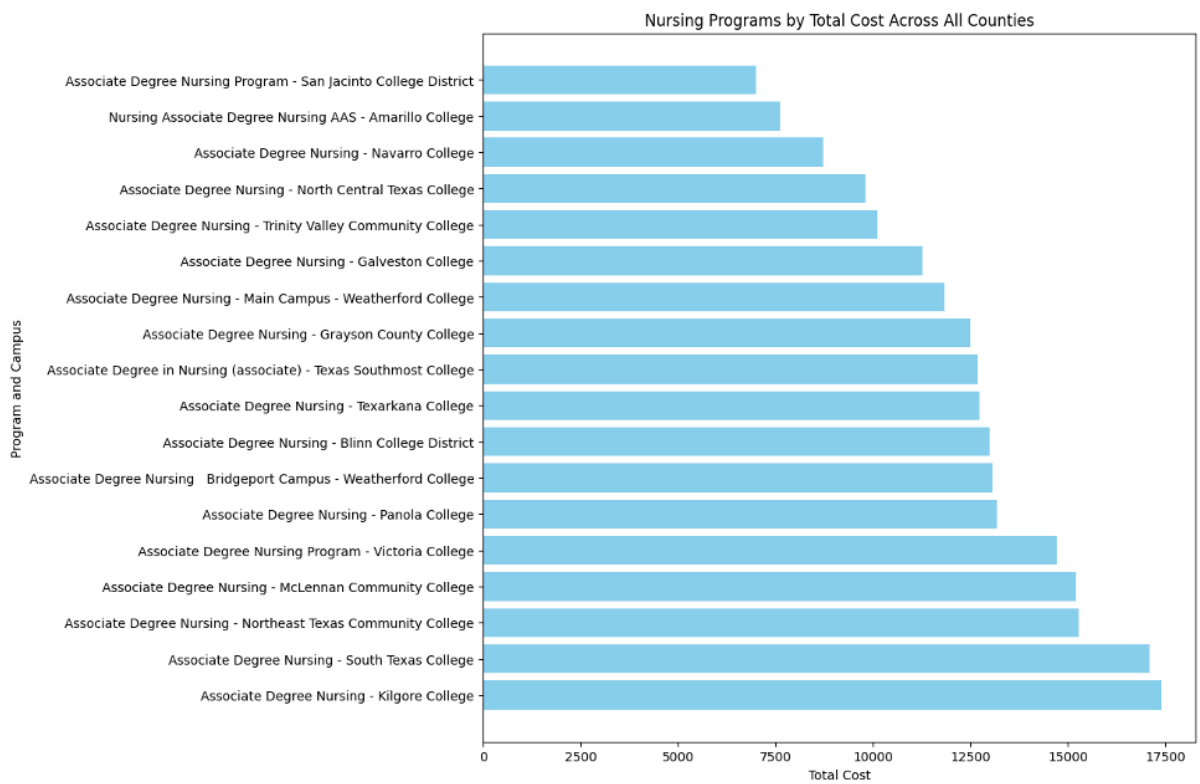
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## 0.5 Associates in Nursing - San Jacinto College District

The Associates in Nursing provides an alternative to the Bachelor's in Nursing that decreases cost of attendance and shortens duration of the program. Unfortunately, many assistant medical professions that come from a Associates in Nursing do not meet the livable wage requirement of \$21.68 an hour in Texas (constraint via Workforce Solutions), thus the goal would be to attain a status of a more technical career field like Registered Nurse. According to a 2017 ACS PUMS microdata file via the BLS, the largest population percent of registered nurses have a 4-year degree. Although, close behind the bachelor's degree is the associates degree making it a foreseeable alternative path to becoming a registered nurse (See figure below).



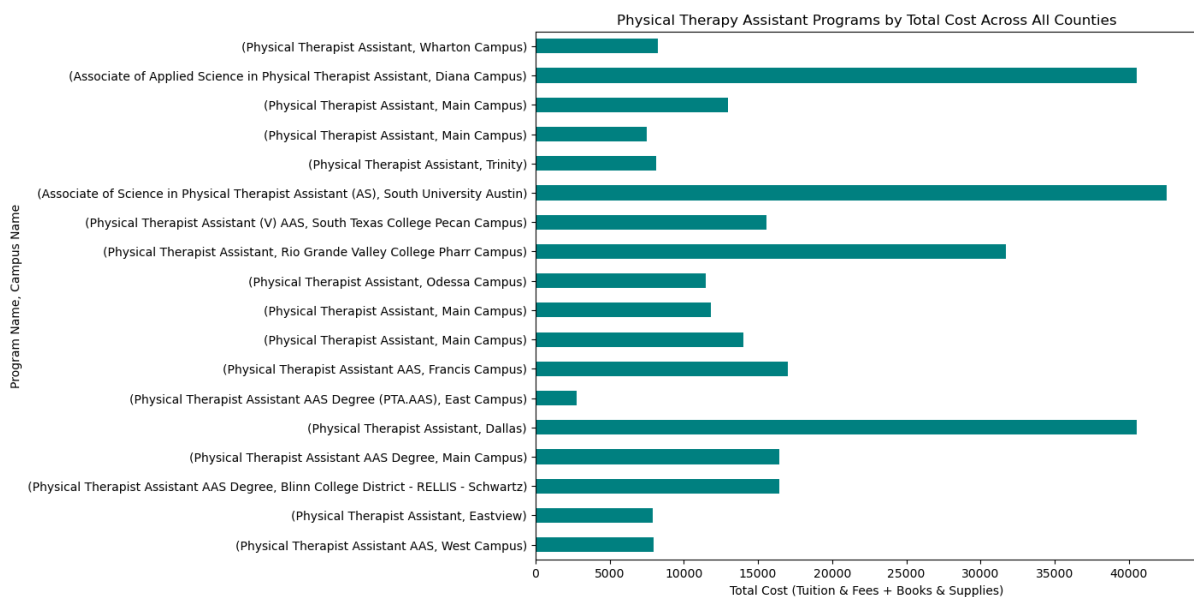
San Jacinto College offers the most affordable Associate in Nursing program within the Gulf Coast Region of Texas at around \$32,000 per year, making it an excellent option for prospective students. While there is a potential risk for passing the certification given less education, there are students who gain the certification with just an associates degree. The cost to attend the Associates in Nursing program at San Jacinto College is \$6,952.00 (*statewide-eligible-training-program-list* Workforce Solutions). With numerous locations across the Gulf Coast Region of Texas, the program is potentially accessible from numerous counties within the region. In addition, graduates have the potential to earn a median salary of \$85,110 in Texas, and \$86,070 in the United States. The expected salary is for Registered Nurses with an associates degree is, on average, 10% less than those with a bachelor degree. The entry level salary for Registered Nurses with associates degree is approximately \$69,029 (*O\*NET*).



## 0.6 Associates in Physical Therapy Assistants - Wharton County Junior College

An associate degree in Physical Therapist Assistant (PTA) equips students to support physical therapists in improving patient mobility. With this degree, PTA in Texas earns a median wage of \$62,740 per year, surpassing the livable wage threshold of \$21.68, as identified by Workforce Solutions. The demand for PTA remains strong due to Texas’s aging population. While about 10% of PTA choose to further their education to become physical therapists, the decision involves higher tuition costs (APTA 2024). Moreover, transitioning to a physical therapist involves an additional 7-8 years of university education, significantly escalating educational expenses and potential lost earnings during this period (Nebraska Methodist College 2021).

Wharton County offers an alternative when joining a physical therapist assistant program. Their college, Wharton County Junior College, located within the Coastal Plains Region of Texas nonmetropolitan area, provides an affordable PTA program at approximately \$31,547 per year (statewide-eligible-training-program-list Workforce Solutions). Graduates can anticipate an entry-level wage of \$34.53/hour (U.S. Bureau of Labor Statistics 2023). Additionally, the high location quotient of 1.43 and employment per 1,000 jobs rate of 0.980 in Wharton County suggests a critical role for PTA in the local healthcare system, likely leading to better job stability and a significant impact on the community.



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## **0.7 Associates in Diagnostic Medical Sonography - San Jacinto College District Lone Star College-CyFair**

The field of Diagnostic Medical Sonography is experiencing rapid growth, with employment projected to increase by 17% from 2021 to 2031, according to the Bureau of Labor Statistics. This growth, significantly faster than the average for all occupations, is fueled by the increasing preference for ultrasound imaging as a safer, non-invasive alternative to radiologic procedures. Consequently, there is a high demand for qualified professionals, ensuring job security and steady opportunities in various medical settings, such as hospitals, clinics, and diagnostic imaging centers.

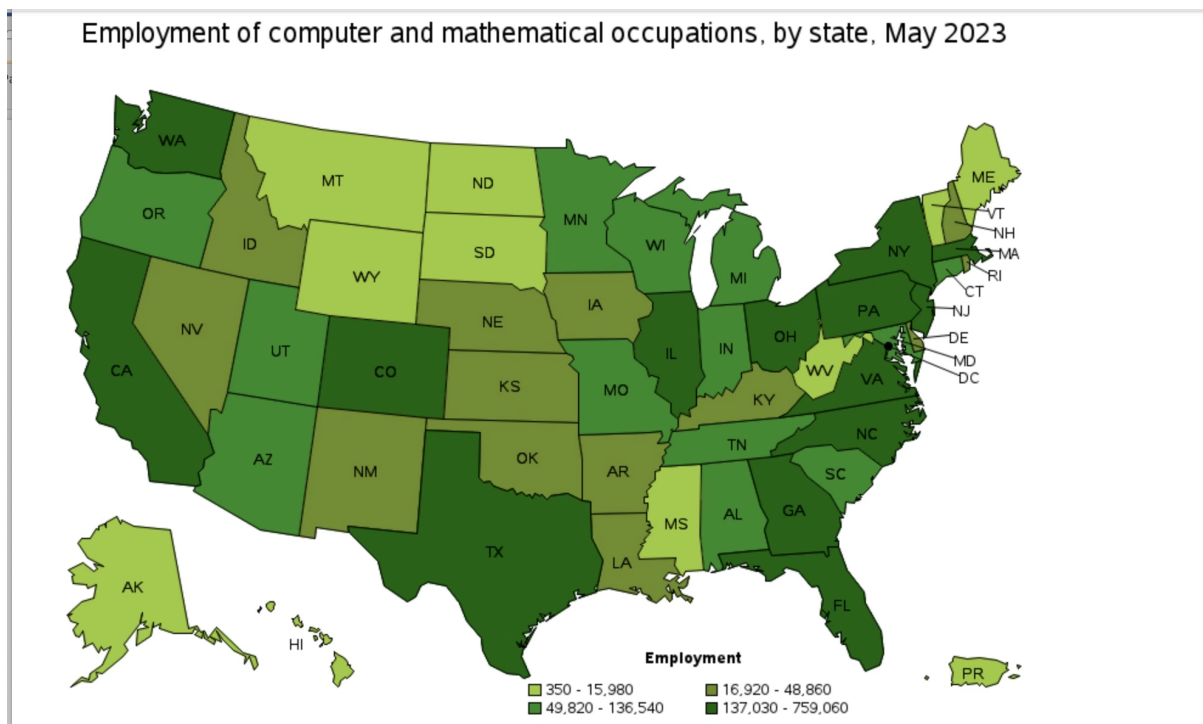
The average entry-level salary for diagnostic medical sonographers in Texas is approximately \$65,000 per year. This competitive salary, along with potential for growth, makes the profession financially attractive. The field of Diagnostic Medical Sonography is experiencing rapid growth, with employment projected to increase by 17% from 2021 to 2031, according to the Bureau of Labor Statistics. This growth, significantly faster than the average for all occupations, is fueled by the increasing preference for ultrasound imaging as a safer, non-invasive alternative to radiologic procedures. Consequently, there is a high demand for qualified professionals, ensuring job security and steady opportunities in various medical settings, such as hospitals, clinics, and diagnostic imaging centers.

## Computer and Mathematical Programs

Computer and Mathematical Occupations programs offer multiple career avenues, including software engineering, data science, embedded systems, and information analysis. This versatility makes it a valuable and adaptable degree. With an expected national growth rate of 13.7%—much faster than the average for all occupations—and a nationwide median annual wage of \$104,200, a degree in computer science can lead to a lucrative and diverse career (*O\*NET*). Analysis of data from the U.S. Department of Labor reveals that job changes (excluding promotions) for both Engineering, Science, and Architecture professions, and IT professions are skewed right, indicating that the majority of those in the workforce change jobs only 0 to 2 times (*Career Pathways Descriptive and Analytical Study Data*. U.S. Department of Labor). This reflects contentment, satisfaction, and long-term career security, making it a worthwhile investment in education.

In Texas, Computer and Mathematical professions are particularly popular compared to the rest of the nation. The dark green shade on the map below represents the significant workforce and popularity of these careers within the state. With the growing populations throughout the nation, these numbers will continue to rise throughout the next 10 years.

In addition to the growing popularity of the sector within Texas, salaries for careers such as Systems Analyst, Software Developer, and Database Administrator have a median salary above \$100,000, with the top 10% earning more than \$150,000. The potential for high salaries often outweighs the cost of the programs, making it an attractive field for prospective students. Salaries for careers within trade sector for computers has relatively high salaries ranging from \$60,000 to \$85,000 which is 30% larger than the average for trade careers.



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## **0.8 Computer Science, Bachelor of Science – Texas A&M University San Antonio**

The limited options in the statewide eligibility program list leave us with only two choices for computer science programs. In efforts to diversify the program list with higher education options, Texas A&M University San Antonio emerges as the more cost-effective choice, despite being the most expensive option on the top ten list. The risk comes in the debt that accumulates and if the student can't complete the curriculum. Otherwise, with a tuition cost of approximately \$150,000, it is still a viable option for entering the industry due to its affordability relative to the alternatives on the list.

A majority of computer and mathematical workers, about 65.5%, obtain a bachelor's degree. While not always a strict requirement, having a bachelor's degree is highly recommended for most job listings in the field. Graduates from Texas A&M University San Antonio can anticipate entering careers with consistent salaries exceeding \$100,000 with an entry level salary of \$79,437, justifying the initial investment in education with the potential for substantial returns in the form of salary. With Texas being a large landing spot for these careers, investing in this program will provide large value from the program's scholarship and career guidance.

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## **0.9 Computer Numeric Control Operator Programmer Level I**

A CNC (Computer Numerical Control) machinist operates and programs computer-controlled machine tools such as lathes, mills, and grinders to create precise metal and plastic parts. Machinists set up devices, write and test codes, and make adjustments to ensure high-quality products. Training as a CNC machinist offers diverse career paths, starting from machine operators who gain skills and can progress to become set-up machinists responsible for machine setups.

Lone Star's Montgomery County College Computer Control Operator Programmer Level I certificate covers blueprint reading, CAD/CAM, and CNC machine operation, preparing graduates for manufacturing careers. The average full-time tuition for the program is \$862 each semester, totaling \$3,448 over two years, making it affordable. This program is offered not only at the Montgomery County location but throughout the Lone Star College System, ensuring accessibility for a broad demographic. Houston, the fourth-largest city in the United States and the largest in Texas, maintains a high concentration of manufacturing jobs according to the U.S. Bureau of Labor Statistics. This dynamic environment offers vast opportunities for CNC programming professionals. Graduates can expect a livable wage of \$32.10 hourly, exceeding Texas's livable wage requirement of \$21.68 hourly.

Montgomery county residents should consider the CNC programmer certification course for its excellent career prospects in the city's growing industrial sector. This credential equips students with skills highly valued in Houston's thriving industries, including oil, aerospace, and manufacturing. Graduates can secure well-paying positions as CNC programmers, utilizing their abilities to write code, design parts, and optimize machine performance. The program's affordability and accessibility within Houston make it an attractive option for residents looking to enter or advance in the manufacturing industry.

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## Management Programs

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While management positions across industries often do not require a specific degree, obtaining a Bachelor of Business Administration (BBA) can significantly broaden one's career options. This degree not only prepares graduates for roles in project management and business analysis but also equips them for diverse sectors like healthcare, technology, and manufacturing, reflecting the interdisciplinary demand for management expertise. With rigorous training in strategic planning, operational supervision, and team leadership, a BBA provides a strong foundation for leading within complex organizational structures.

In today's rapidly evolving economic landscape, the healthcare sector's expansion is reshaping job prospects across nearly all major occupational groups. Notably, medical and health services managers are experiencing remarkable growth, with an expected increase of 16.9 percent—translating to approximately 56,300 new positions by 2024. Yet, it's the role of general and operations managers that stands out significantly, projected to expand by 151,100 new jobs within the same period. This surge underscores the critical importance of effective management in fostering organizational success and sustainability.

The robust growth in management jobs is primarily fueled by the continual formation and expansion of new organizations. As these enterprises evolve, the demand for skilled managers to oversee operations and lead teams becomes increasingly critical. This is particularly evident in Texas, ranked as the eighth-best state for business, where low tax rates contribute to a thriving economic environment conducive to business growth and development.

A Bachelor of Business Administration (BBA) in Management prepares students to lead and manage organizations effectively by presenting skills in strategic planning, operational supervision, and team leadership. Graduates can expect a median starting salary ranging from 37,970 to 59,110 in Texas, where the presence of over 100 of the 1,000 largest public and private companies in the United States—like Dell, ExxonMobil, Sysco, Oracle, Amazon, HPE, and Tesla—fuels a robust demand for qualified managers. As these businesses expand in Texas, the need for skilled managers who can efficiently run growing companies increases significantly.

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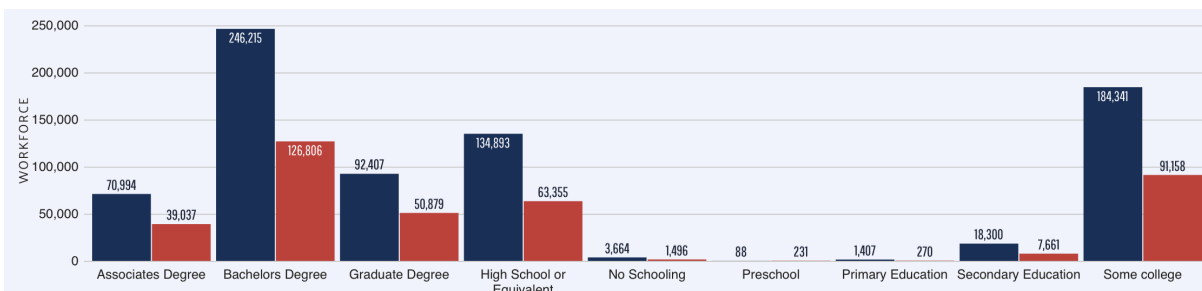
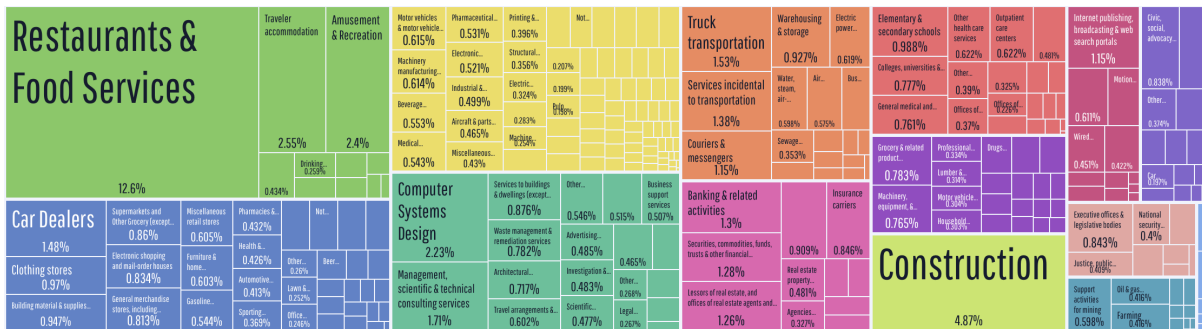


## 0.10 Bachelor’s in Business Administration-Management

The University of El Paso offers a BBA in Management with total tuition and costs of approximately \$80,000 over four years. While this is a substantial investment, the degree opens doors to a broader range of job opportunities. It qualifies graduates for higher-level positions that may be unattainable with just an Associate’s degree or no degree. According to the Bureau of Labor Statistics (BLS), 33% of General and Operations Managers hold a bachelor’s degree, compared to only 10.4% with an Associate’s. Providing theoretical knowledge, a BBA also emphasizes acquiring practical skills through internships, which are essential to the program. These experiences enhance competitiveness in the job market and prepare graduates to tackle real-world business challenges. Additionally, the networking opportunities provided by the program connect students with peers, professionals, and industry experts during various events and engagements, potentially leading to job opportunities, partnerships, and lifelong professional relationships.

The accompanying graphics underscore these points effectively presented by the U.S Census Bureau. The first graphic reveals the share of General and Operations Managers across various sectors, highlighting that the Restaurants and Food Services sector employs the largest share at 62.9%, followed by Construction at 24.3%, and Traveler accommodation at 12.8%. This diversity in employment sectors showcases the versatile applications of management skills acquired through a BBA.

The second graphic details the workforce distribution of General and Operations Managers by educational level, illustrating a significant portion of the workforce holding a Bachelor’s degree. This data, sourced from the Census Bureau ACS PUMS 5-Year Estimate, emphasizes the educational attainment of managers and further validates the importance of a comprehensive education in securing managerial positions.



## Construction and Extraction Programs

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### 0.11 Research on Construction Step Up Supervisor Program at San Jacinto College District

The construction sector is a key driver of economic stability and growth, reflecting the constant changes in urban development and societal needs. This industry is essential for creating and renovating infrastructure, such as homes, commercial buildings, transportation networks, and utilities. It not only shapes our surroundings but also boosts economic activity, creates jobs, and supports community development. In Texas, where cities are growing quickly to meet rising population demands, there is a strong need for skilled leaders who can manage complex construction projects effectively. Recognizing this need, institutions like San Jacinto College District offer specialized programs designed to develop future leaders in construction management.

According to the Bureau of Labor Statistics (2023), the job market for construction supervisors is expected to remain strong, driven by continuous needs for infrastructure development and maintenance. This ensures that graduates of such programs are ready to step into jobs right away and have a good chance for career stability and growth. Starting salaries for construction supervisors are around \$50,000 a year, with opportunities to earn more as they gain experience and take on more responsibilities.

The tuition and fees for the Construction Step Up Supervisor program at San Jacinto College District are relatively affordable, making it an accessible option for many students. The total cost for two years, including tuition, fees, and additional expenses for books and supplies, is approximately \$28,000. This cost-effective education, coupled with the high earning potential in the field, makes this program a financially sound choice for those looking to enter the construction industry.

Graduates of the Construction Step Up Supervisor program have numerous opportunities for career advancement. Starting as supervisors, individuals can progress to higher managerial positions such as project managers, construction managers, and even executive roles within construction firms. The skills and knowledge gained from this program provide a solid foundation for continuous professional development and career growth.

Construction supervisors play a crucial role in the development and maintenance of essential infrastructure, contributing significantly to community growth and safety. By choosing this program, individuals can be part of projects that improve living standards, enhance public safety, and support economic development. The ability to make a tangible impact on the community adds an intrinsic value to this career, making it a fulfilling and rewarding choice.

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## **Production Programs**

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Production programs provide essential training for careers in industries that are vital to the economy, such as manufacturing, energy production, and chemical processing. These programs equip students with the technical skills needed to operate, maintain, and troubleshoot industrial equipment, ensuring that production processes run efficiently and safely. With a strong emphasis on hands-on experience, production programs prepare graduates to meet the demands of the workforce, offering stable and well-paying job opportunities in a variety of sectors. As these industries continue to grow and evolve, the skills gained from production programs will remain in high demand, making them a valuable investment for those seeking a long-term career in industrial settings

### **0.12 Industrial Maintenance Engineering Technician (Certificate)**

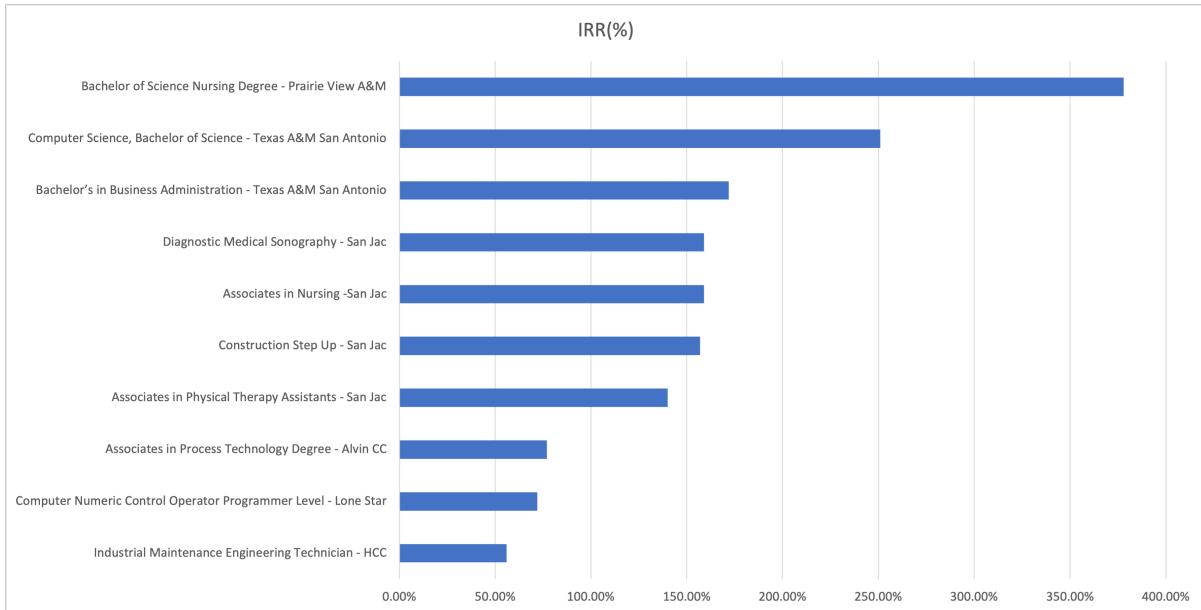
The Industrial Maintenance Engineering Technician (IMET) program at Houston Community College prepares students for careers in maintaining and troubleshooting industrial equipment. The curriculum covers a broad range of subjects, including electrical systems, hydraulics, pneumatics, programmable logic controllers (PLCs), and mechanical systems. Emphasizing hands-on training, the program ensures students gain practical experience with industry tools and technologies. Students learn to diagnose and repair industrial machinery, minimizing downtime in manufacturing and production environments. The program also covers preventive maintenance strategies to extend equipment lifespans and reduce failures. Graduates can find employment in sectors such as manufacturing, energy production, and facilities management, with a typical starting salary of around \$45,082 per year. The cost of attendance for the Industrial Maintenance Engineering Technician certificate at Houston Community College is approximately \$3,000 per year for in-district students, offering an affordable path to a rewarding career.

### **0.13 Process Technology Degree (AAS)**

The Associate of Applied Science (AAS) degree in Process Technology at Alvin Community College prepares students for careers as process technicians in chemical processing, power generation, and oil and gas industries. The curriculum includes coursework in physics, chemistry, and process technology systems, emphasizing safety, instrumentation, and quality control. Students gain skills in operating and troubleshooting complex process systems, learning to monitor and control production processes that convert raw materials into finished products. This training ensures efficiency and compliance with safety regulations. Graduates are equipped as chemical technicians, power plant operators, and water treatment specialists, with an average starting salary of approximately \$49,820 per year. The cost of attendance for the Process Technology degree (AAS) at Alvin Community College is approximately \$4,500 per year for in-district students, making it an affordable investment in a promising career.

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## Internal Rate of Return Findings



Degrees and certifications that take two years or less typically exhibit higher Internal Rates of Return (IRR) than four-year bachelor's degrees. This trend can be attributed to the higher initial investments required for bachelor's degrees, which significantly influence the IRR calculations. The IRR metric seeks to balance this initial outlay against future returns. Furthermore, the time value of money principle, which values earlier returns more highly, plays a crucial role in these calculations. Shorter programs like associate degrees usually involve lower initial costs, leading to quicker returns that are valued more under this principle.

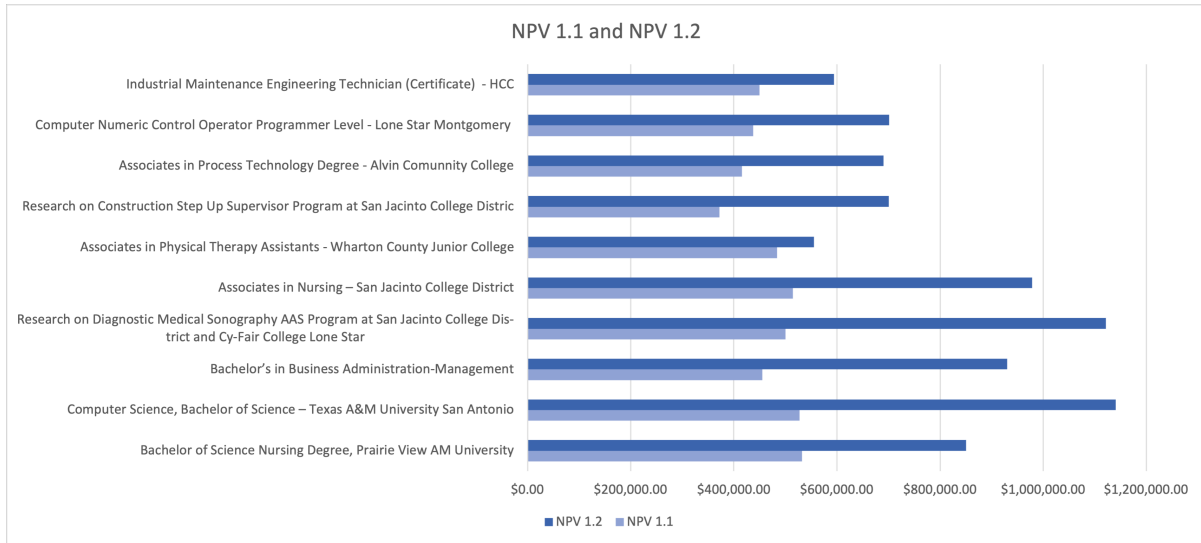
In terms of the magnitude of cash flows, shorter programs often result in smaller but quicker returns, enhancing their IRR. In contrast, bachelor's degrees involve larger but delayed returns, diminishing their immediate impact on IRR calculations. Despite this, over a 25-year horizon, bachelor's degrees typically generate a higher net return. This larger cumulative financial benefit underscores the trade-off between immediate higher returns and long-term financial gains.

Therefore, while the IRR for bachelor's degrees may be lower, the substantial net returns

they offer over an extended period warrant careful consideration. The decision between pursuing a short or long-duration educational program should be made on an individual basis, taking into account personal financial situations and career goals, as the larger upfront investment in a bachelor's degree might yield greater financial rewards in the long run.

## Net Present Value Findings

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Bachelor's degrees generally offer higher Net Present Values (NPV) compared to Associate of Applied Science (AAS) programs and certificates. This indicates that, despite higher initial costs and longer study durations, Bachelor's degrees tend to provide better financial returns over time. The highest NPVs are associated with Bachelor's degrees, reflecting their potential for greater long-term earnings. In contrast, AAS programs and certificates, while still offering positive NPVs and substantial returns, tend to have lower NPVs than Bachelor's degrees. Overall, investing in a Bachelor's degree appears to be more financially advantageous in the long run, highlighting the value of higher education for economic benefits and improved career prospects.

## Conclusion

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Our analysis of financial metrics across educational programs highlights critical economic outcomes associated with bachelor and associate degrees. With customized Net Present Value (NPV) models, Workforce Solutions can categorize strong programs for future participants. Specifically, Bachelor degrees typically show a lower Internal Rate of Return (IRR) but yield higher net returns over time due to the substantial scale of initial investments. These programs require higher tuition fees and have a lower IRR, but still pave the way for significant long-term financial benefits. On the other hand, associate degrees exhibit a higher IRR but lower overall net returns, as their smaller initial investments allow for quicker recovery of costs, though the total financial benefits are less substantial compared to bachelor degrees.

Based on these findings, we advocate for state entities such as the Texas Workforce Commission to include more universities and bachelor's degree programs on the Eligible Training Providers List (ETPL). These programs not only offer higher-paying, but also larger long-term total revenue. Duration and difficulty of program depends on the participant and how they prioritize the time value of money and also their choice of risk regarding cost. Overall, Workforce Solutions should continue to fight for income entities that will not only strengthen Texas's position in competitive high-demand sectors, but will also ensure that educational investments align effectively with future workforce needs.

## Appendix A

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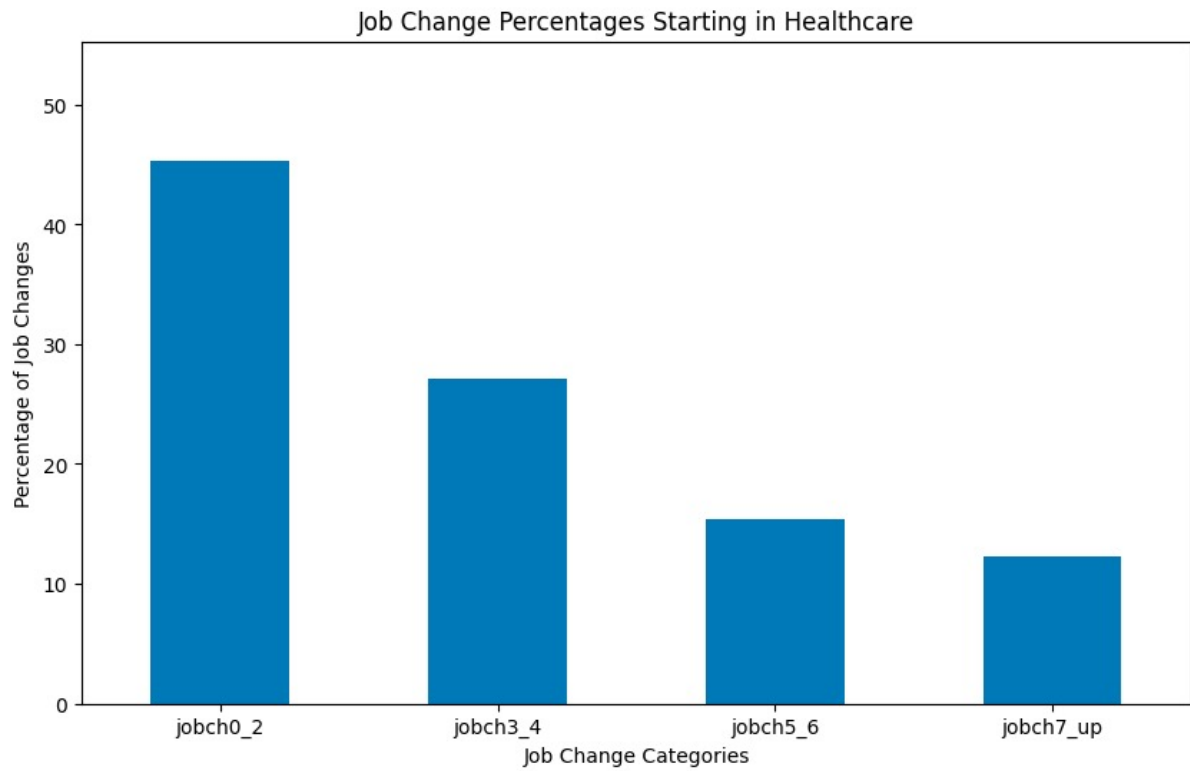


Figure 1: % Job Changes in Health Care



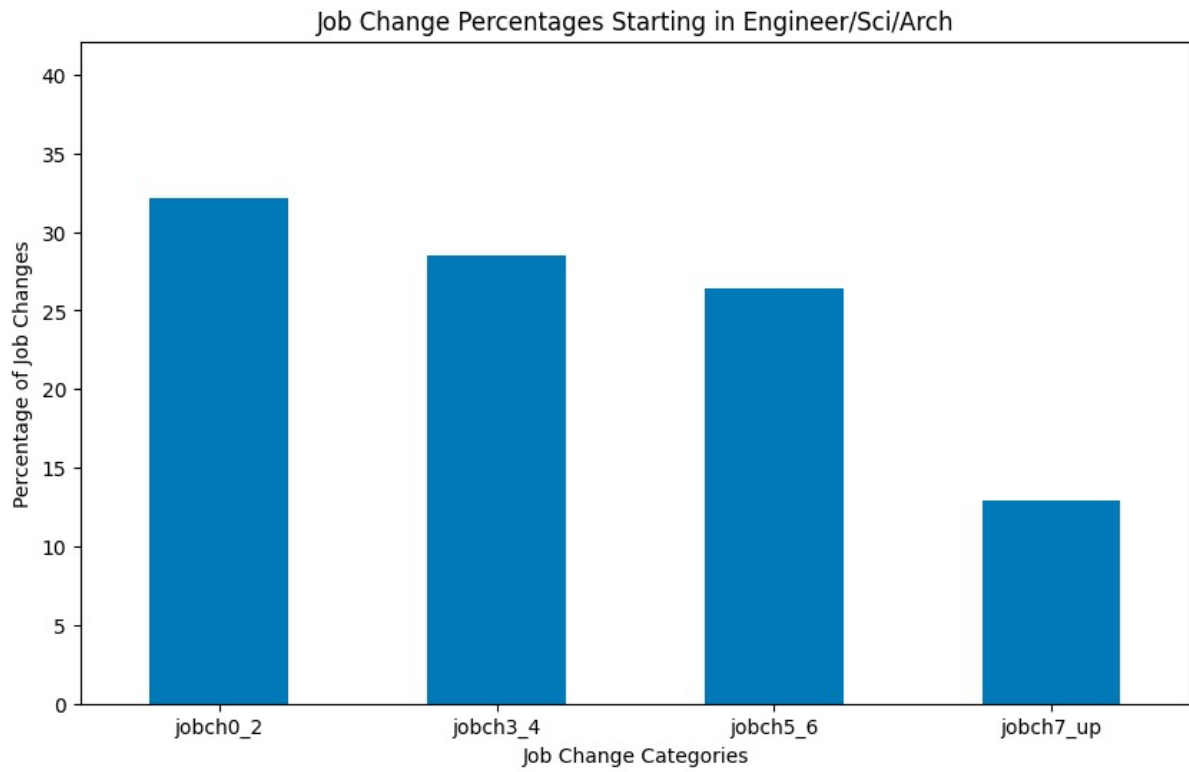


Figure 2: % Job Changes in Engineering, Science, Architecture

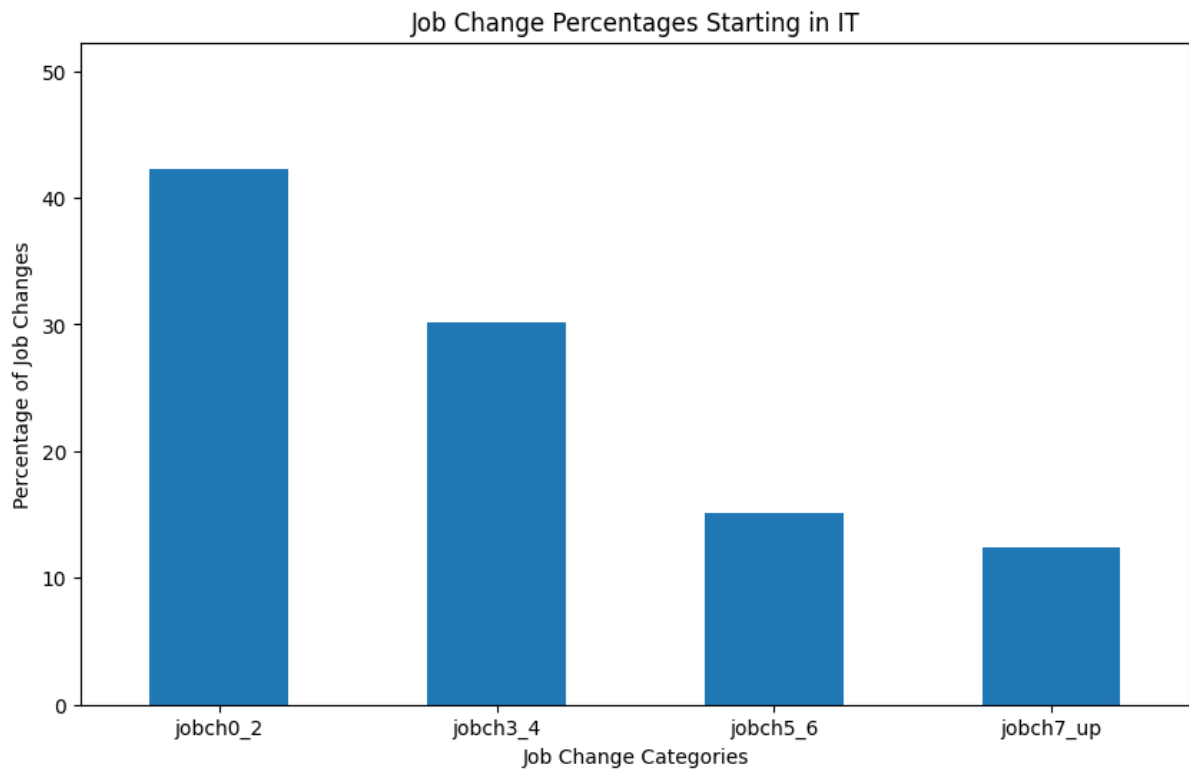


Figure 3: % Job Changes in IT

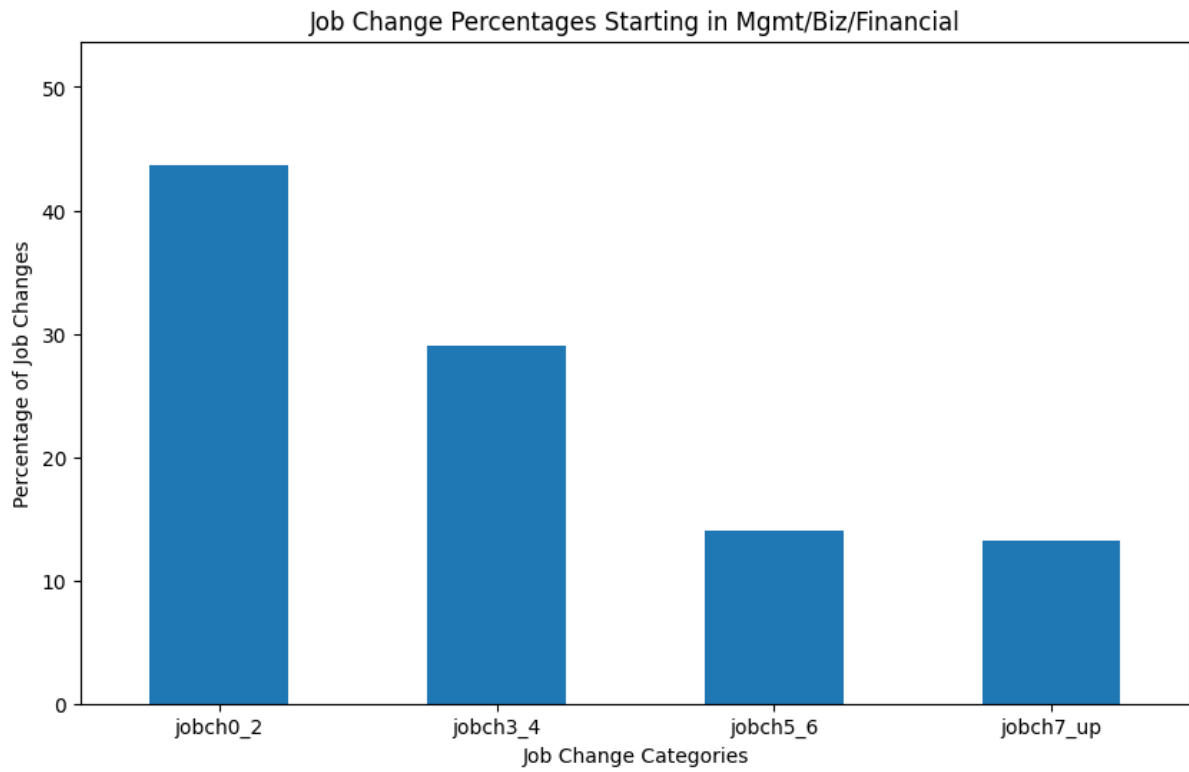


Figure 4: % Job Changes in Management, Business, and Finance

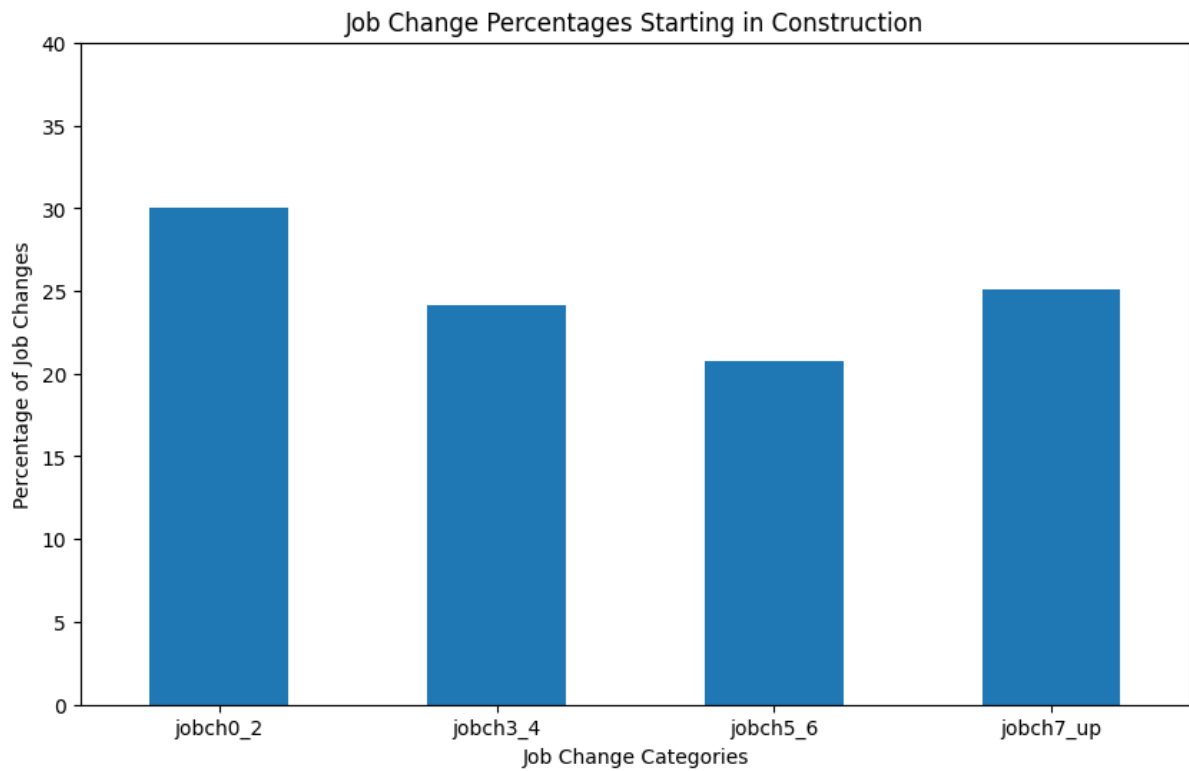


Figure 5: % Job Changes in Construction

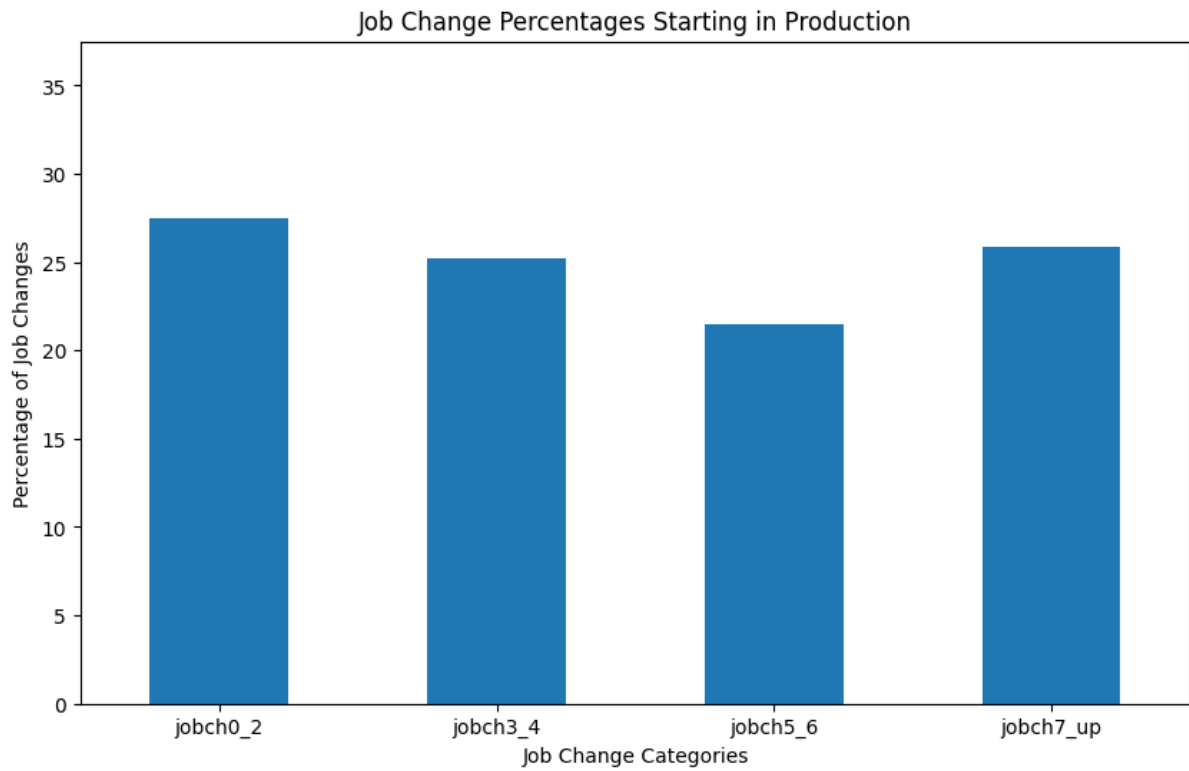


Figure 6: % Job Changes in Production

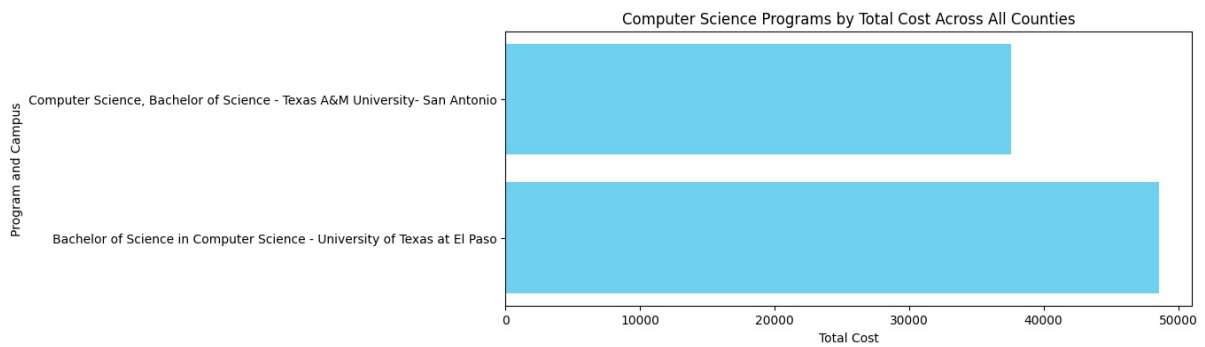


Figure 7: Total Cost for Computer Science Programs

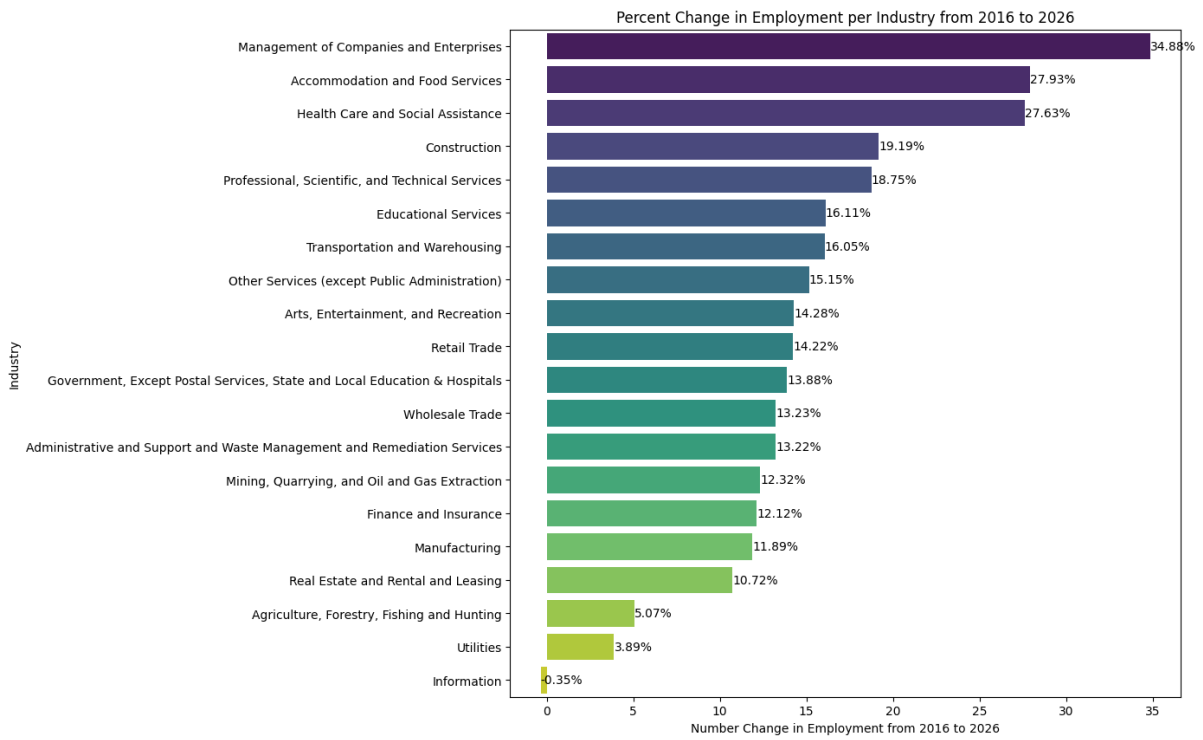


Figure 8: Top 20 Occupation with Percent Growth

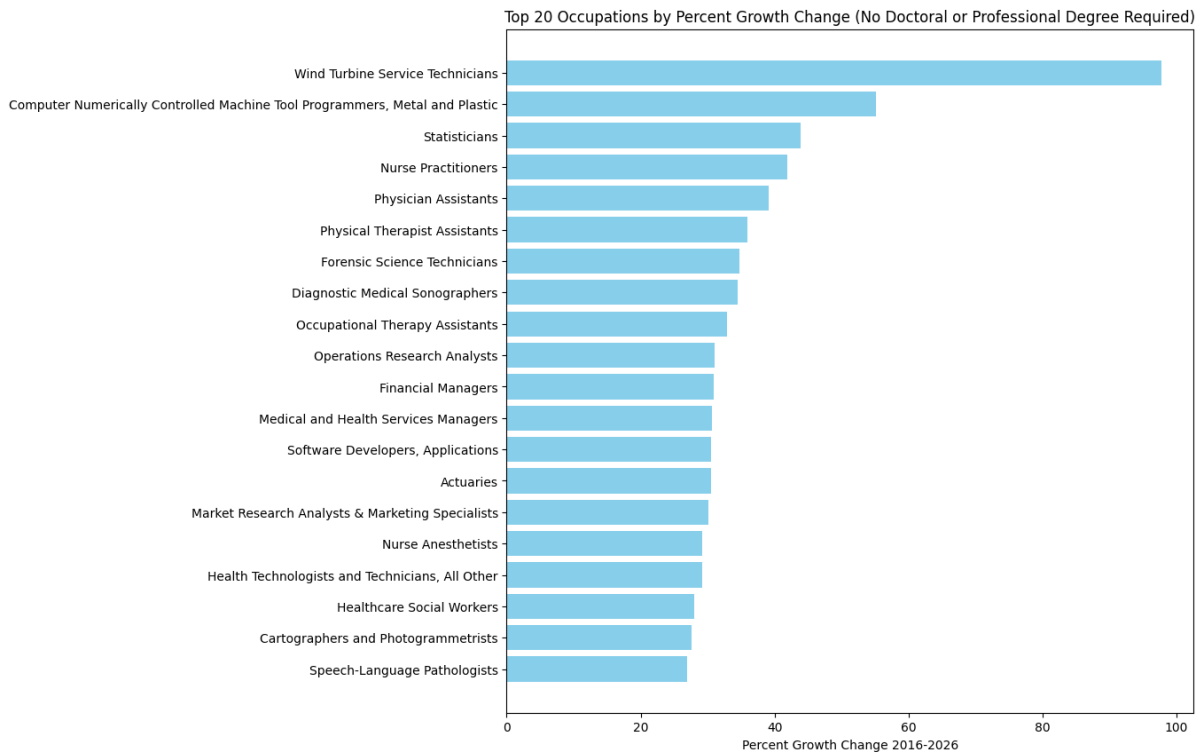


Figure 9: Top 20 Occupations with Percent Growth (No Doctorate)

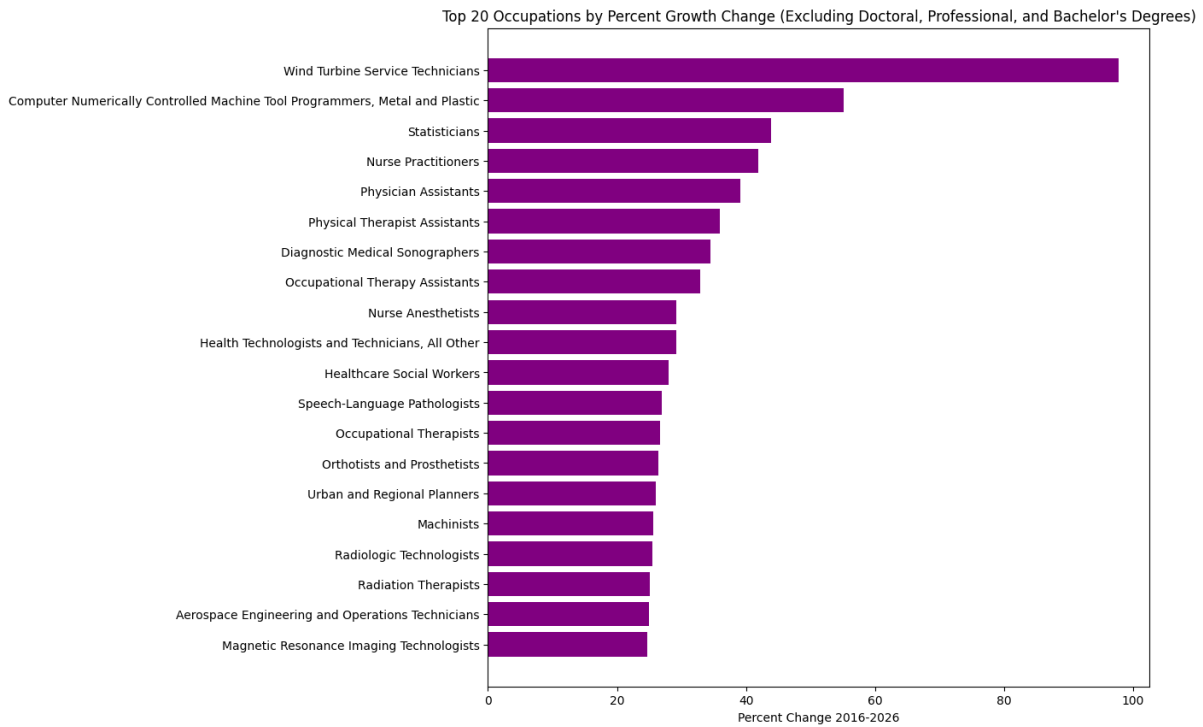


Figure 10: Top 20 Occupations with Percent Growth (No Doctorate or Bachelors)

Program	NPV 1.1	NPV 1.2
Associates in Physical Therapy Assistants - Wharton County Junior College	\$483,916.93	\$555,673.57
Industrial Maintenance Engineering Technician (Certificate) - HCC	\$449,763.47	\$594,291.53
Associates in Process Technology Degree - Alvin Community College	\$415,879.47	\$690,215.63
Research on Construction Step Up Supervisor Program at San Jacinto College District	\$372,068.14	\$700,450.87
Computer Numeric Control Operator Programmer Level - Lone Star Montgomery	\$437,359.95	\$701,132.88
Bachelor of Science Nursing Degree, Prairie View AM University	\$532,361.00	\$850,689.69
Bachelor's in Business Administration-Management	\$455,486.81	\$929,834.80
Associates in Nursing – San Jacinto College District	\$514,711.37	\$978,574.50
Research on Diagnostic Medical Sonography AAS Program at San Jacinto College District and Cy-Fair College Lone Star	\$500,021.19	\$1,121,804.79
Computer Science, Bachelor of Science – Texas A&M University San Antonio	\$527,317.72	\$1,140,418.17

Figure 11: NPV

<b>Program</b>	<b>IRR(%)</b>	<b>Total Earnings(\$)</b>
Bachelor of Science Nursing Degree, Prairie View AM University	77.00%	\$2,994,246.00
Computer Science, Bachelor of Science – Texas A&M University San Antonio	56.00%	\$2,730,282.00
Bachelor’s in Business Administration-Management	72.00%	\$2,415,689.00
trict and Cy-Fair College Lone Star	251.00%	\$2,413,948.00
Associates in Nursing – San Jacinto College District	172.00%	\$1,936,800.00
Associates in Physical Therapy Assistants - Wharton County Junior College	159.00%	\$1,790,963.00
Research on Construction Step Up Supervisor Program at San Jacinto College Distric	159.00%	\$1,790,963.00
Associates in Process Technology Degree - Alvin Comunnity College	157.00%	\$1,784,001.00
Computer Numeric Control Operator Programmer Level - Lone Star Montgomery	378.00%	\$1,628,667.00
Industrial Maintenance Engineering Technician (Certificate) - HCC	140.00%	\$1,607,782.00

Figure 12: IRR

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