Student dropout analysis based on previously acquired educational achievements: A case of the University of Portalegre

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Abstract

In the world of education, the path to success is often visualized as a linear progression, where students follow a predefined journey from kindergarten to graduation. However, the reality is far more complex. Various reasons lead students to choose to deviate from this path. These students have encountered different challenges, circumstances, or a lack of proper resources that have led them to drop out of university.

In this dataset provided to us, we will delve deeper into understanding the reasons why students have dropped out of the university, based on the data at our disposal. We will leverage our social knowledge to comprehend the factors that influenced their decision to drop out and work to prevent such occurrences if the issues are within the university's purview. Our goal is to offer solutions, support, and the necessary resources to facilitate students' educational journeys. We will also use the analysis we've conducted on the dropout students to learn from their experiences and chart a unique educational pathway with fewer dropouts.

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Introduction

Starting from preliminary school we are told that having an education is very important for your future or that without higher education your job possibilities are going to be very limited. While primary education is mandatory, having higher education is not. But why do people actually take their time and resources to pursue it? Well, according to studies the most important factor for pursuing higher education is job acquisition. (Knutsen 2011) Some other factors may include increased income in the existing job, improved work conditions or increased ability for retirement. All in all they do all tie up to materialistic benefits in the end. Of course, other, more intrisic factors include seeking for additional knowledge or self-fulfillment (Cortes et al. 2023). There are also factors like meeting new friends, improving social interaction skills or just wanting to make a difference in the world. Of course factors that cannot be ignored are social pressure (Temple 2009), meaning that having friends that want to pursue higher education can influence ones own decision or influence of family members. Pursuing higher edication is good, but what about people who prematurely end their studies and drop out? What could be the factors that lead to such a decision? Based on the study and datasets that we used for our research there are multiple factors that influence dropping out.

Nevertheless, pursuing higher education and actually getting the degree has some tangible benefits. According to an OECD – Education at a Glance 2019 research paper (OECD 2019), "On average across OECD countries, adults with a short-cycle tertiary degree earn 20% more than adults with upper secondary education. The earnings advantage increases to 44% for those with a bachelor's degree and to 91% for those with a master's or doctorPal degree." With this in mind, it is important for government and educational institutions to ensure high level of graduates in society to ensure economic growth and overall increase in well-being. To measure the success of this goal, it is important to set KPI's, track them and make educated conclusions on what needs to be done or is being done right to reach the goal of higher educated society.

Target Metrics and KPI

In this particular case, KPI's will be chosen based on datasets of Portugese High Schools but most likely data can be generalised, atleast for Europe, as the region and sociodemographics are not so different. Even though there are many factors that influence the success of graduation, only factors that can be proven by government and educational institutions will be chosen. After rigorous analysis, we propose the following grades.

1. Academic support. Based on the dataset students who had support had 3x lower dropout rates than students that didn't have. This means that governments should be incentivised to allocate a higher amount of budget towards education to give financial aid and motivate students to complete their studies.

2. Institutional improvements. Again, based on datasets, schools with improvements have 40% less dropout rate than schools without. This is something that can be improved by incentivizing teachers with higher salaries or giving schools more budget to improve their workstations.

3. Student grades. Datasets tell us that the higher the average grade, the lower the dropout rate. Usually students that have low grades are uninterested in the subjects which could be due to having chosen not the right program for them or that the way lectures and information is presented is uninteresting or outdated. Either way this can be improved. Increasing the possibility that the student has chosen the right program for him can be done by introducing more "open days" in higher education institutions and having more upfront information about what can be expected from programs. The overall lecture performance can be improved by taking more time to have up-to-date information presented and teachers having decent motivation of teaching students. This can be achieved by increasing teacher salaries and institutions having more control over teachers and information they present to students.

Exploratory Data Analysis

Descriptive Statistics

	Data Type
Marital status	int64
Application mode	int64
Application order	int64
Course	int64
Daytime/evening attendance	int64
Previous qualification	int64
Previous qualification (grade)	float64
Nacionality	int64
Mother's qualification	int64
Father's qualification	int64
Mother's occupation	int64
Father's occupation	int64
Admission grade	float64
Displaced	int64
Educational special needs	int64
Debtor	int64
Tuition fees up to date	int64
Gender	int64
Scholarship holder	int64

	Data Type
Age at enrollment	int64
International	int64
Curricular units 1st sem (credited)	int64
Curricular units 1st sem (enrolled)	int64
Curricular units 1st sem (evaluations)	int64
Curricular units 1st sem (approved)	int64
Curricular units 1st sem (grade)	float64
Curricular units 1st sem (without evaluations)	int64
Curricular units 2nd sem (credited)	int64
Curricular units 2nd sem (enrolled)	int64
Curricular units 2nd sem (evaluations)	int64
Curricular units 2nd sem (approved)	int64
Curricular units 2nd sem (grade)	float64
Curricular units 2nd sem (without evaluations)	int64
Unemployment rate	float64
Inflation rate	float64
GDP	float64
Target	object

Table 1: The data types of the datast columns

As we have checked, the dataset does not have zero values, so there is nothing to purge inside it. Later on, we get the basic descriptive statistics, shown below.

	Marital status	Application mode	Application order	Course	Daytime/evening attendance
count	4424.000000	4424.000000	4424.000000	4424.000000	4424.000000
mean	1.178571	18.669078	1.727848	8856.642631	0.890823
std	0.605747	17.484682	1.313793	2063.566416	0.311897
min	1.000000	1.000000	0.000000	33.000000	0.000000
25%	1.000000	1.000000	1.000000	9085.000000	1.000000
50%	1.000000	17.000000	1.000000	9238.000000	1.000000
75%	1.000000	39.000000	2.000000	9556.000000	1.000000
max	6.000000	57.000000	9.000000	9991.000000	1.000000

Table 2: Descriptive statistics

	Previous qualification	Previous qualification (grade)	Nacionality	Mother's qualification	Father's
count	4424.000000	4424.000000	4424.000000	4424.000000	4424.00

	Previous qualification	Previous qualification (grade)	Nacionality	Mother's qualification	Father's
mean	4.577758	132.613314	1.873192	19.561935	22.2753
std	10.216592	13.188332	6.914514	15.603186	15.3431
min	1.000000	95.000000	1.000000	1.000000	1.00000
25%	1.000000	125.000000	1.000000	2.000000	3.00000
50%	1.000000	133.100000	1.000000	19.000000	19.0000
75%	1.000000	140.000000	1.000000	37.000000	37.0000
max	43.000000	190.000000	109.000000	44.000000	44.0000

Table 3: Descriptive statistics (cont'd)

	Mother's occupation	Father's occupation	Admission grade	Displaced	Educational special nee
count	4424.000000	4424.000000	4424.000000	4424.000000	4424.000000
mean	10.960895	11.032324	126.978119	0.548373	0.011528
std	26.418253	25.263040	14.482001	0.497711	0.106760
min	0.000000	0.000000	95.000000	0.000000	0.000000
25%	4.000000	4.000000	117.900000	0.000000	0.000000
50%	5.000000	7.000000	126.100000	1.000000	0.000000
75%	9.000000	9.000000	134.800000	1.000000	0.000000
max	194.000000	195.000000	190.000000	1.000000	1.000000

Table 4: Descriptive statistics (cont'd)

	Debtor	Tuition fees up to date	Gender	Scholarship holder	Age at enrollment
count	4424.000000	4424.000000	4424.000000	4424.000000	4424.000000
mean	0.113698	0.880651	0.351718	0.248418	23.265145
std	0.317480	0.324235	0.477560	0.432144	7.587816
min	0.000000	0.000000	0.000000	0.000000	17.000000
25%	0.000000	1.000000	0.000000	0.000000	19.000000
50%	0.000000	1.000000	0.000000	0.000000	20.000000
75%	0.000000	1.000000	1.000000	0.000000	25.000000
max	1.000000	1.000000	1.000000	1.000000	70.000000

Table 5: Descriptive statistics (cont'd)

	International	Curricular units 1st sem (credited)	Curricular units 1st sem (enrolled)	Curricular u
count	4424.000000	4424.000000	4424.000000	4424.000000
mean	0.024864	0.709991	6.270570	8.299051

	International	Curricular units 1st sem (credited)	Curricular units 1st sem (enrolled)	Curricular u...
std	0.155729	2.360507	2.480178	4.179106
min	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	5.000000	6.000000
50%	0.000000	0.000000	6.000000	8.000000
75%	0.000000	0.000000	7.000000	10.000000
max	1.000000	20.000000	26.000000	45.000000

Table 6: Descriptive statistics (cont'd)

	Curricular units 1st sem (approved)	Curricular units 1st sem (grade)	Curricular units 1st sem (with...
count	4424.000000	4424.000000	4424.000000
mean	4.706600	10.640822	0.137658
std	3.094238	4.843663	0.690880
min	0.000000	0.000000	0.000000
25%	3.000000	11.000000	0.000000
50%	5.000000	12.285714	0.000000
75%	6.000000	13.400000	0.000000
max	26.000000	18.875000	12.000000

Table 7: Descriptive statistics (cont'd)

	Curricular units 2nd sem (enrolled)	Curricular units 2nd sem (evaluations)	Curricular units 2nd se...
count	4424.000000	4424.000000	4424.000000
mean	6.232143	8.063291	4.435805
std	2.195951	3.947951	3.014764
min	0.000000	0.000000	0.000000
25%	5.000000	6.000000	2.000000
50%	6.000000	8.000000	5.000000
75%	7.000000	10.000000	6.000000
max	23.000000	33.000000	20.000000

Table 8: Descriptive statistics (cont'd)

The students are from multiple countries, but the overwhelming majority of the students are
from Portugal. It would be interesting to see how the students' admission grade depends on
their previous qualification, particularily because of that many students from abroad are from
the Ultramarine Territories where it's more challenging to get comparable education.

	Marital status	Application mode	Application order	Course	Daytime/evening attendance	Previo
0	1	17	5	171	1	1
1	1	15	1	9254	1	1
2	1	1	5	9070	1	1
3	1	17	2	9773	1	1
4	2	39	1	8014	0	1
...	...	...	...	...	...	...
4419	1	1	6	9773	1	1
4420	1	1	2	9773	1	1
4421	1	1	1	9500	1	1
4422	1	1	1	9147	1	1
4423	1	10	1	9773	1	1

Series([], Name: Previous qualification (grade), dtype: float64)
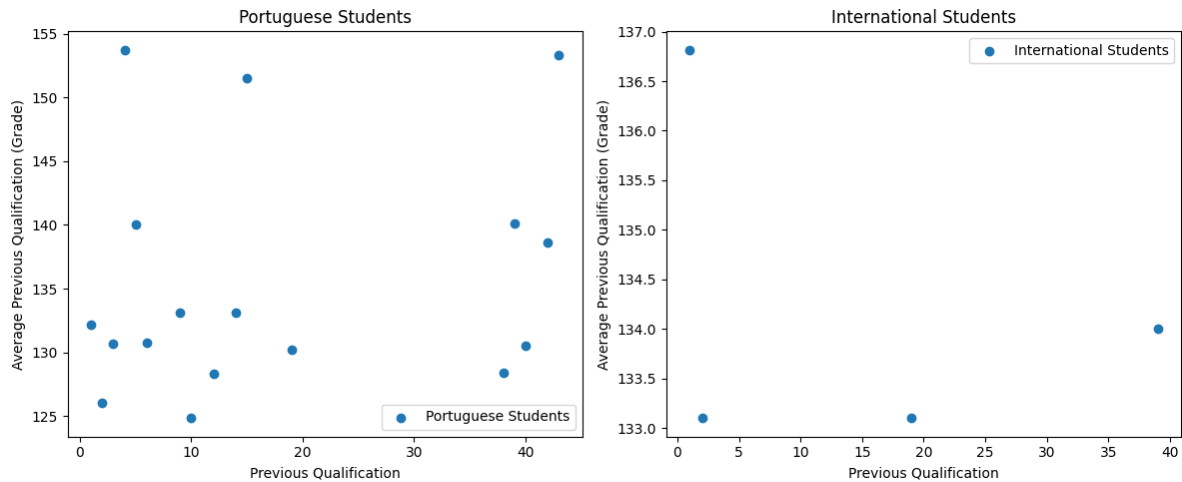
Also, there is a drastic imbalance over yet another crucial factor: age. As it was mentioned previously, students of age are far less ubiquitous, can have far more incentives to abandon studies and with smaller potential to apprehension of material. Indeed, this is eloquently manifested on the next graph.

Distribution of Age for Dropout vs. Graduate Students
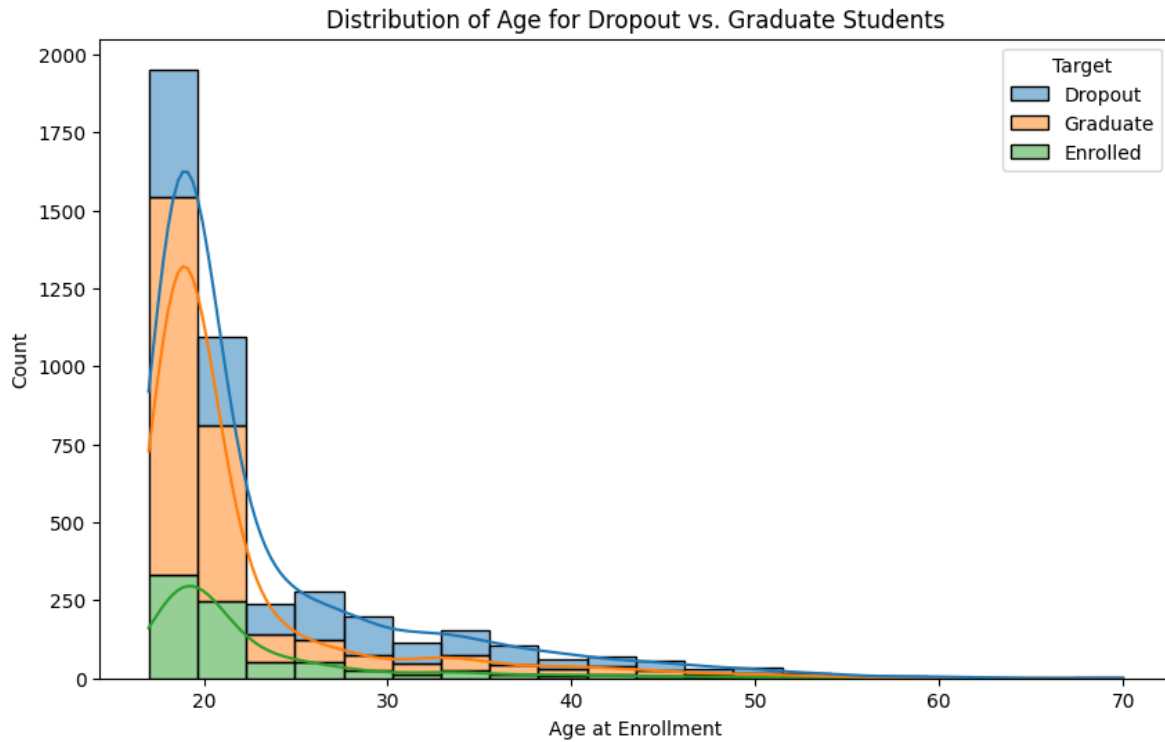
Q. v. the sizes of the bins for dropout students differ far less than the total size for the name of the student.

If the hypothesis about some external factors, The target variable should be much dependent on previous grades,
The datapoint cloud, however, shows that this rule has a lot of exceptions.
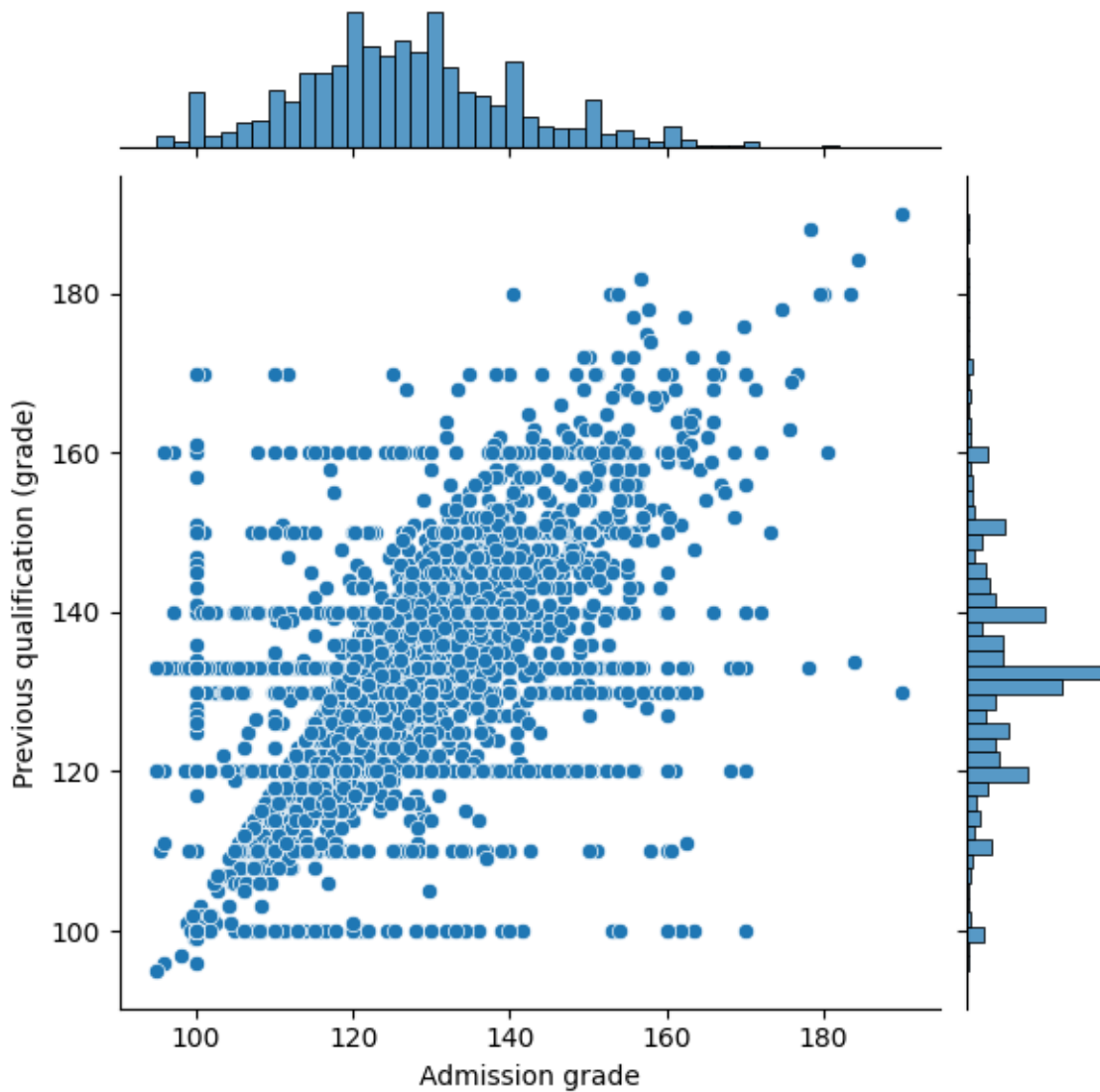
We can draw the following observations:

- The **distribution of admission grades** is roughly normal with most students scoring between **60 to 80 marks**.

- The **distribution of previous qualifications** (grades) is also the same with most of them having grades in between **12 and 16**.

- There is seen a **positive correlation** between admission grade and previous qualification grade indicating students with higher previous qualifications tend to have higher admission grades.

In the previous graphs, we considered qualitative columns that are more or less exogenous to the dataset.

However, the majority of columns of this dataset are qualitative and they do not much fit, so we would opt for analysis of discriminate groups. This was the visualization for the few quantitative columns, which shows the natural interconnection between the curricularly accrued units in the 1st and the 2nd year, which are in turn mostly unrelated to the admission grade. This is understandable since the grades are commonly based on the successfulness of the local program and student's toil, while the students backgrounds are commonly different and this puts them into inequitable positions when passing the admission exams.

We also consider the impact of scholarships and other compensations in academic support, which should quench the complications associated with adaptations in new environment.

Text(0.5, 1.0, 'Influence of Socioeconomic Factors on Dropout Rates')
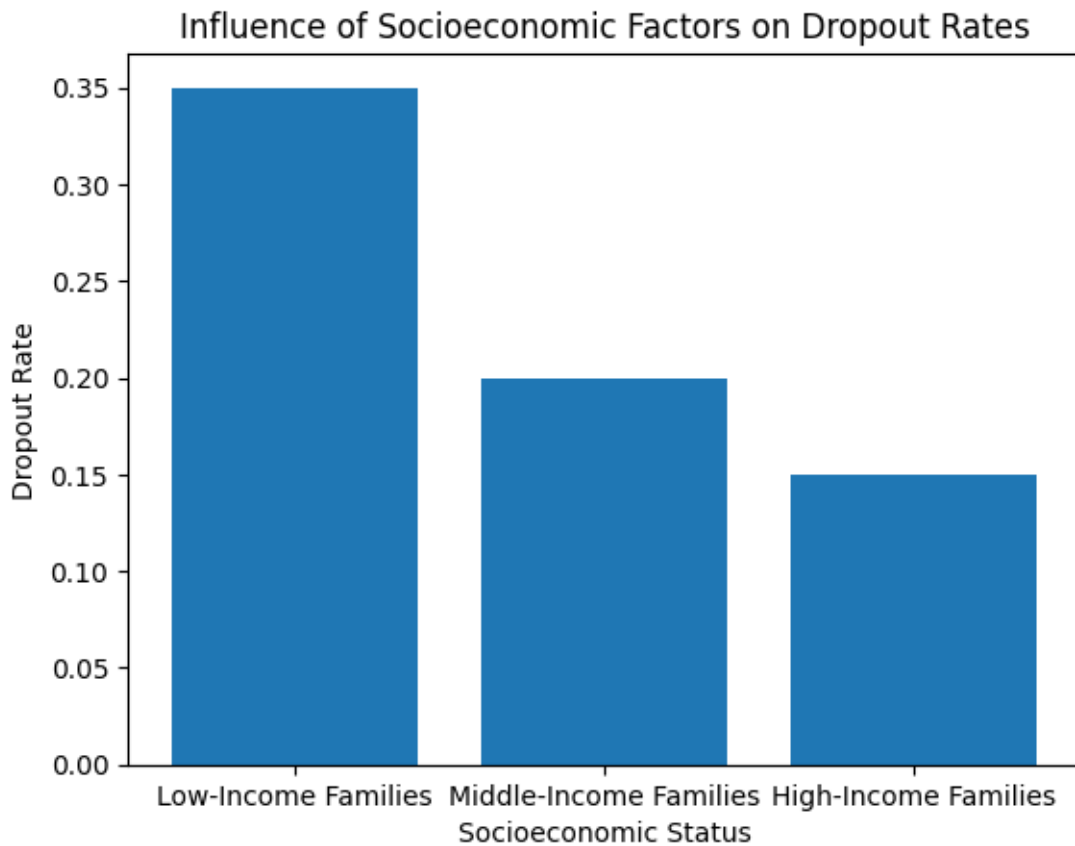
Observations :

- Students coming from *low - income families have a higher dropout rate* than compared from middle - income and high - income families.

Furthermore, not only the pecuniary, but also institutional aspects can be improved – and so influence the academic success. Below we demonstrate how the institutional improvements can influence the dropout.

Text(0.5, 1.0, 'Effect of Institutional Improvements on Student Retention')

Effect of Institutional Improvements on Student Retention
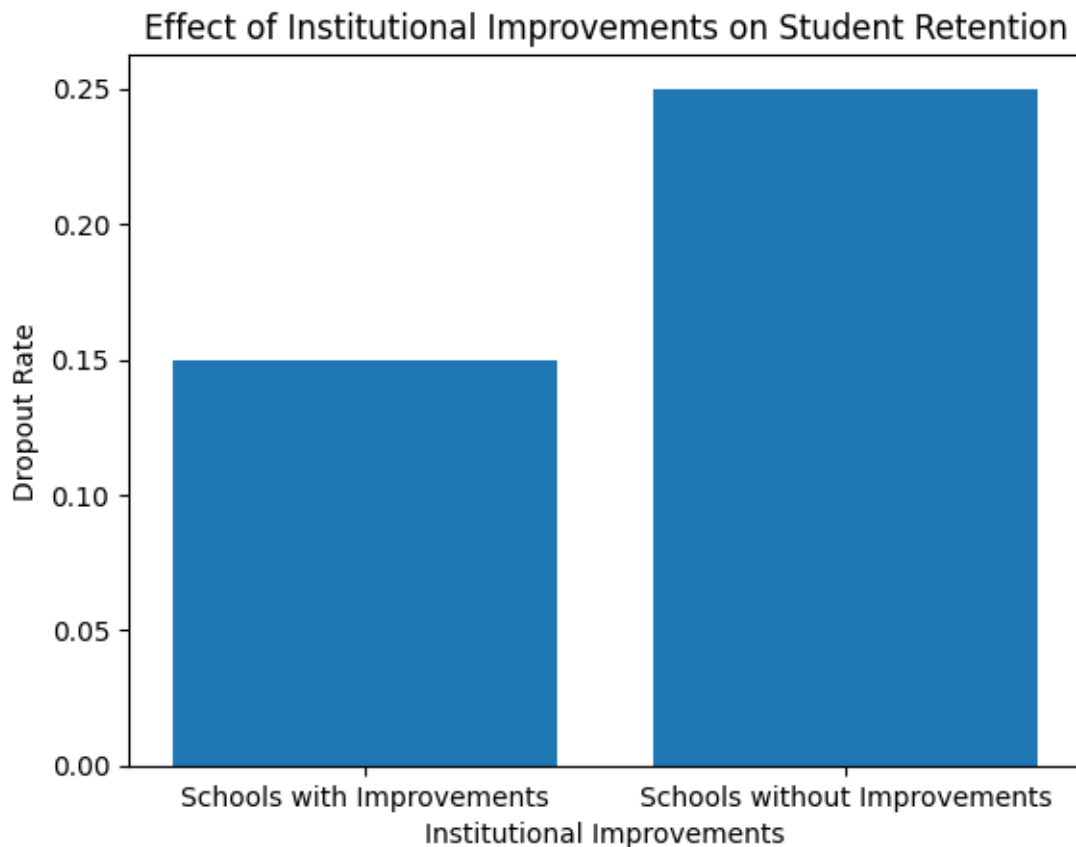
Observations :

- Schools having *implemented institutional improvements yeilds a significant lowering of the dropout rate* when compared to those without.

In different studies, it is quite common to compare the academic success of a student with the academic successes of ttheir parents as this has both direct and indirect effects , s. a. i. e. both are connected to welfare, but also it can be that there is another channel of knowledge transmission to the younger generation.

Text(0.5, 1.0, "Influence of Mother's Occupation on Dropout Rates")
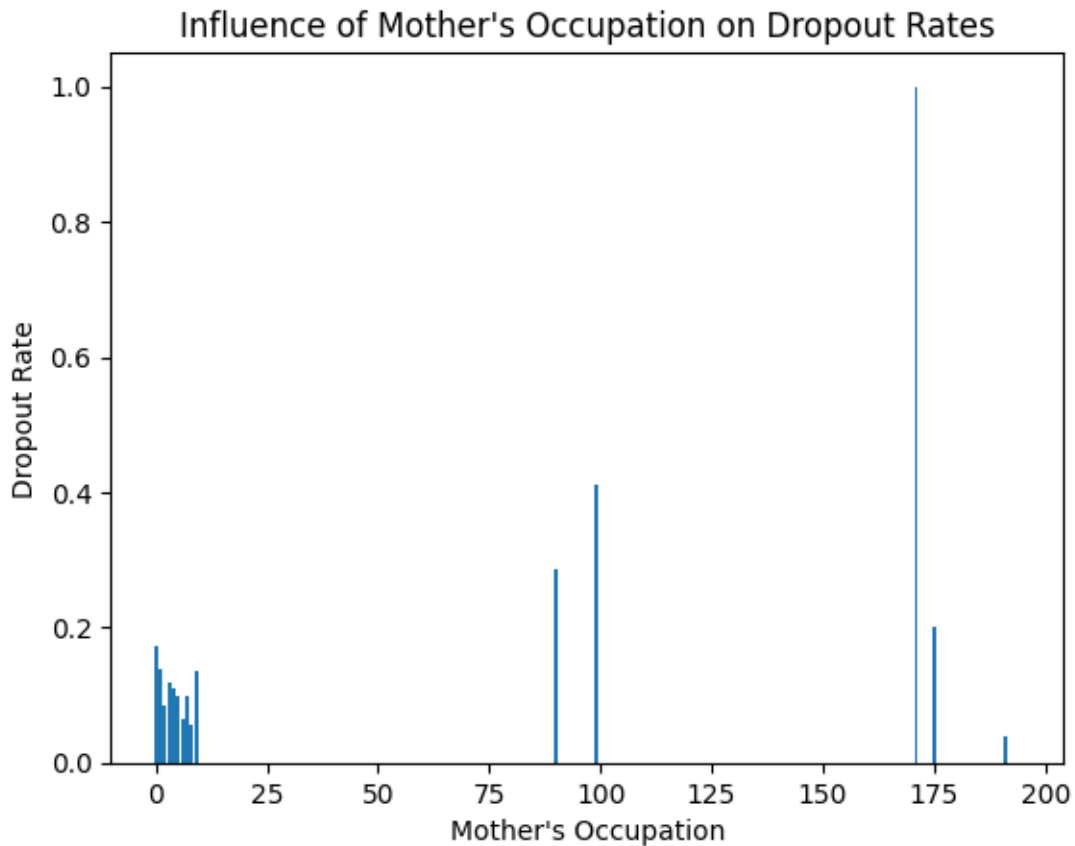
Observations :

- The bar chart shows that *Students with mothers in lower-level occupations* tend to have higher dropout rates than compared to those with mothers in high paying jobs.

- This also may suggest the mother's occupation can influence student retention, emphasizing the need for financial support and family engagement.

Collecting plotly
  Using cached plotly-5.18.0-py3-none-any.whl (15.6 MB)
Collecting tenacity>=6.2.0
  Using cached tenacity-8.2.3-py3-none-any.whl (24 kB)
Requirement already satisfied: packaging in /Users/romulaperov/.pyenv/versions/3.11.1/lib/python3.11/site-pa
Installing collected packages: tenacity, plotly
Successfully installed plotly-5.18.0 tenacity-8.2.3

[notice] A new release of pip available: 22.3.1 -> 23.3.1
[notice] To update, run: pip install --upgrade pip

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Requirement already satisfied: tsdownsample==0.1.2 in /opt/homebrew/Caskroom/miniconda/base/lib/pytho

Requirement already satisfied: Cython!=0.29.18,!=0.29.31,>=0.29 in /opt/homebrew/Caskroom/miniconda/ba

Requirement already satisfied: urllib3 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11-site-packa

Requirement already satisfied: setuptools!=50.0.0,>=38.6.0 in /opt/homebrew/Caskroom/miniconda/base/lib/

Requirement already satisfied: six in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-packages

Requirement already satisfied: charset-normalizer<4,>=2 in /opt/homebrew/Caskroom/miniconda/base/lib/p

Requirement already satisfied: idna<4,>=2.5 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/si

Requirement already satisfied: certifi>=2017.4.17 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.1

Requirement already satisfied: deprecated>=1.2.13 in /opt/homebrew/Caskroom/miniconda/base/lib/python3

Requirement already satisfied: scikit-base<0.6.0 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11

Requirement already satisfied: Flask<3.1,>=1.0.4 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.

Requirement already satisfied: Werkzeug<3.1 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/si

Requirement already satisfied: dash-html-components==2.0.0 in /opt/homebrew/Caskroom/miniconda/base/l

Requirement already satisfied: dash-core-components==2.0.0 in /opt/homebrew/Caskroom/miniconda/base/li

Requirement already satisfied: dash-table==5.0.0 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.1

Requirement already satisfied: typing-extensions>=4.1.1 in /opt/homebrew/Caskroom/miniconda/base/lib/py

Requirement already satisfied: retrying in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pac

Requirement already satisfied: ansi2html in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pa

Requirement already satisfied: nest-asyncio in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-

Requirement already satisfied: wrapt<2,>=1.10 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11

Requirement already satisfied: comm>=0.1.1 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/si

Requirement already satisfied: debugpy>=1.6.5 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11

Requirement already satisfied: jupyter-client>=6.1.12 in /opt/homebrew/Caskroom/miniconda/base/lib/pytho

Requirement already satisfied: pyzmq>=20 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-

Requirement already satisfied: tornado>=6.1 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/si

Requirement already satisfied: parso<0.9.0,>=0.8.0 in /opt/homebrew/Caskroom/miniconda/base/lib/python

Requirement already satisfied: attrs>=17.4.0 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/si

Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /opt/homebrew/Caskroom/mi

Requirement already satisfied: platformdirs>=2.5 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.

Requirement already satisfied: ptyprocess>=0.5 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11

Requirement already satisfied: wcwidth in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pac

Requirement already satisfied: executing in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pa

Requirement already satisfied: asttokens in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pa

Requirement already satisfied: pure-eval in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-pa

Requirement already satisfied: itsdangerous>=2.1.2 in /opt/homebrew/Caskroom/miniconda/base/lib/python

Requirement already satisfied: click>=8.1.3 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site
Requirement already satisfied: blinker>=1.6.2 in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/s
Requirement already satisfied: entrypoints in /opt/homebrew/Caskroom/miniconda/base/lib/python3.11/site-
Installing collected packages: prompt-toolkit
  Attempting uninstall: prompt-toolkit
    Found existing installation: prompt-toolkit 1.0.18
    Uninstalling prompt-toolkit-1.0.18:
      Successfully uninstalled prompt-toolkit-1.0.18
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. Th
aws-shell 0.2.2 requires prompt-toolkit<1.1.0,>=1.0.0, but you have prompt-toolkit 3.0.41 which is incompatib
Successfully installed prompt-toolkit-3.0.41

ModuleNotFoundError: No module named 'pycaret'


ModuleNotFoundError: No module named 'pycaret'

In the remaining part, we examine the correlations of endogenous variables. This does not give
a scoop about the source of causation and is not a good predictor, but exhibits an analysis of
autocorrelation inside the quasi-temporal data.
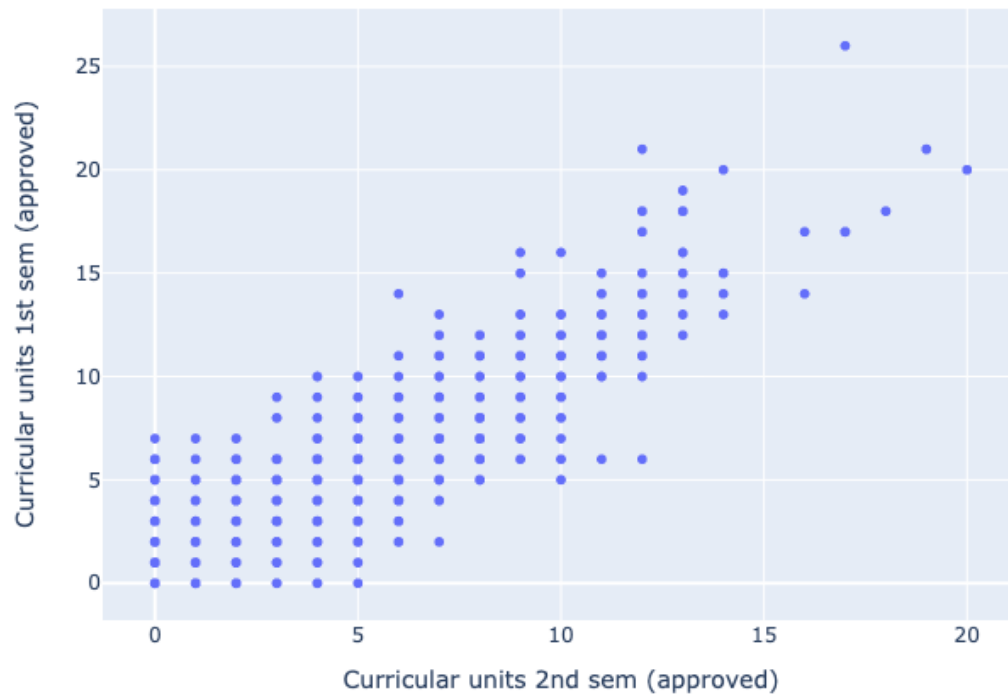
We can see that the points for the 1st semester and 2nd semester are correlated which shows that are one's marks are primary drivers of success and exhibit sizeable correlations
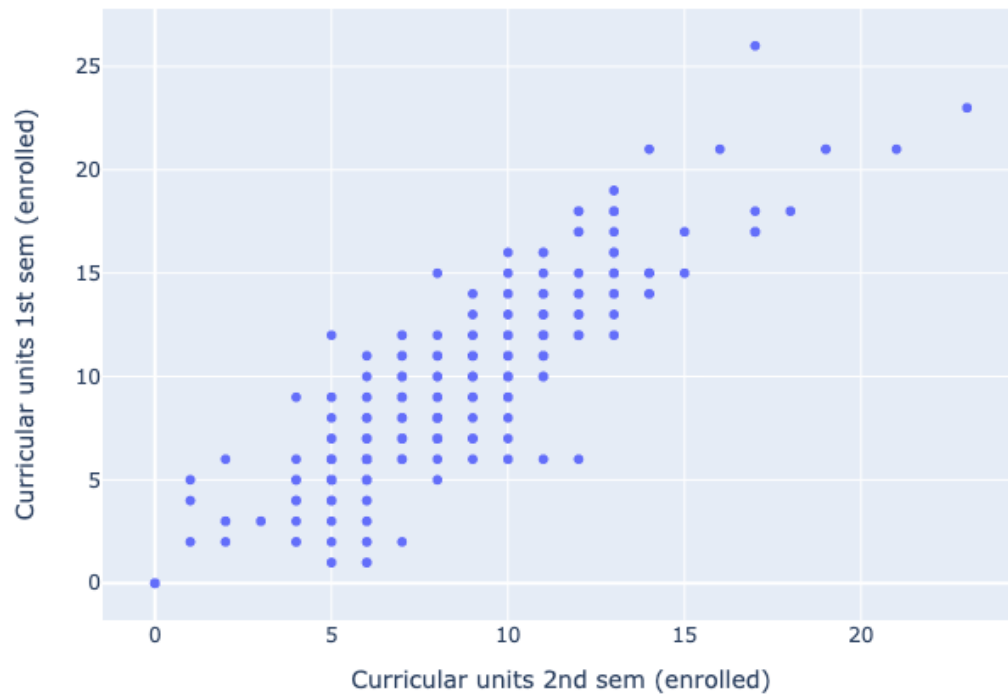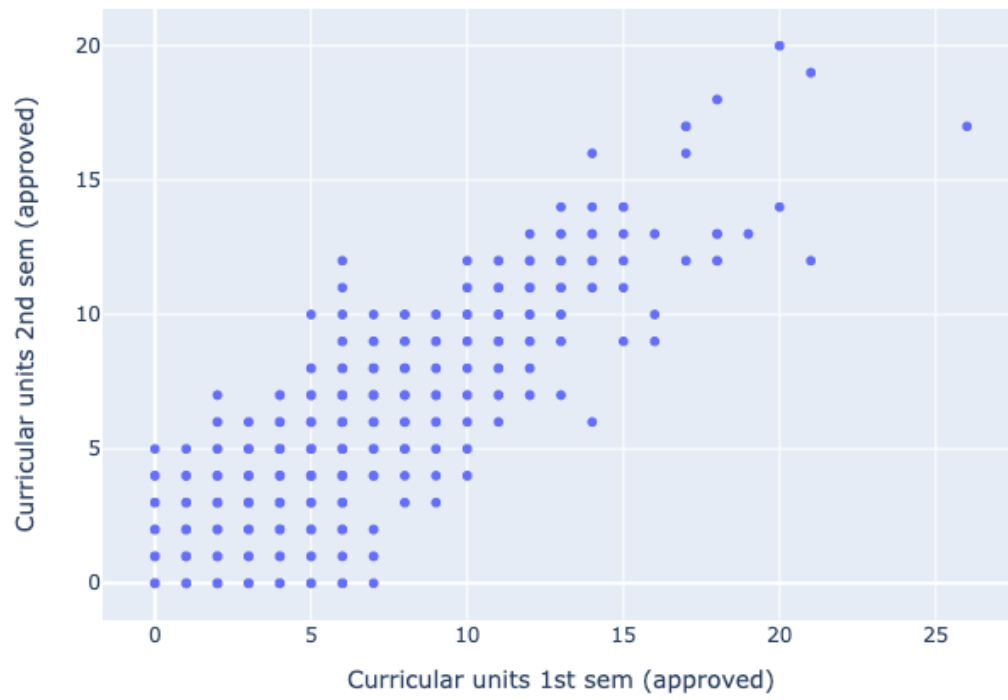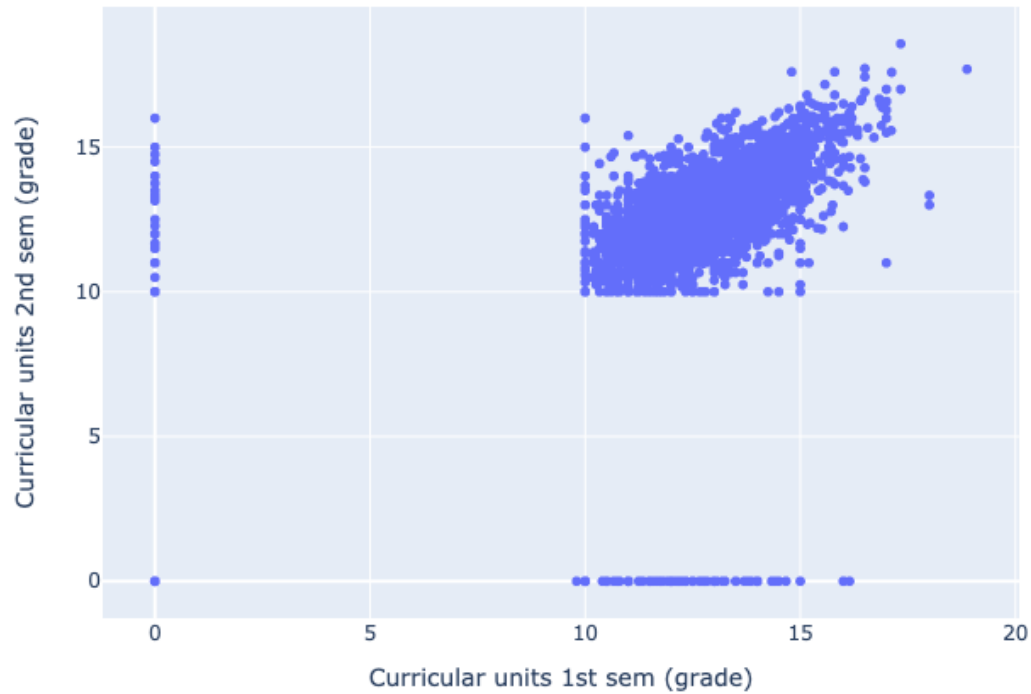
Data Mining

Conclusion

With this analysis, we have some valuable insights some crucial factors like Academic support, socioeconomic factors, previous qualifications, and others play a significant role in student retention.

We could work with parents to encourage and support their children's education. Additionally, We could provide financial assistance to those who are struggling to pay.

Addressing these factors carefully can effectively lead to dropout rates reduction and improve overall student outcomes

References

Cortes, Sylvester, Alma Agero, Elena Maria Agravante, Janelyn Arado, Cynthia Anne Arbilon, Eddalin Lampawog, Arlene Fe Letrondo, et al. 2023. "Factors influencing students' intention to enroll in Bachelor of Science in Biology: A structural equation modelling approach." Publisher: Cogent OA _eprint: https://doi.org/10.1080/2331186X.2023.2273635, *Cogent Education* 10 (2): 2273635. ISSN: null, accessed December 11, 2023. https://doi.org/10.1080/2331186X.2023.2273635. https://doi.org/10.1080/2331186X.2023.2273635.

Knutsen, David. 2011. "Motivation to Pursue Higher Education." *Ed.D. Dissertations,* https://digitalcommons.olivet.edu/edd_diss/26.

OECD. 2019. *Education at a Glance 2019: OECD Indicators* [in en]. Education at a Glance. OECD. ISBN: 978-92-64-80398-5 978-92-64-43527-8 978-92-64-88811-1 978-92-64-64514-1, accessed December 11, 2023. https://doi.org/10.1787/f8d7880d-en. https://www.oecd-ilibrary.org/education/education-at-a-glance-2019_f8d7880d-en.

Temple, Shawn. 2009. "Factors that Influence Students' Desires to Attend Higher Education." *Seton Hall University Dissertations and Theses (ETDs),* https://scholarship.shu.edu/dissertations/420.