

Data Visualisation: Independent Project

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Dataset Description and sources

This project uses two datasets to explore the relationship between education, skills, and career success. The focus is on salary growth and job satisfaction across different fields of study, and what factors are the most important in securing a job after college.

Education & Career Success

This dataset explores the impact of academic performance, skills, and extracurricular activities on career success (in USA). It includes 5,000 students and provides insights into their educational backgrounds, skills, and career outcomes.

Source : <https://www.kaggle.com/datasets/adilshamim8/education-and-career-success>

Features :

Student Information

- **Student_ID** – Unique identifier for each student
- **Age** – Age of the student (18-30 years)
- **Gender** – Categories: Male, Female, or Other

Academic Performance

- **High_School_GPA** – High school GPA (2.0 - 4.0 scale)
- **SAT_Score** – Standardized test score (900 - 1600)
- **University_Ranking** – Ranking of the university attended (1-1000)
- **University_GPA** – University GPA (2.0 - 4.0 scale)
- **Field_of_Study** – Major or discipline (e.g., Computer Science, Medicine, Business)

Skills & Extracurricular Activities

- **Internships_Completed** – Number of internships completed (0-4)
- **Projects_Completed** – Number of personal/academic projects completed (0-9)
- **Certifications** – Additional certifications earned (0-5)
- **Soft_Skills_Score** – Soft skills rating (1-10)
- **Networking_Score** – Score based on professional networking and connections (1-10)

Career Outcomes

- **Job_Offers** – Number of job offers received after graduation (0-5)
- **Starting_Salary** – First job salary in USD (\$25,000 - \$150,000)

- **Career_Satisfaction** – Career satisfaction level (1-10)
- **Years_to_Promotion** – Time taken to receive the first promotion (1-5 years)
- **Current_Job_Level** – Career level: Entry, Mid, Senior, Executive
- **Work_Life_Balance** – Work-life balance rating (1-10)
- **Entrepreneurship** – Whether the individual started a business (Yes/No)

Degrees that pay back

This dataset provides insights into salary growth by major, based on a year-long survey of 1.2 million people. It includes starting salaries, mid-career earnings, and salary growth percentages across different undergraduate majors.

Source: <https://www.kaggle.com/datasets/wsj/college-salaries>

Features:

- **Undergraduate Major** – Field of study
- **Starting Median Salary** – Median salary for recent graduates in each major
- **Mid-Career Salary** - Median salary after approximately 10 years of experience
- **Percent change from starting to mid-career salary** – Percent change
- **Mid-career 10th Percentile Salary** - Salary for the lowest-earning 10% at mid-career
- **Mid-career 25th Percentile Salary** - Salary for the lowest-earning 25% at mid-career
- **Mid-career 75th Percentile Salary** - Salary for the top 25% at mid-career
- **Mid-career 90th Percentile Salary** - Salary for the highest-earning 10% at mid-career

Why these Datasets

These datasets together, provide an analysis of how education, skills, and field of study impact salary growth and career satisfaction over time. They allow for comparison of salary growth and career satisfaction for different fields of study for students.

Explanation of the Big Idea

What really helps graduates succeed?

This project looks at salary growth, career satisfaction, and what factors actually help graduates land jobs. It starts by checking how salaries change over time, comparing starting salaries to mid-career salaries across different fields to see if salary growth and degree choice have an impact career satisfaction.

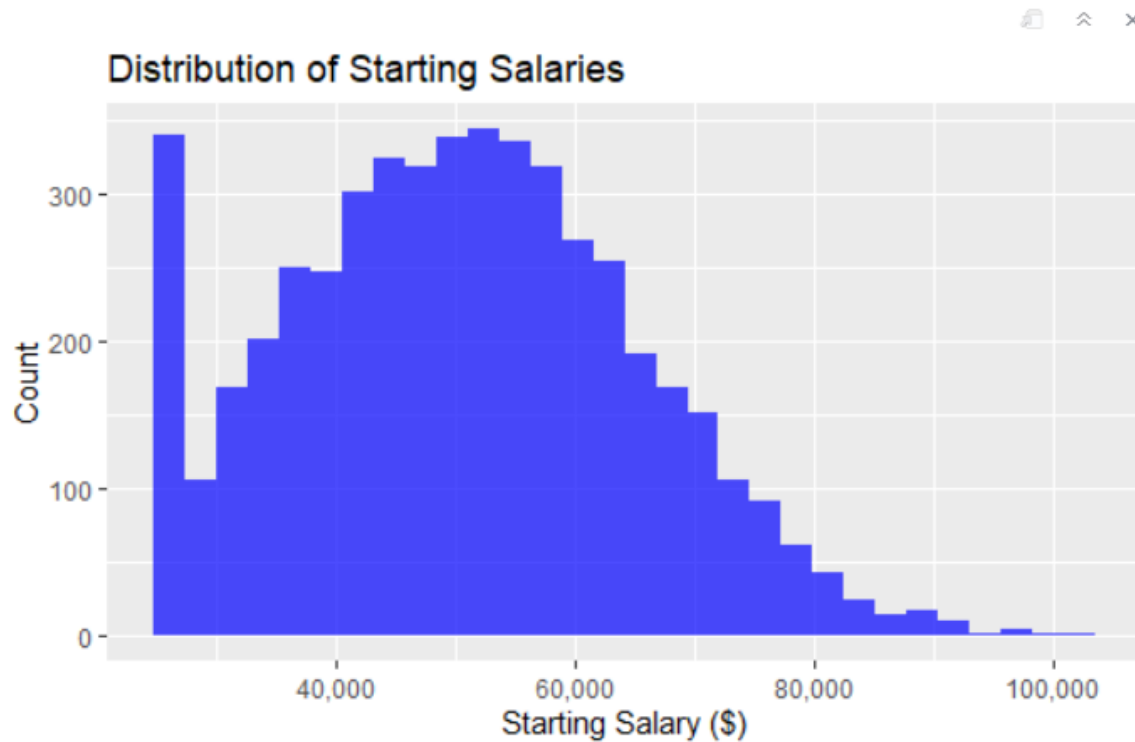
Then, the focus shifts to figuring out what gets graduates the most job offers. First, the impact of internships and GPA on job offers is analysed to see if they make a difference. After checking other factors and finding little correlation, the project looks at comparing experience (internships and projects) to soft skills (soft skills and networking skills) to see which matters more when it comes to getting hired.

The goal is to break down what actually gives an advantage in the job market between experience, academic performance, and soft skills, so that students know what to focus on for career success.

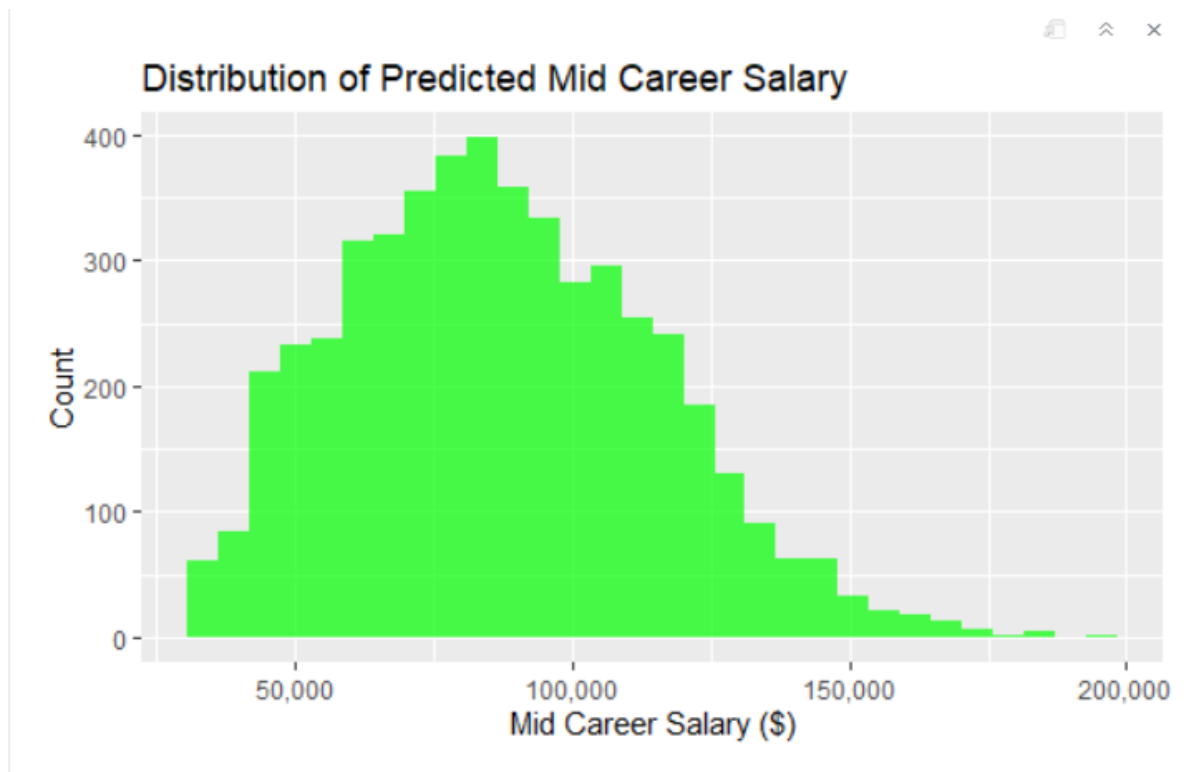
Data Exploration Charts

Histograms

Histograms were chosen to understand the overall distribution of salaries. Before analysing specific salary trends by field, I wanted to see if salaries were normally distributed or skewed.



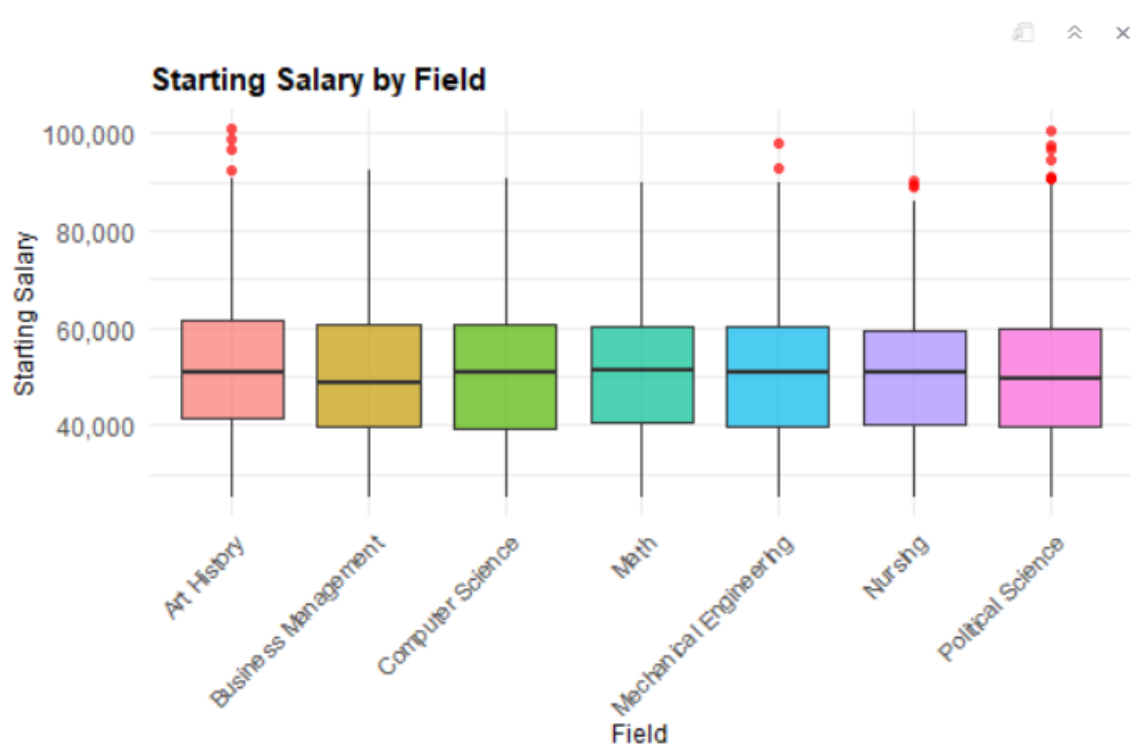
This histogram shows the distribution of starting salaries of the 5,000 students. Most students earn between \$40,000-\$80,000. The distribution is right-skewed meaning that a few individual students earn much more than the majority. There is a spike at the lower end, which indicates that there is a group of students in low-paying fields.



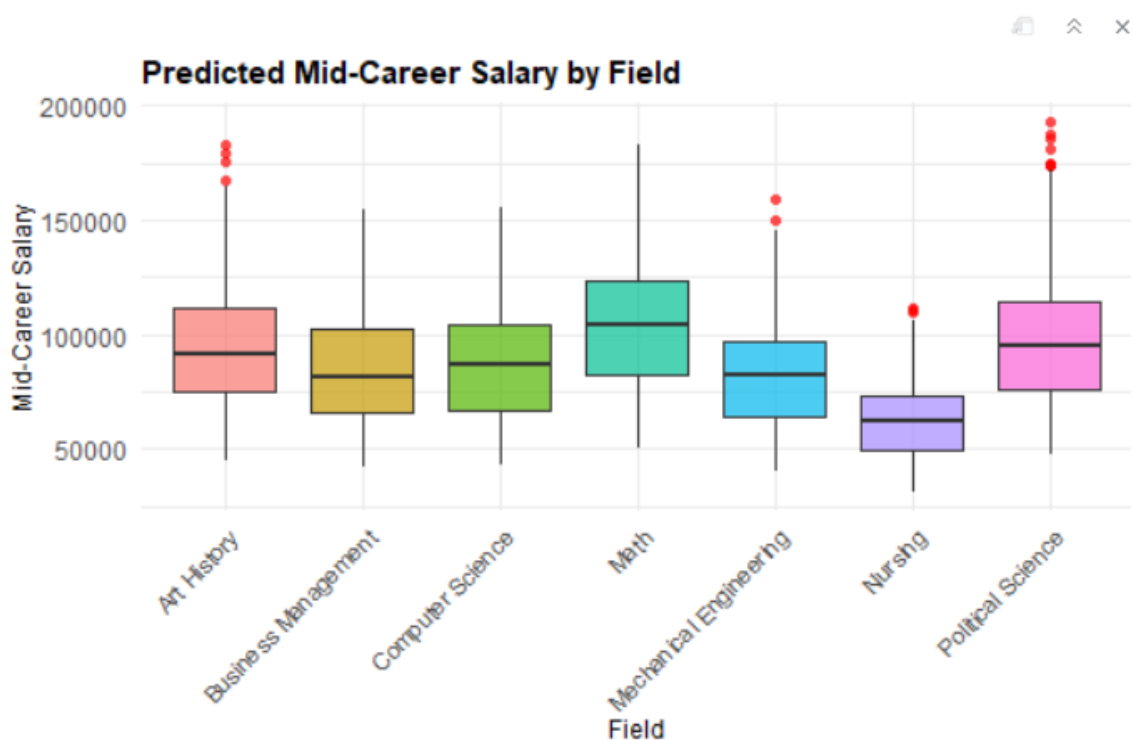
This histogram shows the distribution of predicted mid-career salaries of the students. While it is still right-skewed, most salaries are now between \$70,000-\$90,000, with a few still predicted to earn much more than the rest. The spread is smaller than in the starting salary histogram, which suggests that salaries stabilise over time with fewer extreme outliers.

Boxplots

Boxplots were used to compare salary distributions across different fields of study. Since salaries can vary widely, these charts helped identify which fields had higher starting salaries, more stable pay ranges, and which had outliers.



This boxplot shows the starting salaries by field. Most fields have similar median salaries, but math, computer science, and engineering have slightly higher medians. Business and maths-related fields tend to have less variation in salary, indicating more consistency in their pay. There are some outliers in art, mechanical engineering, nursing, and political science, which means that some students in those fields will start out with a much higher salary than their peers.

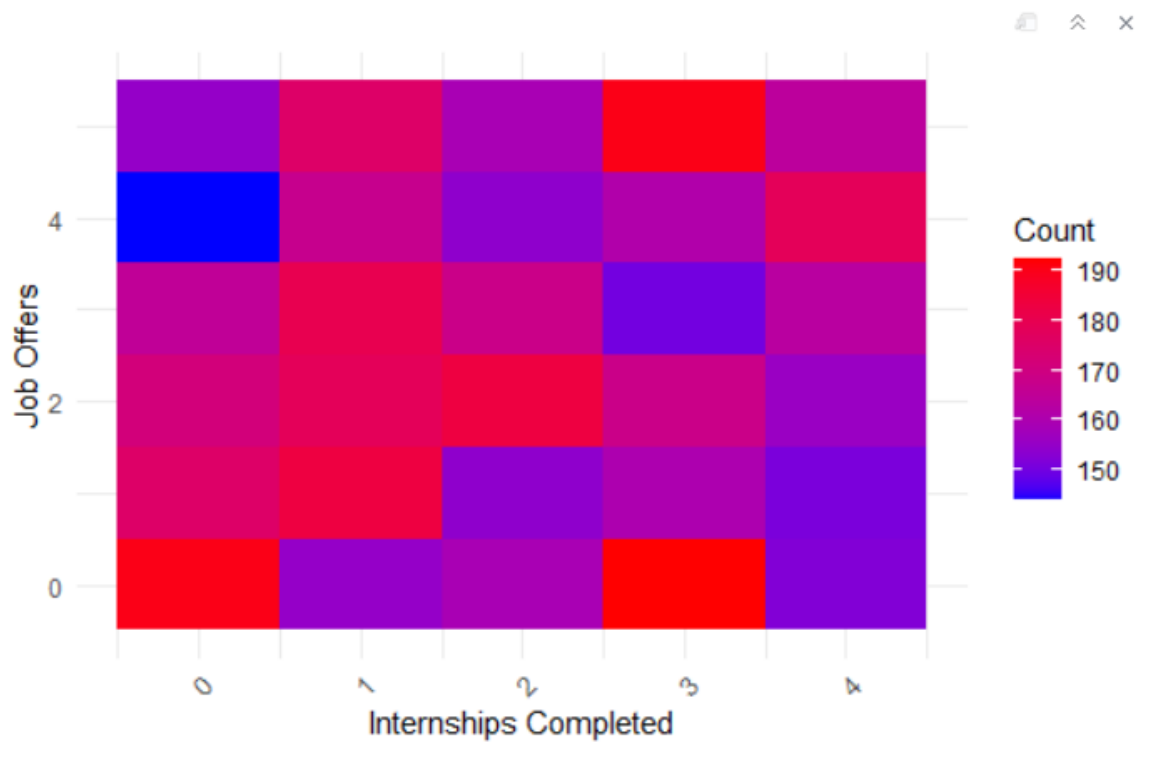


This boxplot shows the predicted mid career salaries by field. There is a relatively big difference between this plot and the starting salaries plot. There is more variety across the fields. The

fields that started with higher salaries (Computer Science and Maths) still dominate. Some of the lower starting fields (Political Science) show strong salary growth. The spread of salaries increases over time, especially in fields like Political Science and Art, suggesting that careers in these fields can vary widely.

Heatmap

A heatmap was chosen to visually explore whether students who completed more internships received more job offers. Since I expected internships are linked to employment opportunities, this helped to confirm that work experience is an important factor before analysing experience in more detail.



This heatmap shows the correlation between internships completed and job offers received. Students who complete more internships tend to receive more job offers, with the highest counts appearing in two groups: students with 3-4 internships and 4-5 job offers, and those with 0-1 internships and 0-1 job offers. This suggests that practical experience is a major factor in employability, potentially more important than GPA alone.

Justification of Explanatory Charts

Stacked Area Chart

A stacked area chart was used to show how salaries change over time across fields. Unlike a line chart, a stacked area chart helps visualise proportions while still showing trends. This was useful for understanding the difference in the salary growth in the different fields.

Bubble Chart

The bubble chart was chosen because it allows for three key dimensions of data in a single visualisation. It was also useful in showing categorical data that cannot be properly shown in a scatterplot. This visualisation helps answer whether higher salaries lead to higher career satisfaction, and which fields tend to have the highest earning potential over time.

Divergent Bar Charts

This type of chart was chosen to compare positive and negative influences of internships and GPA on job offers. This format makes it easy to see which factors have a strong impact in either direction, rather than just showing absolute values.

Stacked Bar Chart

This chart was used to compare multiple categories within a single group. It was useful for visualising how internships contribute to hiring by showing the amount of people who got different amounts of job offers based on how many internships they completed. The stacking made it easier to see the difference.

Grouped Bar Chart

The grouped bar chart was chosen to demonstrate a direct comparison between multiple categories. Unlike stacked bar charts, they keep the categories separate, which makes it easier to compare two or more factors. It was helpful to see which factors had the strongest impact on job offers.

Bar Charts - Combined Factors

Simple bar charts were used to analyse the combination of multiple factors (Experience – Internships and Projects, Soft Skills – Soft Skills Score and Networking Score, and GPA) on job offers. These allowed for a straightforward comparison of how different career success factors interact.

Multi-Line Chart

This chart was the best choice for directly comparing trends. It was used to analyse how experience and soft skills impact job offers over skill levels. Unlike the bar charts, this allows the two to be directly compared side by side.

Static copy of the dashboard

Panel 1: Salary Growth

Independent Project

What really helps graduates succeed?

AUTHOR

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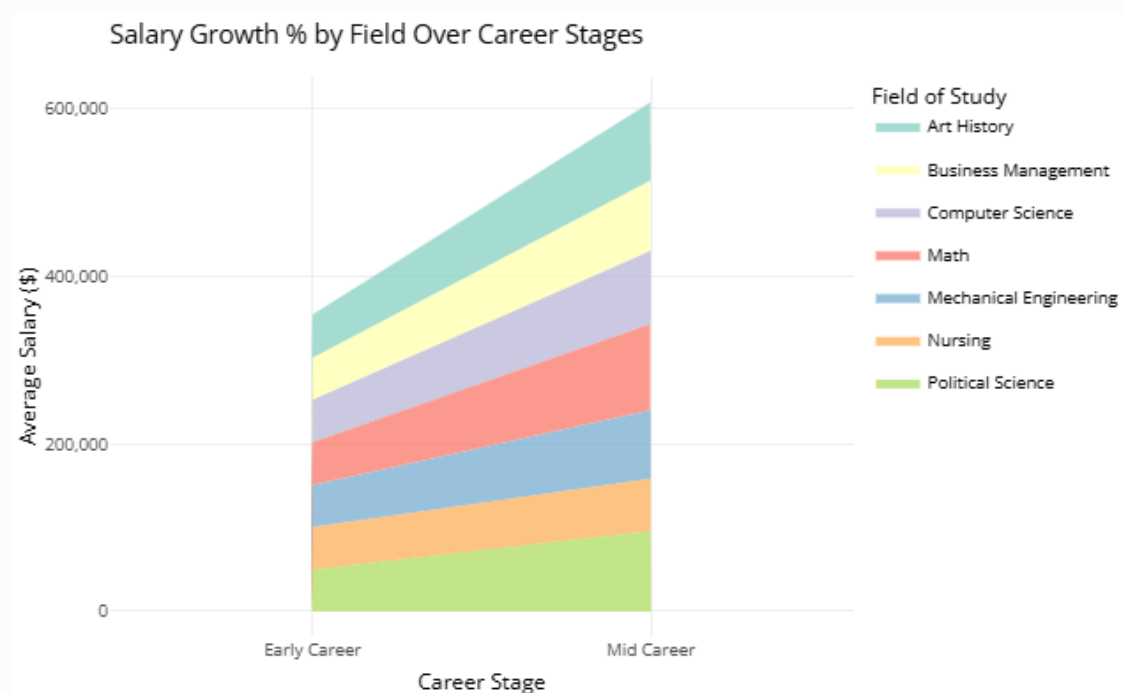
Most Important Factors for Job Offers

Salary Growth

Average Job Offers

Combined Factors

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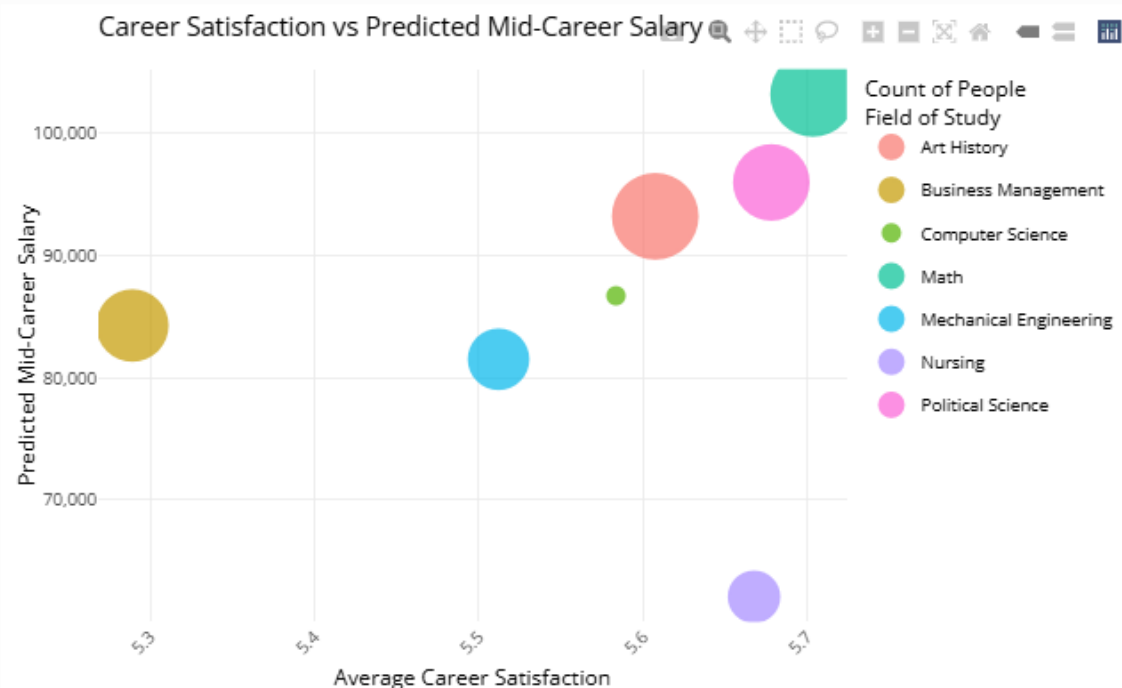


This stacked area chart shows the predicted salary growth in different fields from their starting salary to their mid-career salary. The salary increase varies across fields, with fields like maths, business, and engineering showing the most significant growth.

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This bubble chart shows the relationship between career satisfaction and mid-career salary for different fields of study. Fields like Art History, Maths, and Political Science have the most students, and they also report some of the highest career satisfaction scores along with strong salary growth.

Nursing students have lower predicted salaries, but they still report high satisfaction, suggesting that factors other than salary contribute to their career satisfaction. Business Management graduates have relatively high predicted salaries but lower career satisfaction, indicating that salary alone is not always the best measure of job happiness.

Overall, this chart highlights how salary growth often aligns with career satisfaction, but there are exceptions where non-monetary factors play a significant role.

Panel 2: Average Job Offers

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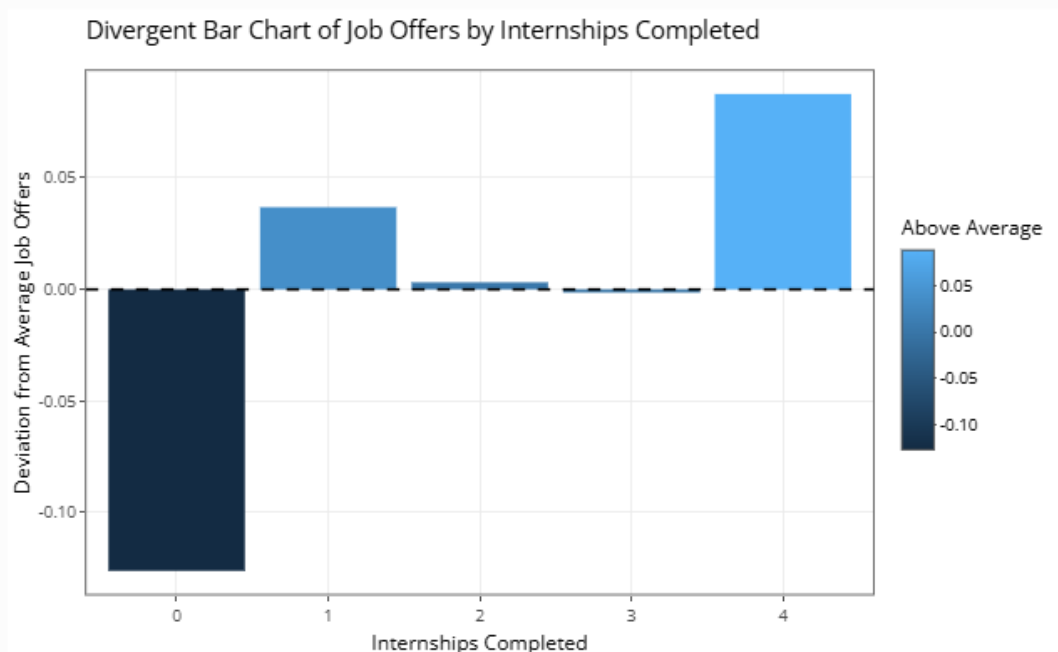
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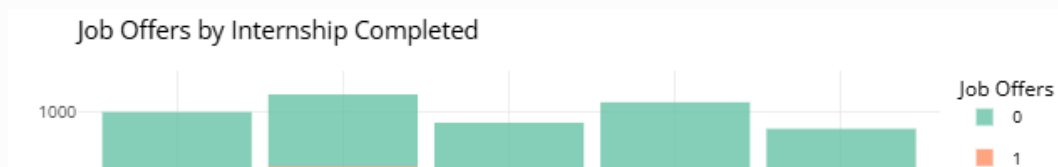
Combined Factors

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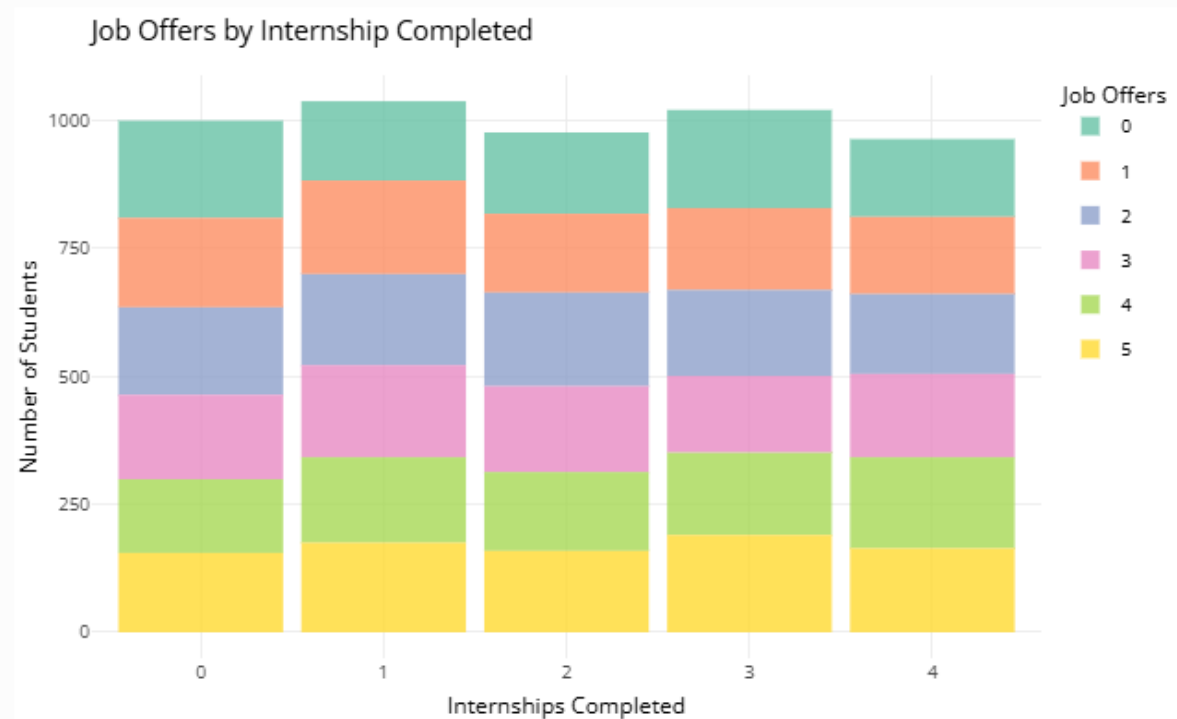


This chart shows that students who did less internships got less job offers. Students who did no internships got significantly less job offers than the average student. Students with 4 internships received significantly more job offers, reinforcing the importance of hands-on experience in hiring decisions.

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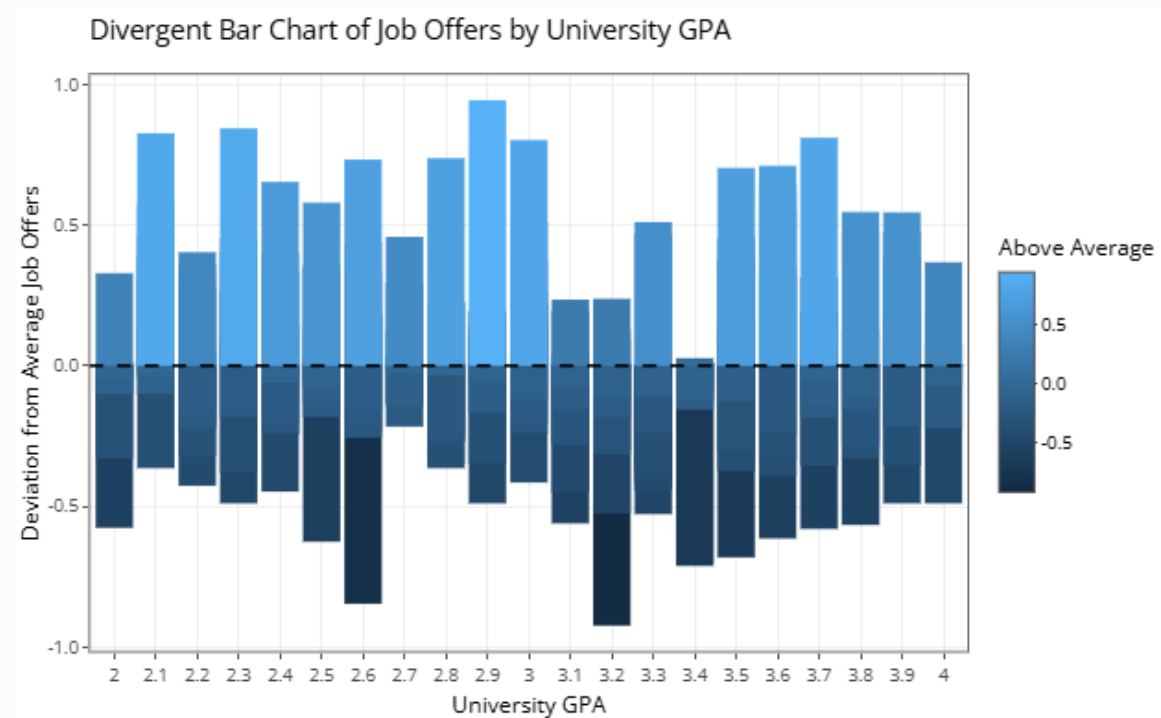


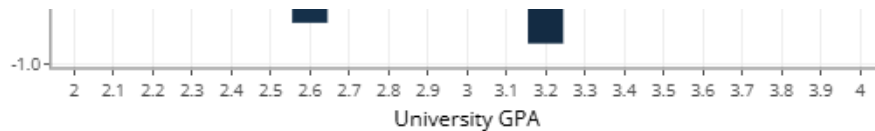
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This graph shows the number of students with different numbers of job offers, grouped by internship experience. Students who completed more internships were more likely to receive multiple job offers, showing a direct link between internship experience and employability.

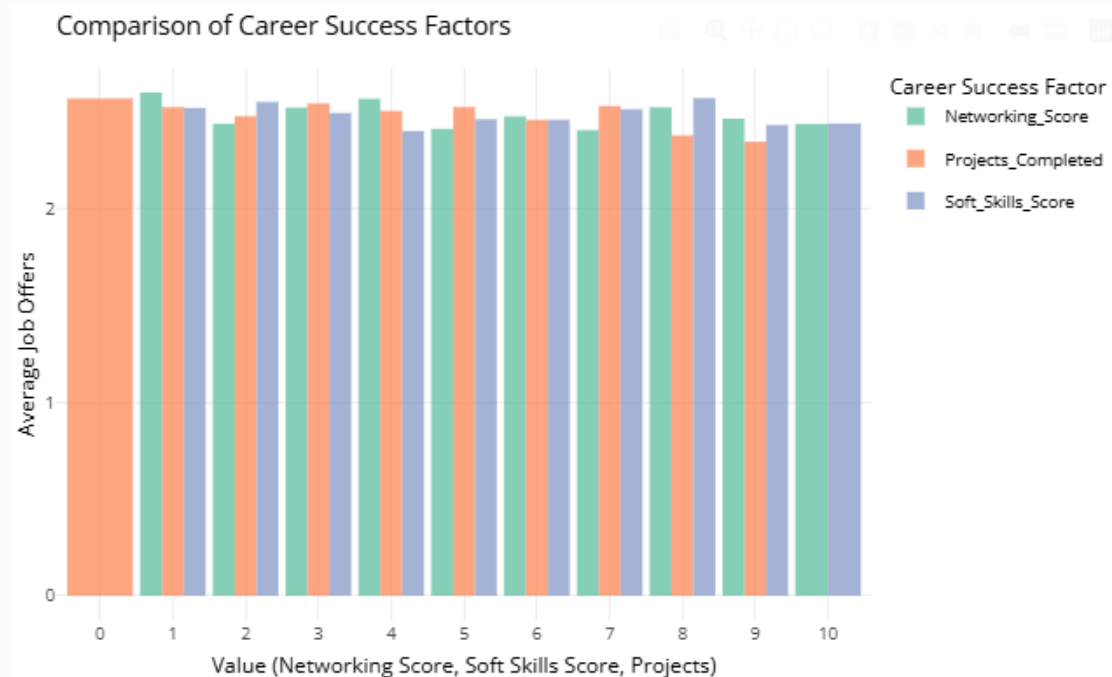
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This chart shows the deviation from average job offers based on university GPA. Unlike internships, GPA does not show a consistent relationship with job offers, as students across all GPA ranges received varying numbers of offers. This indicates that GPA alone is not strong enough of a factor to predict how many job offers a student will get.

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This bar chart compares the amount of job offers given to students based on their networking score, amount of projects completed, and their soft skills score. Although each factor peaks around 6-8, there is not an obvious trend in any of these factors to predict how many job offers a student will receive. This indicates that, rather than any single factor predicting job offers, a combination of networking, projects, and soft skills may play a role.

Panel 3: Combined Factors

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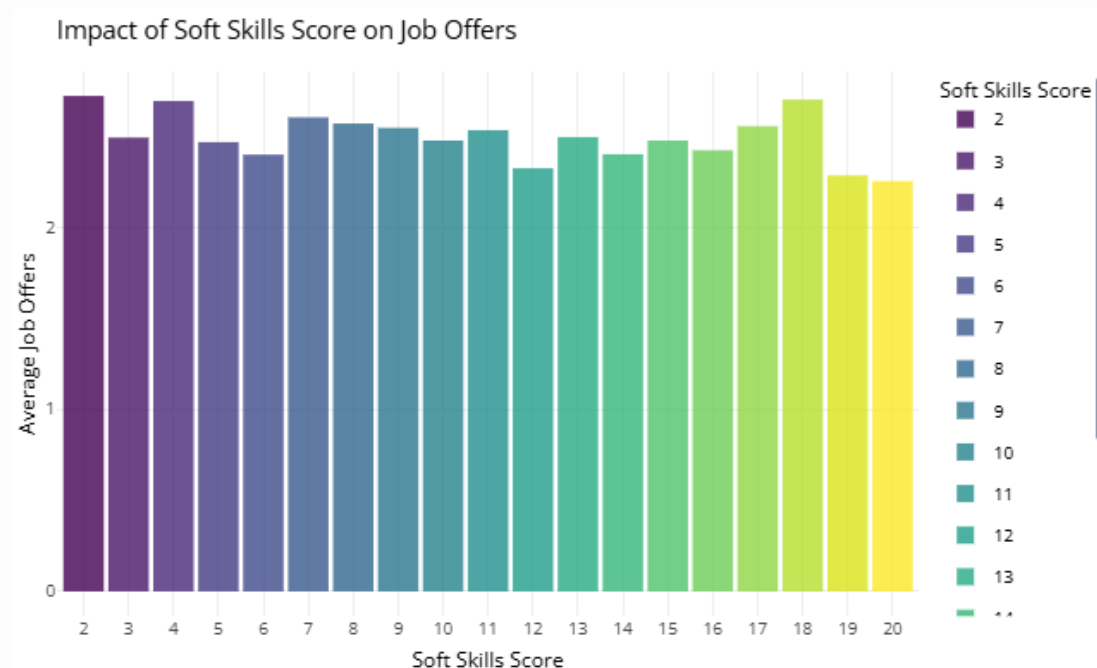
Most Important Factors for Job Offers

Salary Growth

Average Job Offers

Combined Factors

► Code



This chart shows the effect that soft skills (a combination of soft skills, and networking scores) has on job offers. Job offers increase slightly with higher soft skills score, peaking at around 18, but the effect is not strong.

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This chart illustrates the importance of experience (a combination of internships and projects completed). Although it fluctuates, experience score shows a positive impact on job offers, with peaks at 5, 8, and 13.

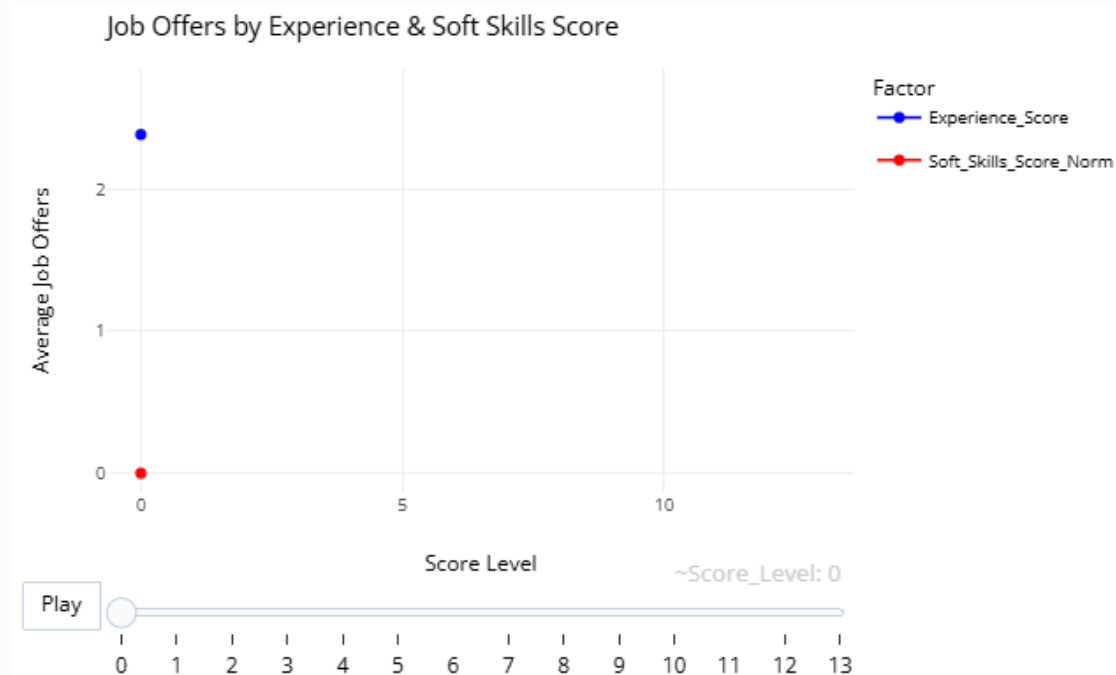
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This graph looks at the effect of university GPA on job offers. It is more varied than the other factors, but job offers peak at 2.9 and 3.6, showing that while GPA has some impact, it is not as strong as experience or soft skills.

► Code



This animated chart shows that experience and soft skills are nearly equally important in employability, as the number of job offers remains very similar across most levels.

However, when both scores are low, soft skills tend to receive slightly more job offers than experience. This suggests that employers may place a higher value on interpersonal and communication abilities when candidates have minimal practical experience.

When both scores are high, experience results in slightly more job offers than soft skills. This indicates that while soft skills remain important, hands-on experience (such as internships and projects) may become the deciding factor in securing more job opportunities.

This suggests that a balance of both experience and soft skills is ideal.