



# Determining Difficulty and Trends in Majors

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## Abstract

This project focuses on the students of CSUN and their performance throughout their college career. The data set includes data on the students' majors, courses, and whether or not the student graduated. Student data is anonymously examined to see if there were any noticeable trends in overall GPA, major changes, and graduation rates related to their respective majors. Ultimately, the goal behind this project is to advise the school faculty about which majors they should focus their attention on, in order to boost student performance throughout the school.

## Introduction

Throughout college, many students spend years of study under a certain major only to change their majors halfway through. Students who do so usually prolong their graduation, and in some cases, relinquish their college diplomas completely. Additionally, students often talk about which majors are considered the most difficult in terms of passing with good grades and graduating on time. Difficulty of a major dictates whether a student ultimately graduates or not, and is responsible for major changes to some extent. As such, two different problems are addressed: which majors are considered the most difficult, and how does changing majors affect a student's chances of graduating.

## Methods

- SQL - reorganize the data frame and export smaller individual data sets based on column name (Majors, Courses, Grades, etc.) so each person in our group could access their own relevant data more efficiently
- Python - re-merged the individual data sets onto "Student ID", and created arrays to display each student's Major, Graduation Dates, and GPA
- Plotly - construct the graphs as displayed in the middle section

## Difficulty of Majors based on Average GPA of Student within Major



Figure: This Bubble Chart Displays the Relationship Between Each Major and Their Respective GPAs as well as the Student Population Within Each Major. The Chart is in Alphabetical Order

## Major Changes and Graduation Rates

Cohort and Number of Major Changes	Didn't Graduate	Graduated	Graduation Rate
<b>FTF</b>	13456	17288	56.23%
0	10805	10789	49.96%
1	2246	5293	70.21%
2	345	1008	74.50%
3	50	177	77.97%
4	7	18	72.00%
5	2	3	60.00%
10	1	0	0.00%
<b>FTT</b>	13144	34594	72.47%
0	11015	28555	72.16%
1	1867	5346	74.12%
2	226	621	73.32%
3	31	61	66.30%
4	5	8	61.54%
5	0	2	100.00%
8	0	1	100.00%
<b>Ret Trans</b>	49	141	74.21%
0	44	101	69.66%
1	5	35	87.50%
2	0	4	100.00%
3	0	1	100.00%
<b>Returning</b>	18	50	73.53%
0	17	31	64.58%
1	1	14	93.33%
2	0	4	100.00%
3	0	1	100.00%
<b>Total</b>	26667	52073	66.13%

Table: This Table Displays How Many Students in Each Cohort Changed their Major and How Many of Those Students Graduated, Respectively. The Cohorts are Define as Follows: FTF = First-Time Freshman, FTT = First-Time Transfer, Ret Trans = Returning Transfer, Returning = Returning Non-Transfer Students

## Conclusion/Discussion

When taking a look at the average GPAs of each unique major at CSUN, it is evident that students in certain majors are performing much better in an academic viewpoint. The majors with the highest GPAs include Psychology, Geological Sciences, and Nursing with Psychology as most populated major of the three. On the other end, the majors with the lowest overall GPA, discounting Exploratory, are Africana Studies, Chemistry and Biochemistry, and Information Systems. A case can be made to argue that these majors are some of the hardest majors at CSUN; however, it should also be noted that GPA alone is only an estimate of major difficulty and there may be other variables that affect a student performance in their major.

For Majors Changes and Graduation Rates, we see that the cohort with the most students changing their majors is the FTF. Notably, within in this cohort, changing a major seems to help with graduation rates, as students with 0 major changes have a graduation rate around 50%, and those that changed their majors once or twice have a graduation rate around 72-74%. This increase is also seen in the other cohorts, where FTT sees an increase of 1-2% and the Ret Trans and Returning cohorts see an increase of 25-30% in graduation rates. Something to note is that in both the FTF and FTT cohorts, changing the major more than 3 times has a negative effect on graduation rates, possibly due to the student becoming academically discouraged after so many changes.

## References

- CSUN Student Database

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