

INTRODUCTION

To tackle the problem of students dropping out and not finishing their studies, multiple dashboards have been used to discover the main insights and patterns in the data. These dashboards take a lot of different information—from students' school performance to their personal backgrounds—and make it easy to understand. This way, it is possible to see the bigger picture and get at the heart of general aspects of students' dropout.

DASHBOARD 1: Students Distribution Analysis

Students Distribution Analysis

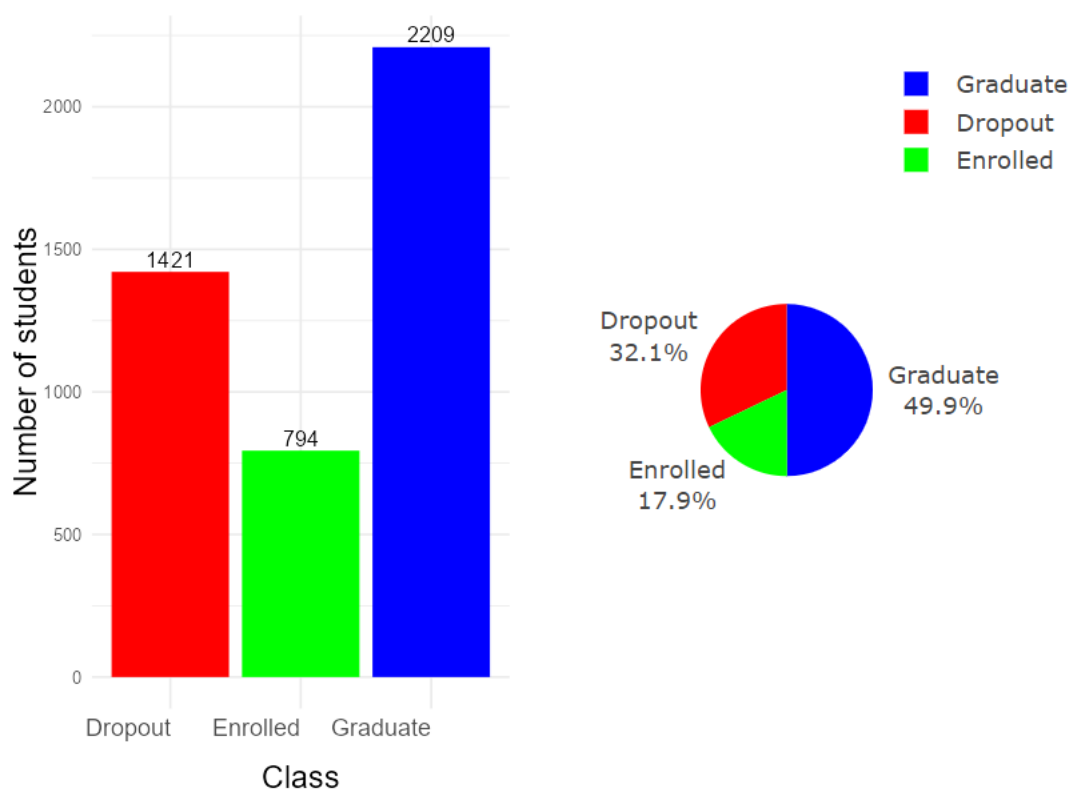


Fig.1 Students Distribution Analysis

The dashboard in the image is a visual representation of the distribution of students across three categories: those who have graduated, those who are currently enrolled, and those who have dropped out.

The dashboard is divided into two main visual components: a bar chart and a pie chart.

- **The bar chart** shows the absolute number of students in each category, providing a clear and immediate grasp of the relative scale of each group. For instance, it is possible to see that the number of graduates is the highest, followed by dropouts, and then enrolled students.

- **The pie chart** displays the proportion of each category in percentages, offering an intuitive understanding of the distribution of students in a different format. Notably, it shows a significant proportion of dropout students at 32.1%.

This dashboard is useful to give a first understanding of the current student status within the university and have a general overview of how well the institution is doing in terms of keeping students enrolled and guiding them to graduation.

Further visualizations will delve deeper into the present conditions concerning students' demographics, academic background, socioeconomic factors, and external economic indicators, which are all factors that can influence a student's likelihood of graduating or dropping out. Therefore, once the current situation is clearer it is possible to apply data mining techniques to identify students at risk of dropping out early in their academic careers and to implement support strategies to improve retention and graduation rates. Additionally, all the dashboards will include a dropdown menu that lets the user sort the data by different student categories: all, graduates, those currently enrolled, and those who have dropped out. This feature will make it easier to focus the analysis on the unique characteristics of each group.

DASHBOARD 2: Student Demographics & Socio-Economic Background Analysis

This dashboard offers a thorough look into the demographic and socio-economic background of the student body at the institution. It aims to bring out and make sense of the trends among students. This understanding can guide the creation of support systems that are more precise in meeting student needs. For example, it can highlight which factors are linked with doing well in school or which might predict if a student might leave.

1. Marital status distribution.

The first chart shows the distribution of students by marital status. The majority are single, which is typical for a student population (Parker & Stepler, 2017). Married, widowed, divorced, and other statuses have much smaller counts. This data can provide insights into the life circumstances of the student body, which may impact their academic performance and needs. Notably, when comparing different student outcomes, there is a discernible rise in the number of married individuals among those who have dropped out (12.6%) compared to those who have graduated (6.7%). This trend may suggest that marital responsibilities, such as the financial necessity to secure full-time employment (Parker & Stepler, 2017), might impede the ability of married students to continue their education, leading to a higher dropout rate within this group.

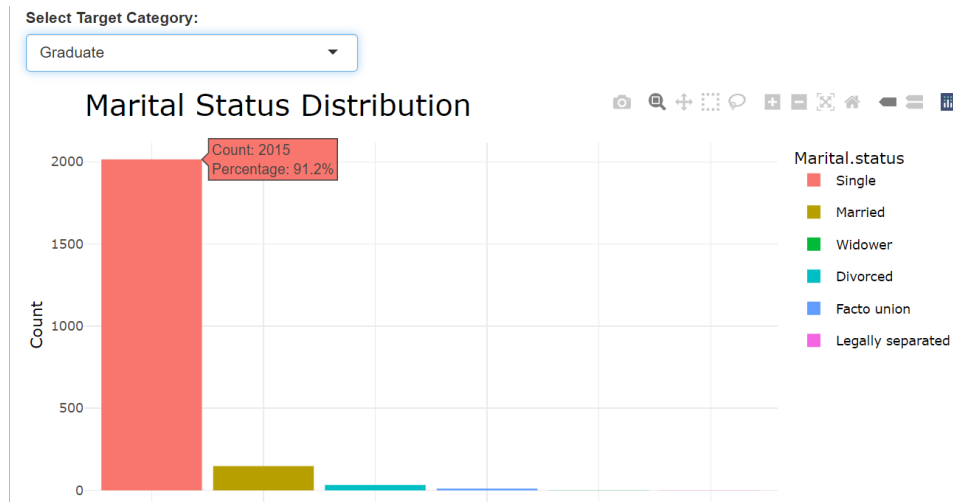


Fig.2 Marital status distribution for graduates

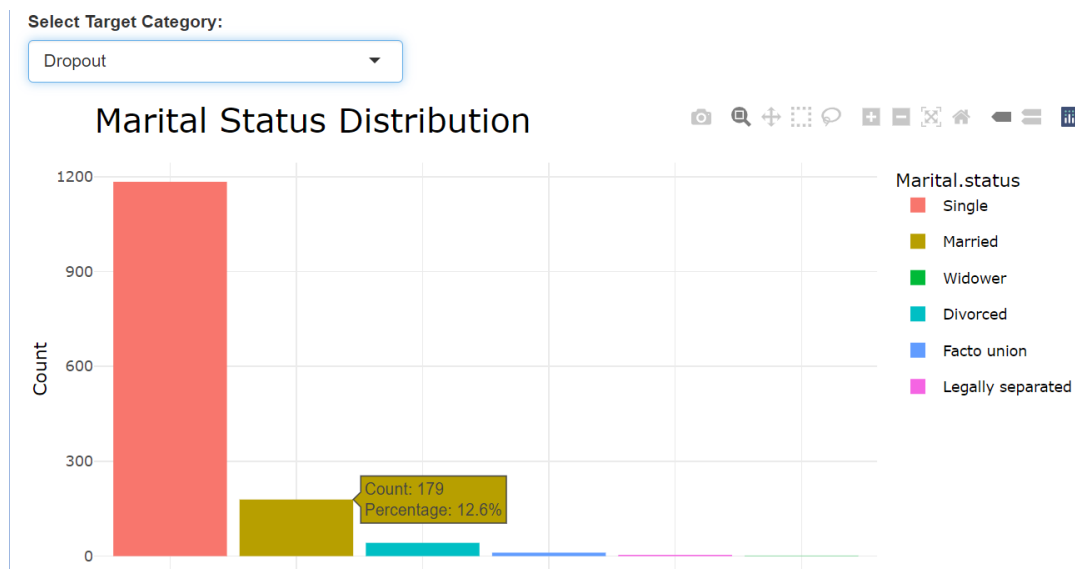


Fig.3 Marital status distribution for dropout

2. Parental Background (Mother's and Father's Qualifications).

The next set of charts illustrates the educational qualifications of students' mothers and fathers. The charts indicate the top 10 educational backgrounds, with the most common being basic education 1st cycle (4th/5th year). While studies have shown that higher levels of parental education might be linked to enhanced academic support and consequently, student success (Lamar University, 2021), an examination of our data reveals a less pronounced or minimal difference in this regard. The bar charts representing the educational qualifications of students' mothers reflect this observation. The first chart, associated with graduates, does not show a markedly higher incidence of higher education when compared to the second chart, which represents dropout students. This suggests that, in our dataset, the correlation between parental education levels and student outcomes, whether they graduate or drop out, is not as significant as might be expected.

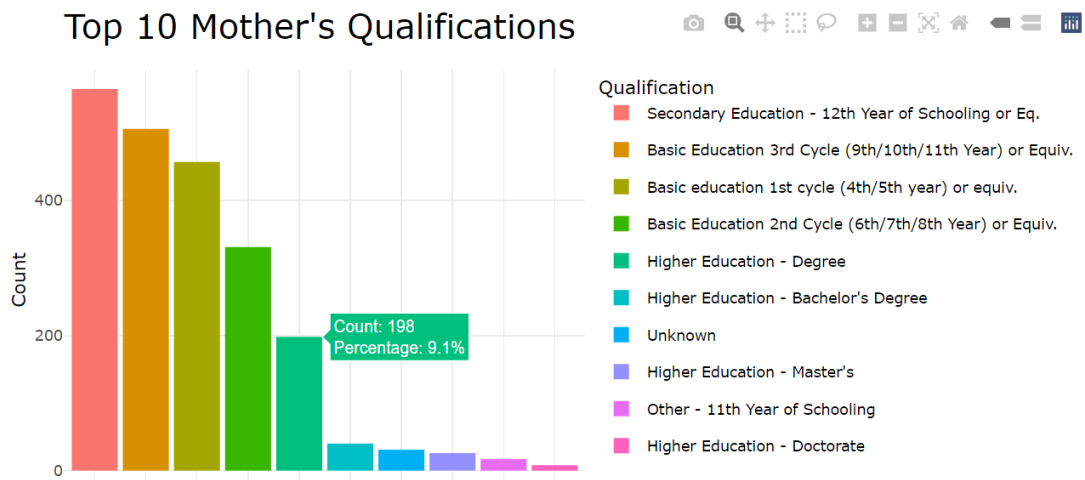


Fig.4 Top 10 Mother's Qualifications for graduates

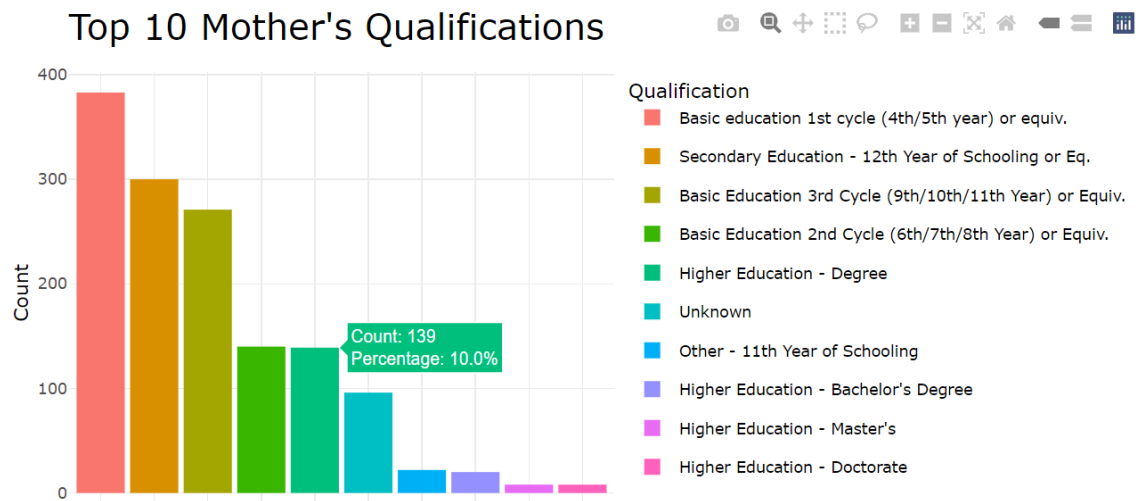


Fig.5 Top 10 Mother's Qualifications for dropout

3. Age at Enrollment Distribution.

The age at enrollment distribution highlights that most students enter higher education at a younger age, with the number gradually declining among older age groups. Upon examining the data specifically for those who have dropped out, there is a noticeable proportion of older students. This could suggest that older individuals enrolling in university may face higher risks of discontinuing their studies. Possible reasons for this could include increased responsibilities outside of education, such as work or family commitments, which may compete with academic obligations (Imlach, Ward, Stuart, et al., 2017).

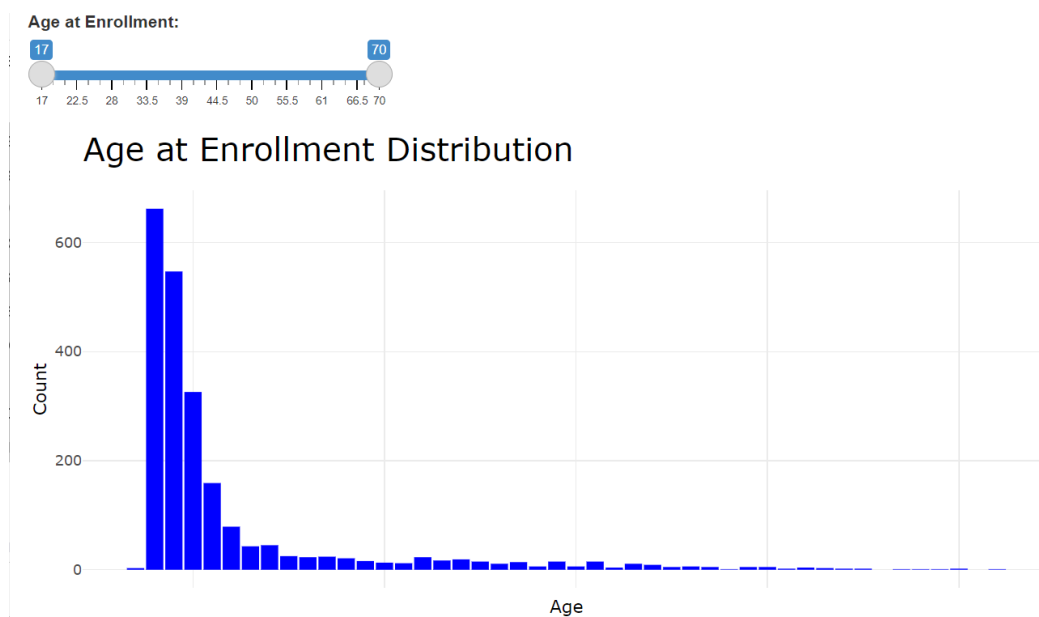


Fig.6 Age at enrolment distribution for graduates

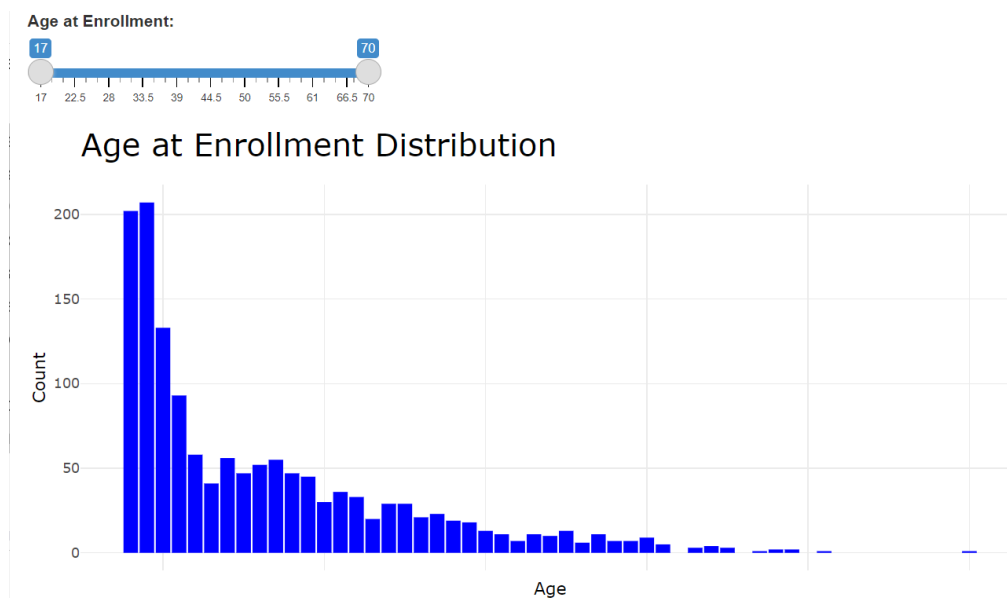


Fig.7 Age at enrolment distribution for dropout

4. Gender distribution.

By looking at the gender distribution for all students it is possible to see that there are more females than males, and this remains true also when looking at the graduate-only distribution. However, when focusing on the dropout distribution the counts of females and males are almost the same. This could imply that while female students enroll and graduate at higher rates, they are dropping out at a similar rate to male students. Therefore, probably this variable may not be critical in predicting student dropout.



Fig.8 Gender distribution for dropout

5. International student distribution.

The international students' chart indicates that most students are not international. This trend is consistent even when examining the subsets of graduates and dropouts. The similar proportions of international students among both graduates and dropouts suggest that those who do enroll are just as likely to complete their studies as they are to leave, indicating that the factors influencing their persistence or departure are proportionately consistent.

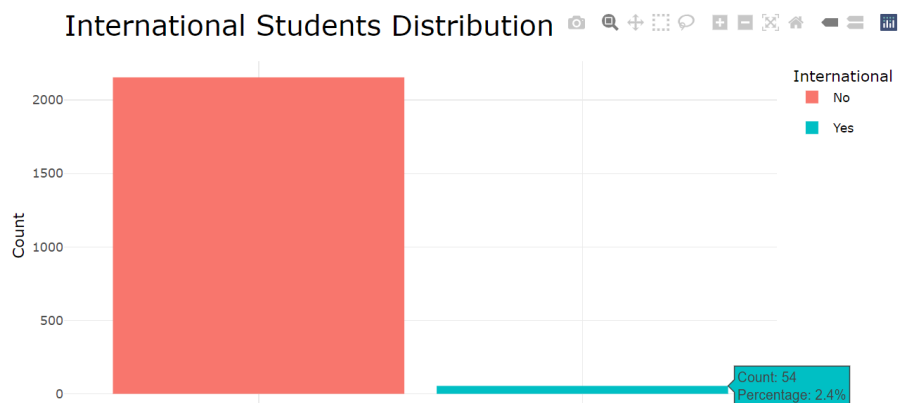


Fig.9 International students distribution for graduates

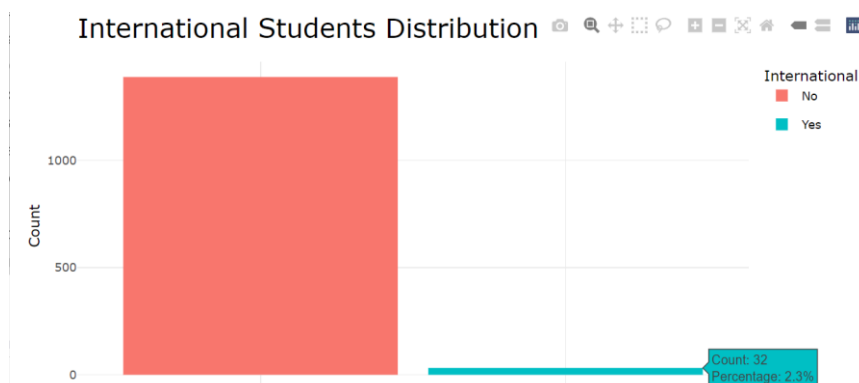


Fig.10 International students distribution for dropout

DASHBOARD 3: Application Modes & Admission Insights

This dashboard serves as an analytical tool for evaluating different aspects of the student admissions process and the possible differences between all, graduate, enrolled, and dropout students. This dashboard is designed to offer insights into application modes, admission grades, and application order preferences. Therefore, can be useful to identify factors that may contribute to student success/dropout or monitor the effectiveness of different application pathways and their alignment with student success.

1. Application Mode Analysis.

The bar chart highlights the varying frequencies of application modes among students, suggesting certain modes' greater accessibility or popularity. Graduates predominantly use standard and direct application modes like "1st phase - general contingent," reflecting a more straightforward academic trajectory where students enter their chosen field of study right away. Dropouts, however, show higher use of less traditional entry modes such as "transfer", "change of institution/course," and "Over 23 years old", indicating a less linear journey that may lead to interruptions in their education or simply suggest a later start. These patterns provide valuable insights for institutions aiming to improve support for students on non-traditional academic paths.

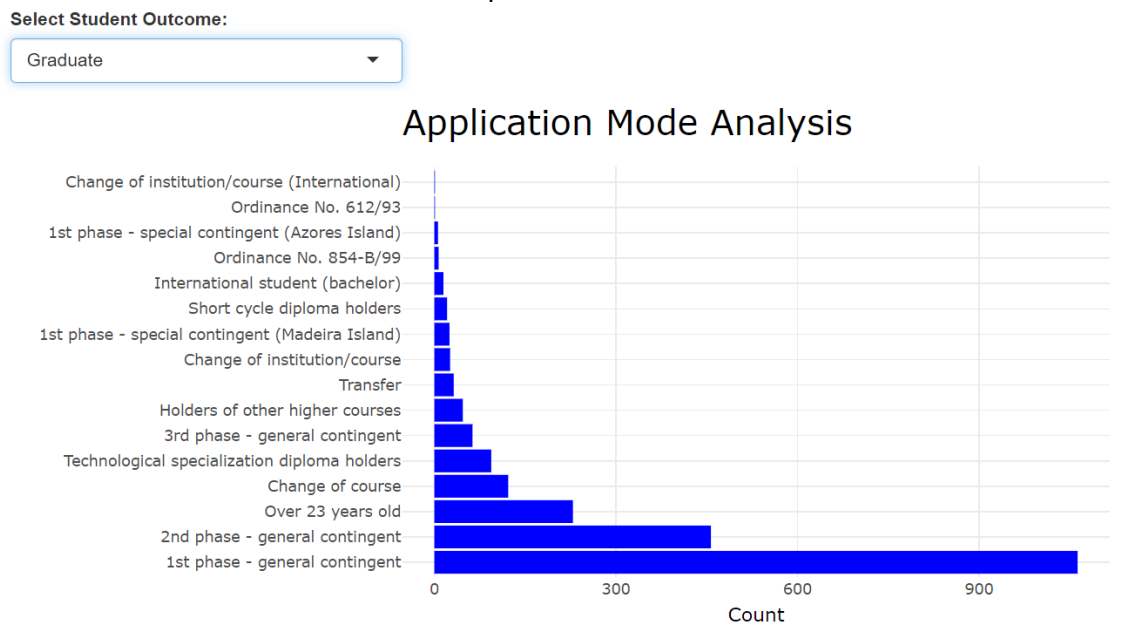


Fig.11 Application mode analysis for graduates

Select Student Outcome:

Dropout

Application Mode Analysis

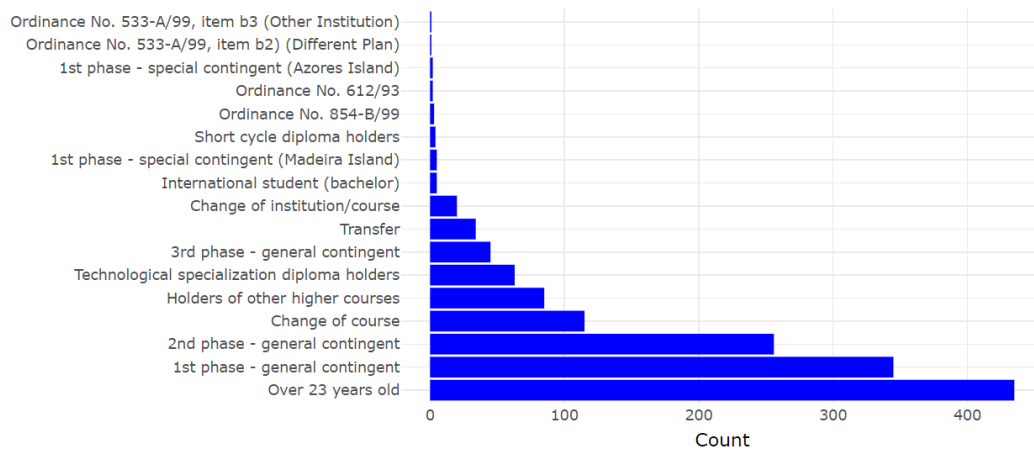


Fig.12 Application mode analysis for dropout

2. Admission Grade Analysis.

The scatter plot correlates admission grades with student outcomes. This visualization can reveal patterns or thresholds in admission grades that might influence whether students graduate, remain enrolled, or drop out. In the visualization, it appears that students who graduate tend to have higher admission grades overall. On the other hand, the data points representing dropouts are more spread across the admission grade spectrum, but there is not a clear difference. This could indicate that while admission grades are important, they are not one of the main predictors of whether a student will drop out, as some students with high grades still leave their courses.

Admission Grade Analysis

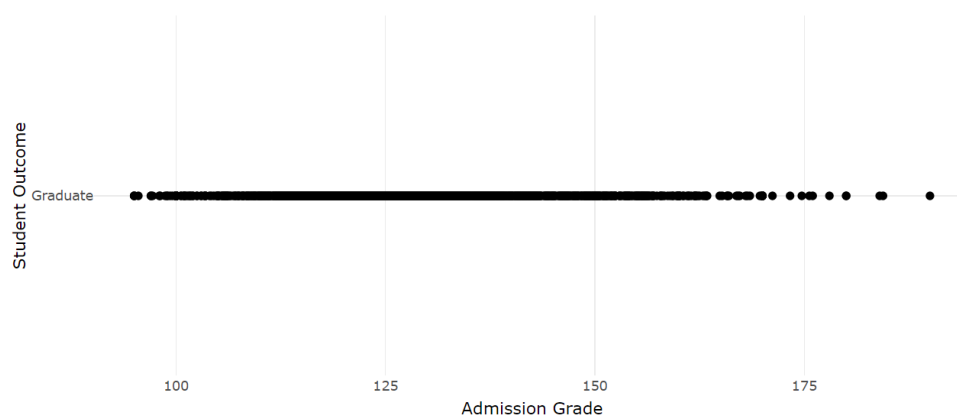


Fig.13 Admission grade analysis for graduates

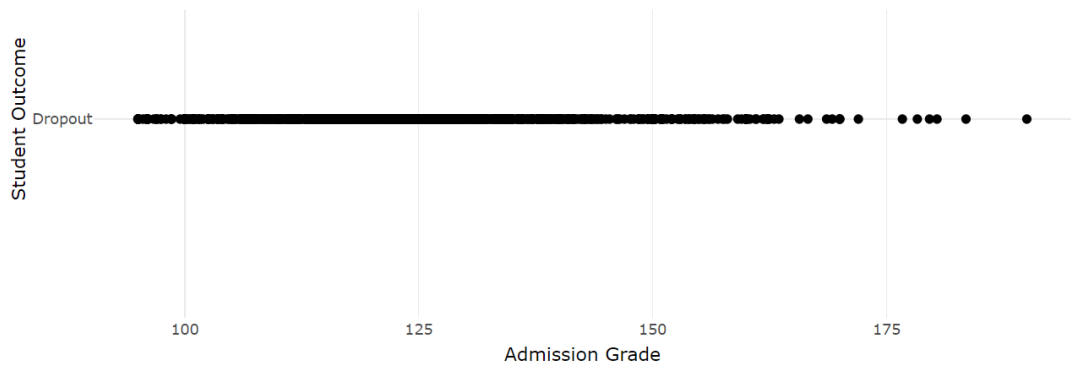


Fig.14 Admission grade analysis for dropouts

3. Application Order Preference.

The last bar chart reflects students' preferences for the order in which they list their applications. The distribution shows a trend in students' first-choice preferences and how this correlates with their eventual outcome. The charts illustrate that a majority of dropouts, the same as graduates and even more, had placed their course as their first preference, implying that despite starting in their preferred field of study, other factors may have contributed to their decision to leave.

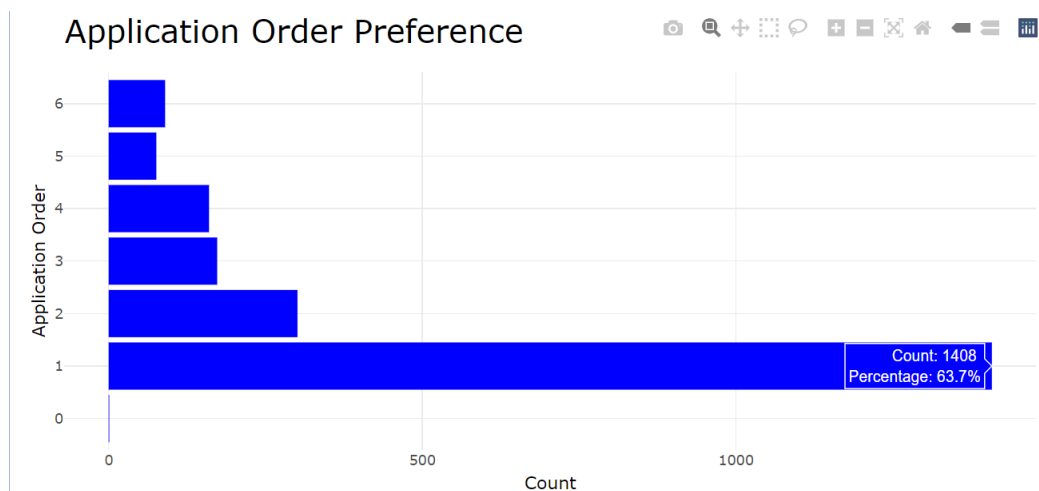


Fig.15 Application order preference for graduates

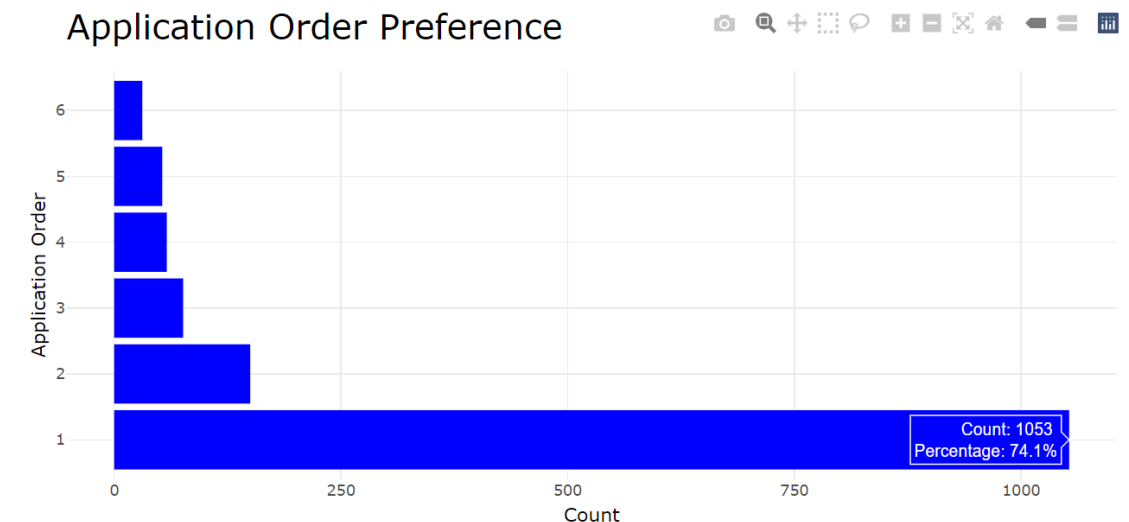


Fig.16 Application order preference for dropouts

DASHBOARD 4: Economic Indicators & Educational Support Services

The fourth and last dashboard is designed to display economic factors and educational support services in relation to student outcomes. The dashboard provides a visual representation of how scholarships and financial standing correlate with educational outcomes. This insight is crucial for institutions to understand the effectiveness of their current economic support systems and to determine where additional resources may be needed.

1. Scholarship Distribution.

This plot allows to observe how scholarship status correlates with the likelihood of a student dropping out, staying enrolled, or graduating. For instance, a higher proportion of scholarship holders among graduates could suggest that scholarships are effective in supporting students to complete their education (Barrow & Rouse, 2018). From the graph, it is possible to see that 37.8% of graduates had scholarships compared to only 9.4% of dropout students. This suggests that students who receive scholarships are more likely to graduate than to drop out. In summary, the pattern observed here implies that scholarships play a vital role in student retention and success. The financial relief they provide seems to correlate with a reduced dropout rate and an increased likelihood of graduation.

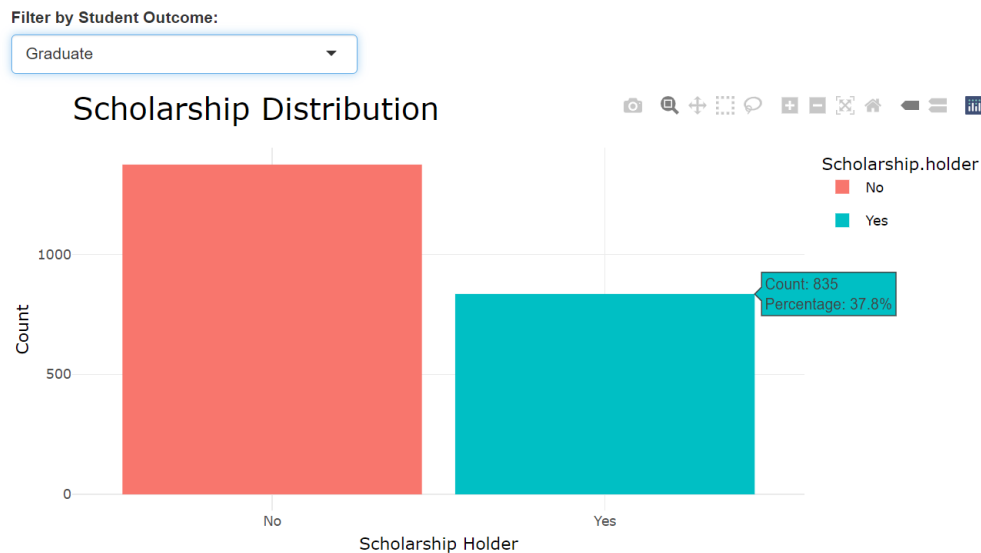


Fig.17 Scholarship distribution for graduates

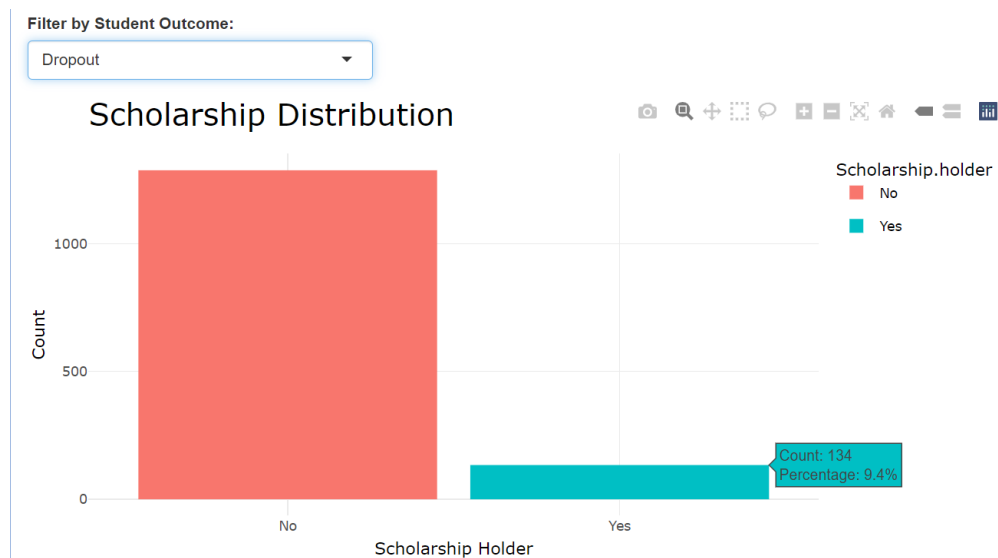


Fig.18 Scholarship distribution for dropouts

2. Financial Standing.

This plot compares students who are up-to-date on tuition fees and those who are not, showing how these financial factors might influence a student's ability to continue their studies or graduate. For graduate students it is possible to observe that the vast majority of students who have completed their studies were not debtor, this trend underscores the positive impact of financial stability on academic achievement, implying that students with less financial strain are more likely to graduate (Destin, M., et al., 2019). On the other hand, for dropout student it is still visible that the vast majority were not debtor as well. However, financial standing is still a factor that must be taken into consideration since either way the percentage of debtor students is higher in dropout, 22% compared to 4.6%.

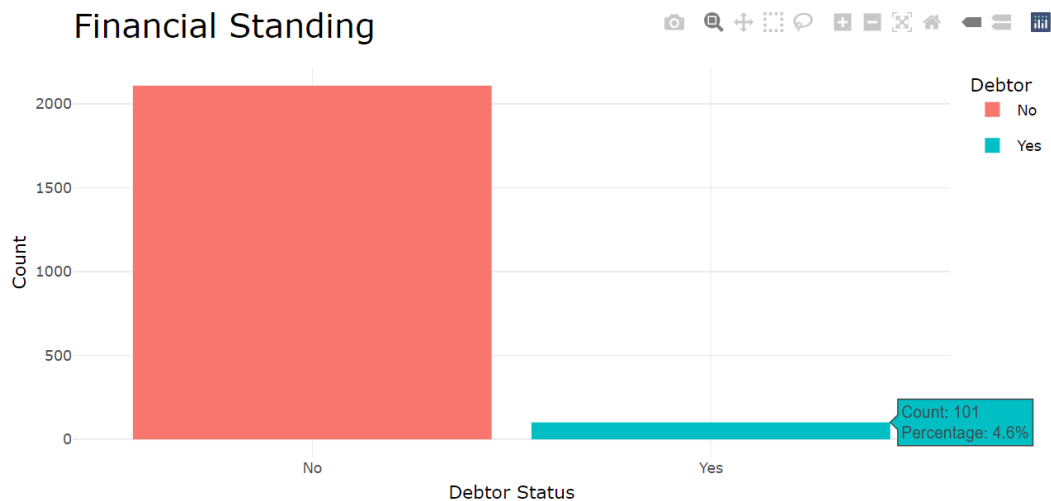


Fig.19 Financial standing for graduates

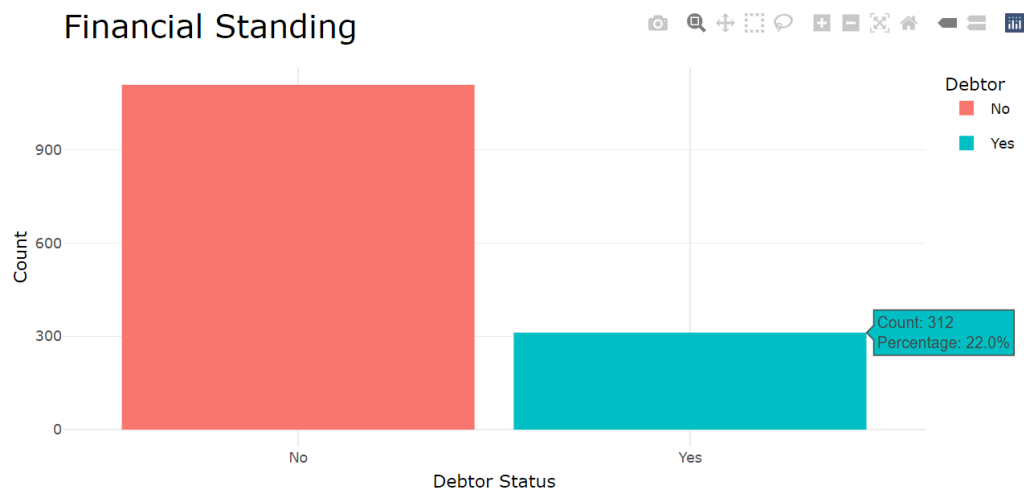


Fig.20 Financial standing for dropouts

3. Box Plots for Grade Distribution by Financial Status.

These plots display the distribution of first-semester and second-semester grades according to students' financial status categorized simply as "Good" or "Poor" based on tuition fee status and debt. It is useful for observing the central tendency (median), dispersion (interquartile range), and outliers in grades based on financial status. For graduate students, it is possible to observe that there is a slight variation in median grades between students with 'Good' and 'Poor' financial statuses in the first semester, with 'Good' having a marginally higher median. The ranges and interquartile ranges are similar, indicating consistency in grade dispersion regardless of financial status. Therefore, Students who graduate maintain a relatively consistent academic performance across financial statuses. Financial stability might contribute to a slight advantage, but the effect is not pronounced, as evidenced by the similar grades of those with 'Poor' financial status.

On the other hand, for dropout students, the median grades for both financial statuses for the first semester seem very close, and the range of grades is also similar. However, for dropouts in the second semester it is possible to notice a drop in the median grade for

‘Poor’ financial status which could be related to the accumulation of stress and financial pressure over time (Mowreader, 2023).

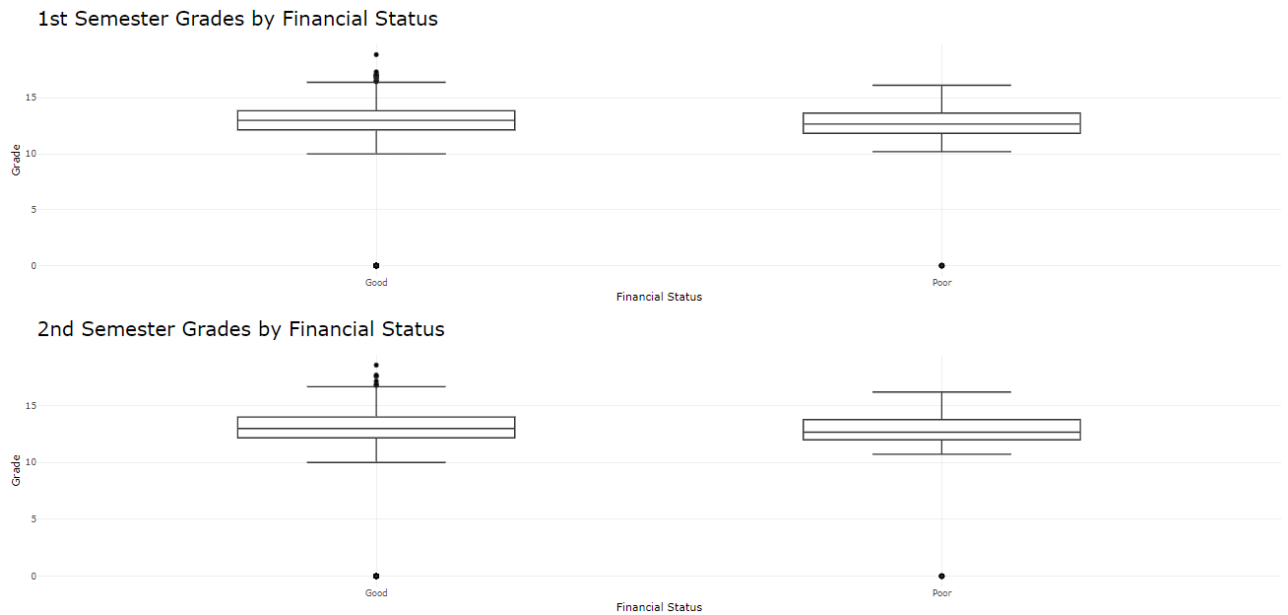


Fig.21 Grades by financial status for graduates

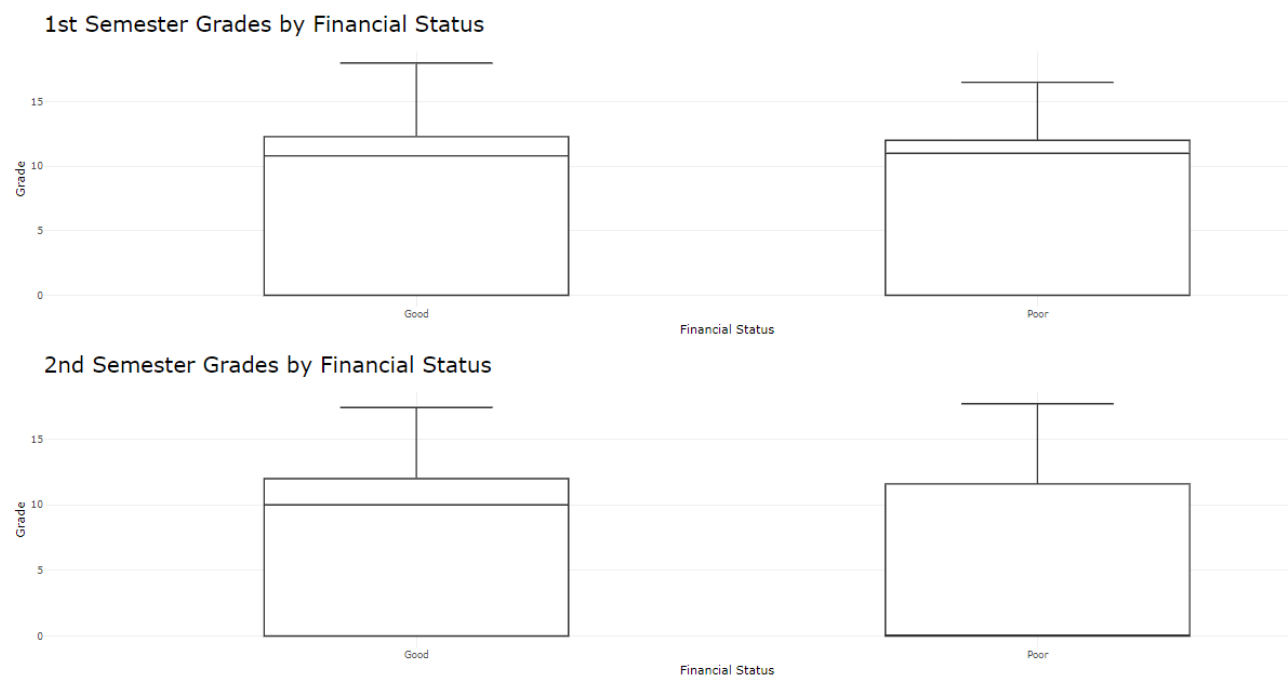


Fig.22 Grades by financial status for dropouts

FINAL INSIGHTS:

The comprehensive analysis presented across the four dashboards sheds light on the multifaceted factors contributing to student success and dropout. The initial dashboard revealed a significant dropout rate of 32.1%, despite a majority achieving graduation. Further exploration into demographic and socioeconomic backgrounds has pointed to personal factors, such as the

potential impact of marital responsibilities on dropout rates, and a less pronounced link between parental education and student outcomes. The examination of admission pathways and grades from the third dashboard indicates a trend where conventional admission routes and higher entrance scores align with higher graduation rates, while non-traditional paths and later starts may escalate dropout likelihood, independent of initial course choice. The fourth and final dashboard highlights economic influences, with scholarship recipients and students without tuition debt exhibiting elevated graduation probabilities. These insights culminate in a recognition that student success is deeply intertwined with their academic, social, economic, and individual contexts. All this information will help shape educational programs and support services to better serve diverse groups of students.

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