Relationship between Academic Achievement and Future Career and Living

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Abstract

Education is something we all pursue to transition to adulthood, work in jobs, and pursue successful careers. In our research, we want to determine if certain education factors can help predict future careers and living outlooks through data analysis.

1 Introduction

Using the dataset 'Education & Career Success' sourced from Kaggle, we will focus on two questions demonstrated below. The goal is to find some relationship between academic achievement and future career and living. Both academic achievement and future career and living can be defined and measured through quantitative and qualitative variables, so we will research to see which are related in the dataset.

1.1 Theory and Background

We want to see if future career an living outlook define success. success can be interpreted in intrinsic and extrinsic ways. Intrinsic success means achieving harmony between work and personal life, and job satisfaction in your current career. Extrinsic success can be attributed to promotions or salary increases, as in moving up the career ladder and more quantitative. Using the given definitions, we want to know which education factor relates the most to which success attribute.

1.2 Research Questions

(1) Which educational factors among university ranking, university GPA, and field of study are related to work-life balance?
(2) Is university GPA related to job offers, starting salary, and years to promotion?

2 Related Work

2.1 Literature Review

*2.1.1 **Student Assessment Center Performance in the Prediction of Early Career Success**.* This study[5] argues that student grade point average (GPA) was generally not a good predictor of early career progress, with the exception of salary. Since the GPA is the most common index used to see one's academic achievement, and also the study is connecting GPA with early career progress. This study mainly focuses on assessing the validity of academic-based assessment center(AC) Exercises and surveys to find the relationship between GPA and early career success, but it also treats relevant data analysis methods to see the relationship between GPA and career success.

*2.1.2 **Does grade point average have a long-lasting impact on career success later in life? A resource caravans' perspective from adolescence to mid-career**.* The article[4] says that GPA has a stronger impact on career success for individuals with higher motivation to lead. It uses latent growth model and affective identity MTL for investigating.

*2.1.3 **Outcomes of work–life balance on job satisfaction, life satisfaction and mental health: A study across seven cultures**.* This study[1] highlights that work-life balance is beneficial in terms of life satisfaction, and it also reduces anxiety and depression. The authors are telling that individuals with higher WLB scores are participating in activities that are meaningful to them and achieve a sense of harmony in life. The research uses the SEM analysis method.

*2.1.4 **Academic achievement and satisfaction in adolescents with CHD**.* This study[3] evaluates academic achievement and satisfaction in adolescents with CHD, where data is collected through questionnaires about University Children's Hospital, Zurich, Switzerland aged between 17 and 20 years. The questions includes academic career, current schooling, or employment, and socio-economic status are assessed and calculated.

*2.1.5 **The Effects of Academic Achievement, College Satisfaction, and Self Efficacy on Career Development Level**.* The paper[2] focuses on career development being the ultimate purpose of going to college. The sample is 973 college students who enrolled in four-year universities in Korea, in which GPA is measured, along with a questionnaire regarding self-efficacy measured by the Likert-Scale. Analysis methods include finding correlations between academic achievement, college life satisfaction, self-efficacy, and career development level.

*2.1.6 **Rationale**.* This study[4] made us want to see what our data would tell us about the relationship between GPA and career

success. It argues that GPA has a strong impact on career success, which is quite opposite to what this study[5] is telling. We would like to compare what variables contribute to interpreting GPA as an indicator of career success. Also, since work-life balance is beneficial for enhancing life satisfaction and reducing anxiety and depression according to this study[1], we want to see which educational factors influence to work-life balance.

We also wanted to see if there are external factors that influence academic achievements, such as the variables in our dataset. The following studies cover academic elements that are part of our research while introducing outside factors that could influence the perception of future job outlook. In this study [3], that 79% regard their job or school situation as being their desired one without a difference for those with severe CHD. School education in Swiss adolescents with CHD is very similar to the normal population, and career chances in Switzerland seem to be widespread so there are sufficient job possibilities and the patients can find their optimal place in society. Another study's conclusion [2], shows that the correlation between self-efficacy and career development is highest, but there are relatively low correlations between career development and academic achievement, and career development and college satisfaction. This shows that academic achievement variables are most likely stable and ready to be analyzed.

3 Research Methods

- Descriptive statistics: This step is necessary for observing data distribution for each variable and going further with that. Also, we can compare simple rates in specific groups and see some trends through that. For example, university ranking and work-life balance.
- Regression analysis: For comparing continuous variables, we will use regression analysis. We checked the relationship between university GPA and the starting salary using Pearson and Spearman correlation coefficients.
- ANOVA: For those comparing multiple groups we will use ANOVA to see the difference. We tested if the average number of job offers are same across the GPA category and if the average GPA is the same across different years to promotion.
- Decision tree: We will fit the data to a decision tree classifier to see if the work-life balance indices can be classified well using variables, university ranking, university GPA, and field of study.

4 Initial Analysis

4.1 Dataset Identification

The dataset is published on Kaggle by Adil Shamim.

The dataset includes 5000 records of students' educational backgrounds, skills, and career outcomes. It has 20 columns of which 15 of them are numerical values and 5 columns of categorical values. There are no missing values in the dataset. The dataset is updated annually.

This dataset is used to find the relationship between academic performance and career success. Academic performance may be attributed to university ranking, field of study, or other variables in the dataset.

The variables are broken down to 4 groups, Student Information, Academic Performance, Skills & Extracurricular Activities, and Career Outcomes. Among them, we will use variables from two specific section academic performance and career outcomes. The table below contains the variables to use.

Academic Performance	University_Ranking
	University_GPA
	Field_of_Study
Career Outcomes	Job_Offers
	Starting_Salary
	Years_to_Promotion
	Work_Life_Balance

Table 1: Academic Performance and Career Outcomes

4.2 Descriptive Statistics

We've checked descriptive statistics for each variable. For discrete variables, we've made frequency tables and visualized them using bar plots. For continuous variables, we've checked summary statistics and visualized them using a histogram. However, due to space limits, we will only show the frequency table and the summary statistics.

Field_of_Study	Count
Arts	749
Mathematics	745
Law	727
Business	719
Engineering	701
Medicine	689
Computer Science	670

Table 2: Frequency Table for Field of Study

Work_Life_Balance	Count
1	522
2	501
3	503
4	494
5	475
6	482
7	521
8	511
9	509
10	482

Table 3: Frequency Table for Work-Life Balance

University_Ranking	
count	5000.000000
mean	504.335600
std	291.060011
min	1.000000
25%	256.000000
50%	501.500000
75%	759.000000
max	1000.000000

Table 4: Summary Statistics for University Ranking

University_GPA	
count	5000.000000
mean	3.020028
std	0.576047
min	2.000000
25%	2.520000
50%	3.030000
75%	3.510000
max	4.000000

Table 5: Summary Statistics for University GPA

Job_Offers	Count
0	848
1	823
2	856
3	826
4	804
5	843

Table 6: Frequency Table for Job Offers

Starting_Salary	Value
count	5000.000000
mean	50563.540000
std	14494.958207
min	25000.000000
25%	40200.000000
50%	50300.000000
75%	60500.000000
max	101000.000000

Table 7: Summary Statistics for Starting Salary

Years_to_Promotion	Count
1	969
2	1047
3	949
4	1006
5	1029

Table 8: Frequency Table for Years to Promotion

Most of the variables are evenly distributed. However, the starting salary shows a right-skewed distribution.

5 Results

5.1 Q1. Which educational factors among university ranking, university GPA, and field of study are related to work-life balance?

Using the recorded work-life balance score in our dataset, we will determine if the variables could predict work-life balance outcomes. To answer this question, we fit our data into a decision tree classifier. First, we divided the work-life balance index into three categories, 1-3 into 3(bad), 4-7 into 2(moderate), and 8-10 into 1(good). Then

we trained the model to predict the work-life balance index using university ranking, university GPA, and field of study. The accuracy of the model was similar to both the training set and test set, which were 0.4055 and 0.3960 for each. This means the model can correctly classify the train set for 40.55% and the test set for 39.6%.

Below is the visualization of the decision tree model. University ranking is most frequently used as split criteria, used five times in total, followed by university GPA which is used three times, and then field of study which is used 2 times.
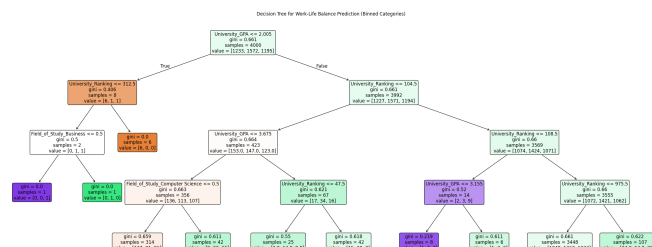

Figure 1: Decision Tree Classifier

5.2 Q2. Is university GPA related to job offers, starting salary, and years to promotion?

5.2.1 University GPA vs. Number of Job offers. A one-way analysis of variance (ANOVA) was conducted to examine the relationship between university GPA and the number of job offers received. GPA was categorized into three groups: 0–2.5, 2.5–3.5, and above 3.5. The results indicated that there was no statistically significant difference in the number of job offers among the GPA groups, $F(2, N) = 2.47, p = .085$. This grouping was selected because the lowest recorded GPA is 2.0. Results may differ based on different grouping choices, although it is very limited in size and does not change the outcome by a marginal difference.

5.2.2 University GPA vs. Starting Salary. A Pearson correlation was performed to assess the relationship between university GPA and starting salary. The results showed no significant correlation, $r(N) = .001, p = .924$. To test for non-linear relationship, a Spearman correlation was conducted, yielding no significant association, $r_s(N) = -.005, p = .744$.

5.2.3 University GPA vs. Years to Promotion. A one-way ANOVA was conducted to evaluate the relationship between university GPA and years to promotion. The results indicated that the difference among GPA groups was not statistically significant, $F(2, N) = 1.81, p = .122$.

6 Conclusion

We couldn't find a significant relationship between academic performance, future living, and success.

In future studies, more variables could be added to compare for a more complex analysis, and that could be used to find some meaningful relationship between variables.

References

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