

Effect of COVID-19 on Universities Enrollment

Issue:

The education sector has been affected by the COVID-19 pandemic. This affected the enrollment of students in universities. Low enrollment can cause reduced revenues and reputation to the university. We want to study the available data to see if the pandemic has changed the attraction of students to some colleges and programs.

Solution:

Given the available data, we will provide an analysis of the data related to some universities in UAE. The analysis has been conducted using Python Jupyter notebook and Power BI report. The created visualizations will reveal hidden insights and help in understanding the impact of the pandemic. This will allow the universities to shape their policies and requirements to attract more students.

Data Description:

- UAUE Stats 2017-2020

The available data describe the number of students enrolled in different colleges in UAEU. They include different aspects of the students (gender, nationality, and study level). The data are split across three different files to represent three years (from 2017 to 2020). The total number of enrollments is 43642.

- Khalifa Stats for Fall 2019-2020

The provided dataset contains statistics of the students' enrollment in the fall semester for 2019-2020. The dataset is split to different datasets. Each dataset contains information about different attributes (nationality, gender, student level, etc.).

- HCT Enrollment by Campus

This dataset contains enrollment information on each campus for HCT from the 2015-2020 academic years. Each campus has a column for enrollment year, and the number of students enrolled for that period.

Data Attributes:

- UAUE Stats 2017-2020

Attribute	Type	Number of values	Description
Year	Ordinal	3	Represents the year of enrollment
College_Desc	Categorical	10	The college in which the student enrolled
Gender_Desc	Binary	2	Whether the student is male or female
Nationality	Binary	2	To indicate if the student is local or non-local (foreigner)
Student_Level	Categorical	4	If the student is undergraduate, master, or doctorate
Total	Numerical	Continuous range	Number of students enrolled

- **Khalifa Stats for Fall 2019-2020**

Attribute	Type	Number of values	Description
Bachelor Programs	Categorical	16	Represents the year of enrollment
Gender	Binary	2	Whether the student is male or female
Nationality	Binary	2	To indicate if the student is local or non-local (foreigner)
Master Programs	Categorical	16	Type of the master program
Doctorate Programs	Categorical	4	Type of the doctorate program
Region	Categorical	7	Region where student's country resides in
Total	Numerical	Continuous range	Number of students enrolled

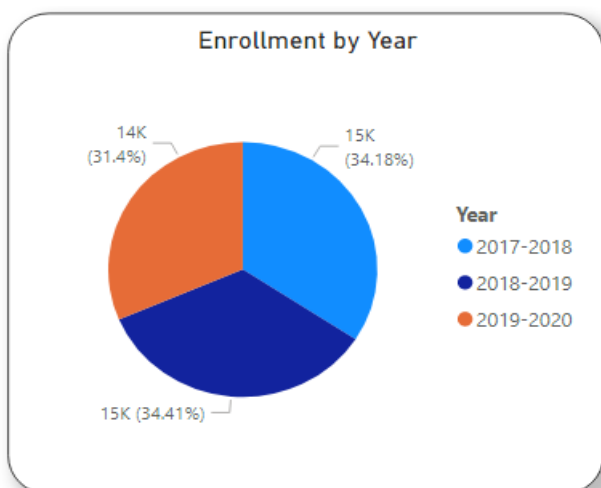
- **HCT Campus Stats 2016-2020:**

Attribute	Type	Number of values	Description
Year	Ordinal	5	Represents the year of enrollment
Campus	categorical	15	Contains which campus the count is for
Count	Numerical	Continuous Range	Number of students enrolled

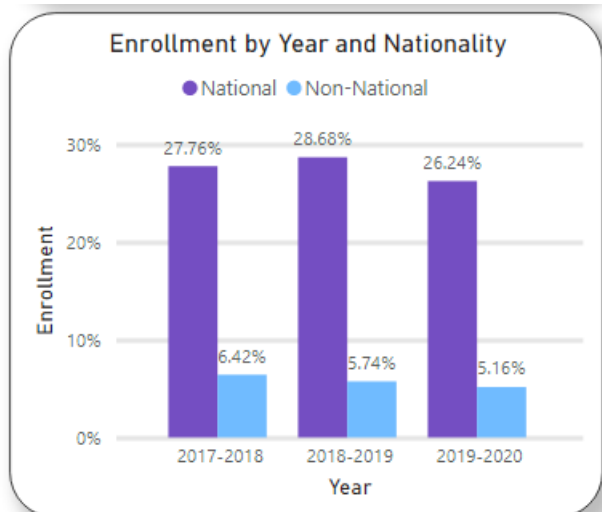
Analysis of UAEU Data:

Basic Analysis:

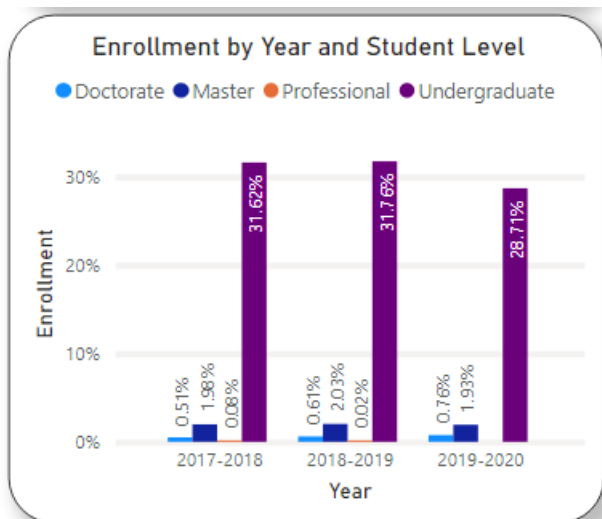
From the pie chart, there is no significant change in the percentage of enrollment during the past three years.



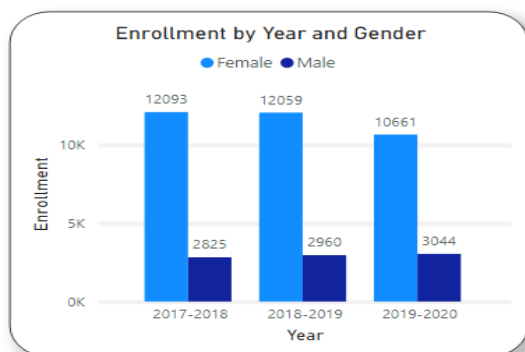
Clearly, UAEU attracts more locals (Emiratis) than non-locals in all the three years with over 75% of overall enrollment. This could be due to the tuition fees of the university. All in all, the ratio between both nationalities is almost the same in all years.



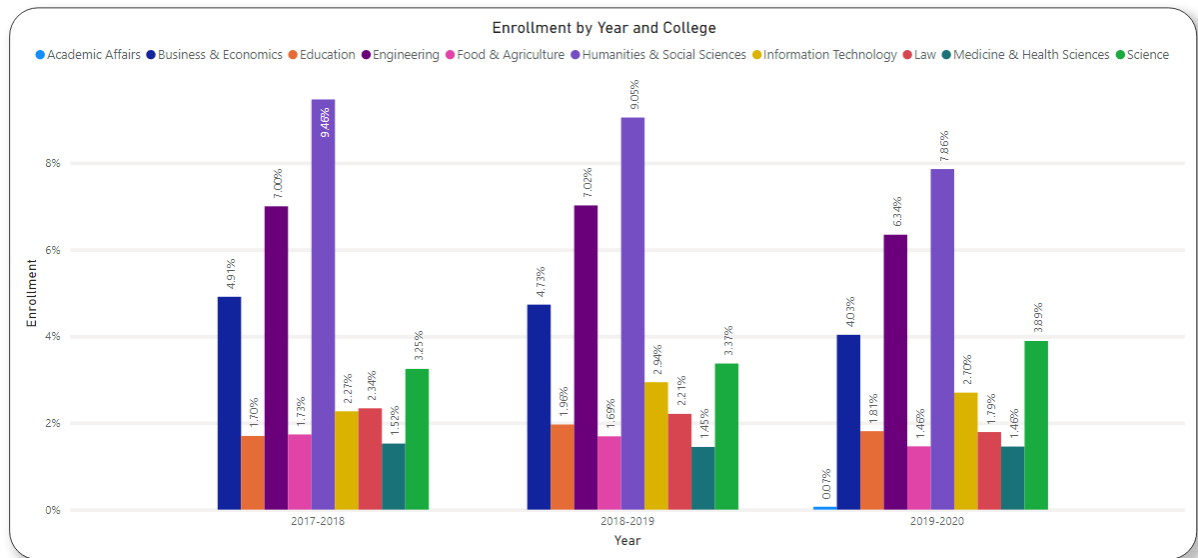
About 92% of the students applied for undergraduate level during the past three years and no one applied for professional certificate in 2020. We can see all levels have maintained the same percentage in all years.



We can see that females are dominant as compared to males in the three years. There is no significant change in males' enrollment across the three years. There is a change of about 11.6% in female's enrollment in the last two years. There is almost a fixed ratio between both genders across all years.

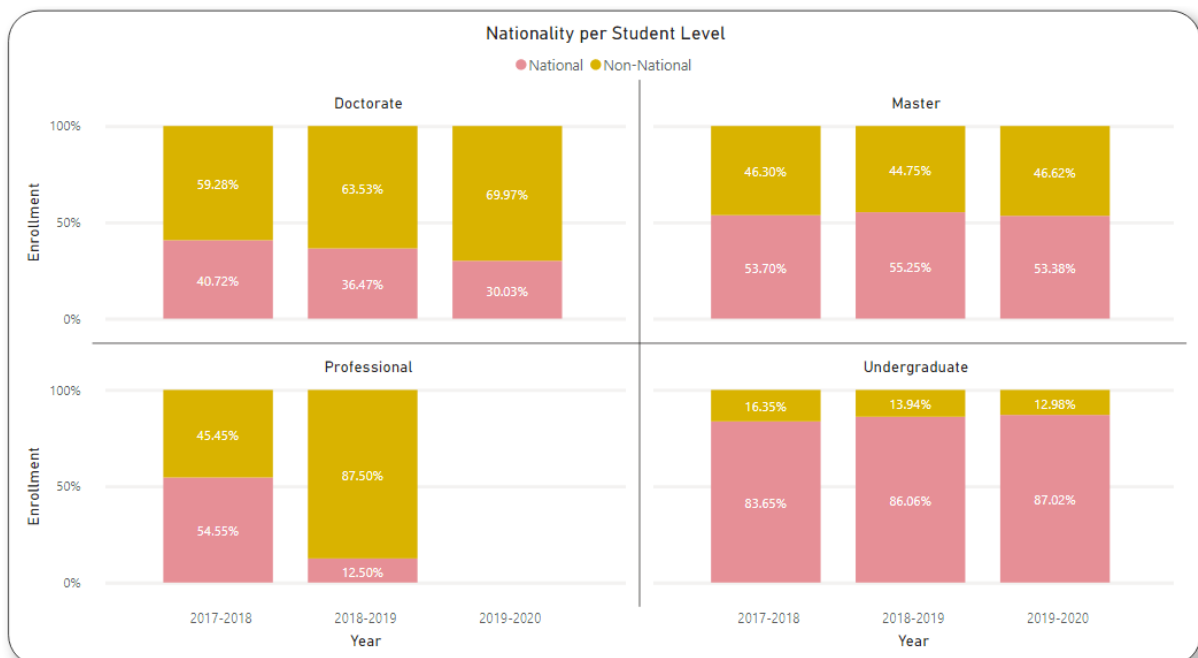


The top three colleges are humanities and social sciences, engineering, business, and economics. They contribute to 26.4%, 20.4%, and 13.7% respectively of the overall enrollment across the three years. There was no enrollment in the academic affairs college in the 2018 and 2019. We thought that majority of the students will start enrolling in medicine college during this pandemic, but this wasn't the case.

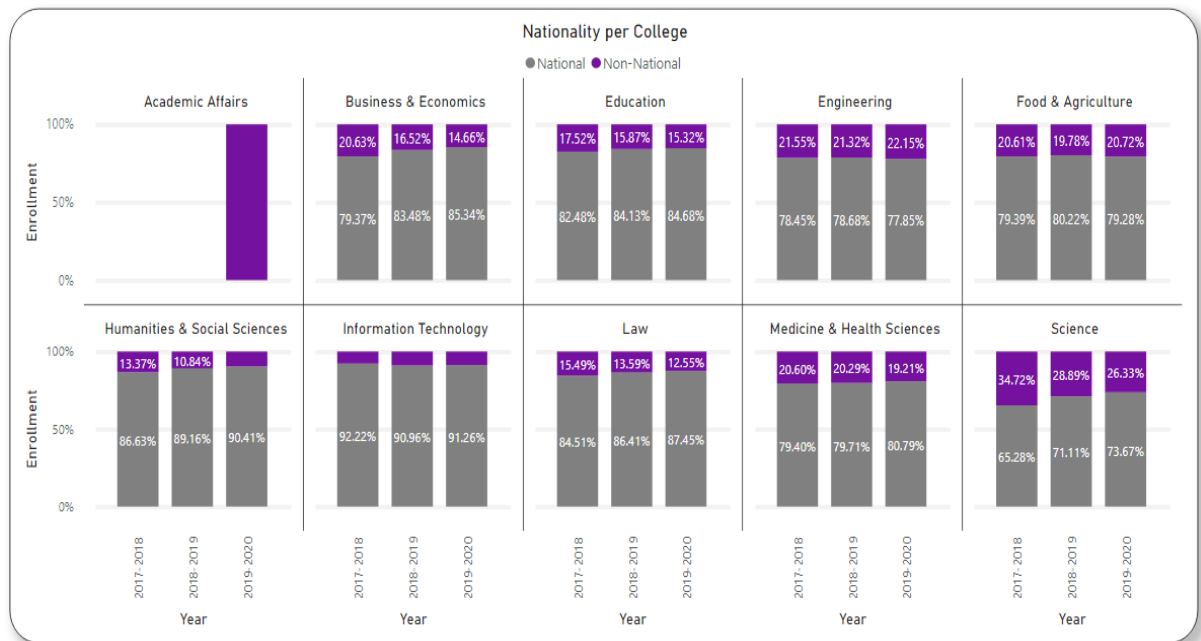


Advanced Analysis:

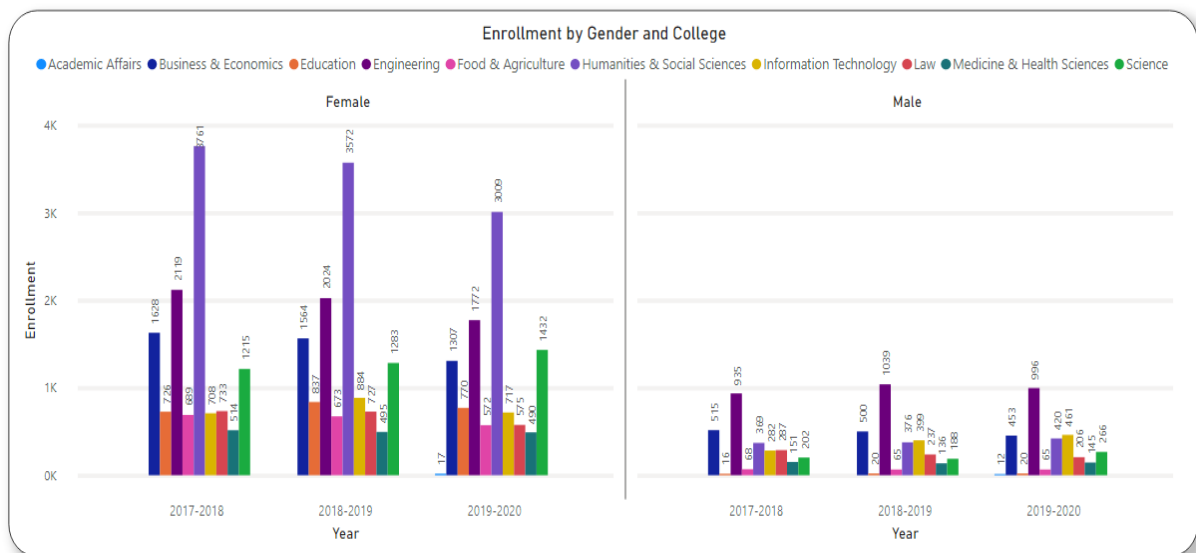
Most of the undergraduate and master students are locals, while most of the doctorate students are non-locals. Regarding the professional certificate, only 8 applied and one of them is local.



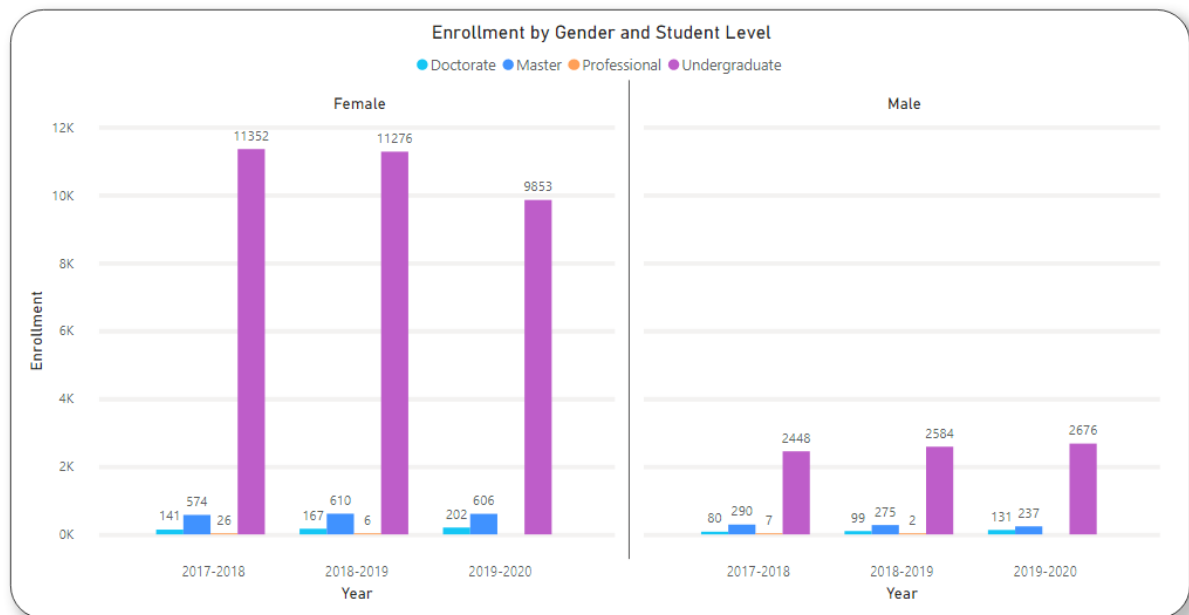
In all colleges, most of the students are locals, except for the academic affairs which suffers from low enrollment. Also, there are no significant changes across colleges, except for the science college where the enrollment of the non-locals has increased significantly in all three years. Even in colleges with low enrollment, most of the students applied are locals.



In the top three colleges, females are dominant. Even in the low enrollment colleges, at least 76% of the students are females.



In all three years, most of the undergraduate are females. Overall, males and females maintain almost the same distribution.



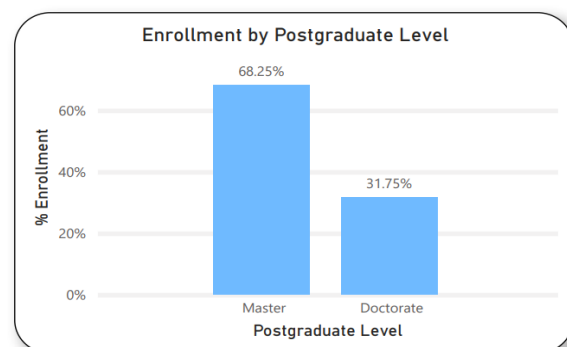
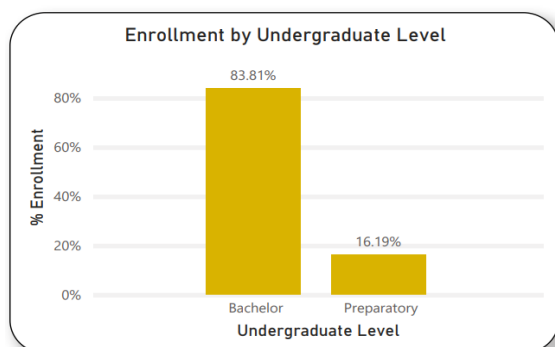
Analysis of Khalifa Data:

Before we analyze the data, there are some missing information and hence we can not build graphs that are like the ones in UAEU data. Another point to mention is that we only have data for fall 2019-2020. So, it is hard to compare UAEU and Khalifa data during the pandemic.

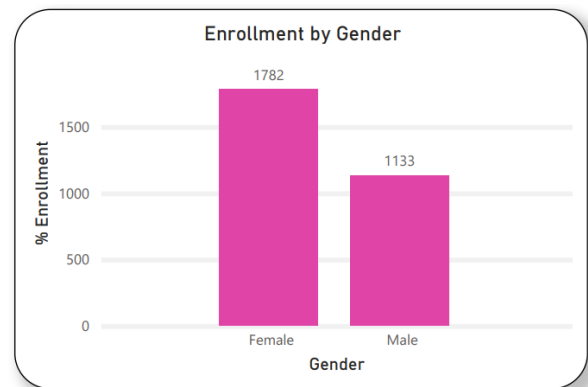
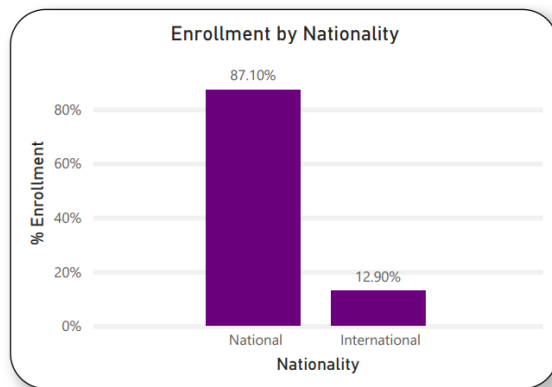
Anyway, we have analyzed the data to collect more information that can help the university to attract more students. For example, what the popular bachelor and master programs are, Does Khalifa attract females or males more often, and so on. Because of the missing data, we can define several hypotheses and build upon them our insights. Later, when we have enough data, we can either accept or reject those hypotheses. In our work, we didn't define any hypotheses and decided to use the available data.

Basic Analysis:

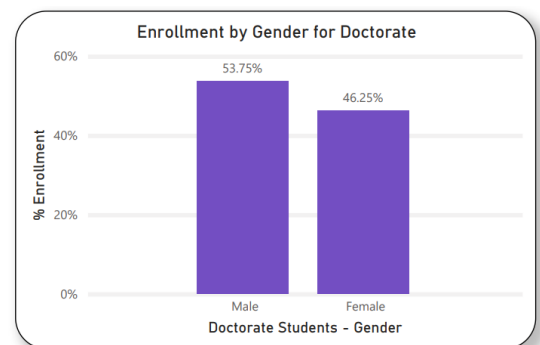
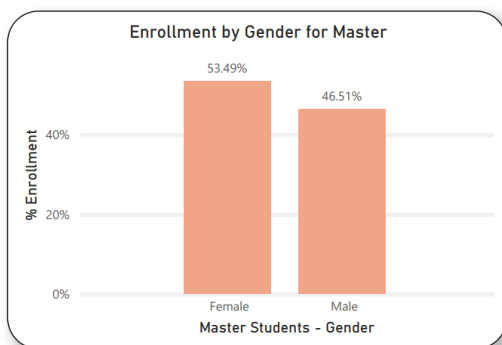
Clearly, bachelor and master program attract more students. This is due to the high reputation of the university and the wide range of programs it presents. Also, most of the students who enroll are already prepared in terms in basic courses and knowledge. Hence, they don't need to enroll in preparatory program.



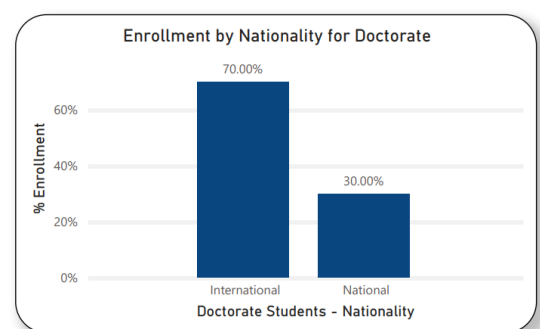
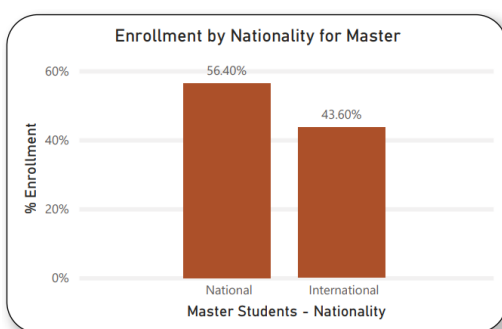
From the graphs, most of the university students are local and females. The reason for the low enrollment from non-local could be the either the high percentage to enroll or the tuition fees.



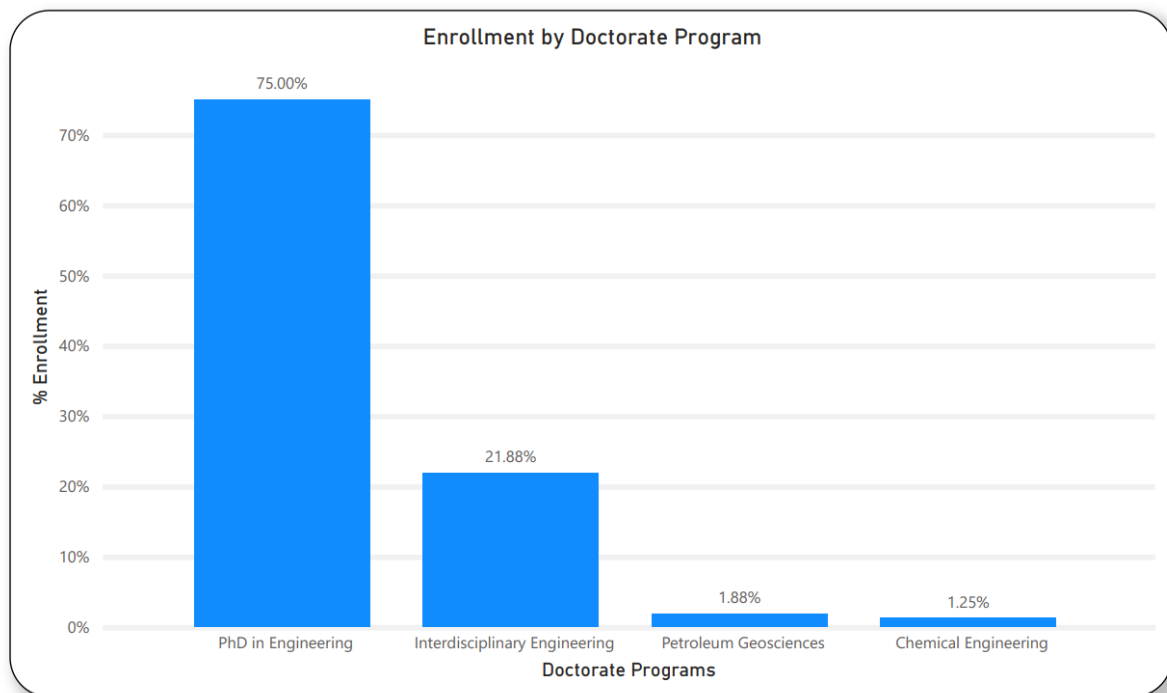
More than 50% of the master students are females, while half of the doctorate students are males.



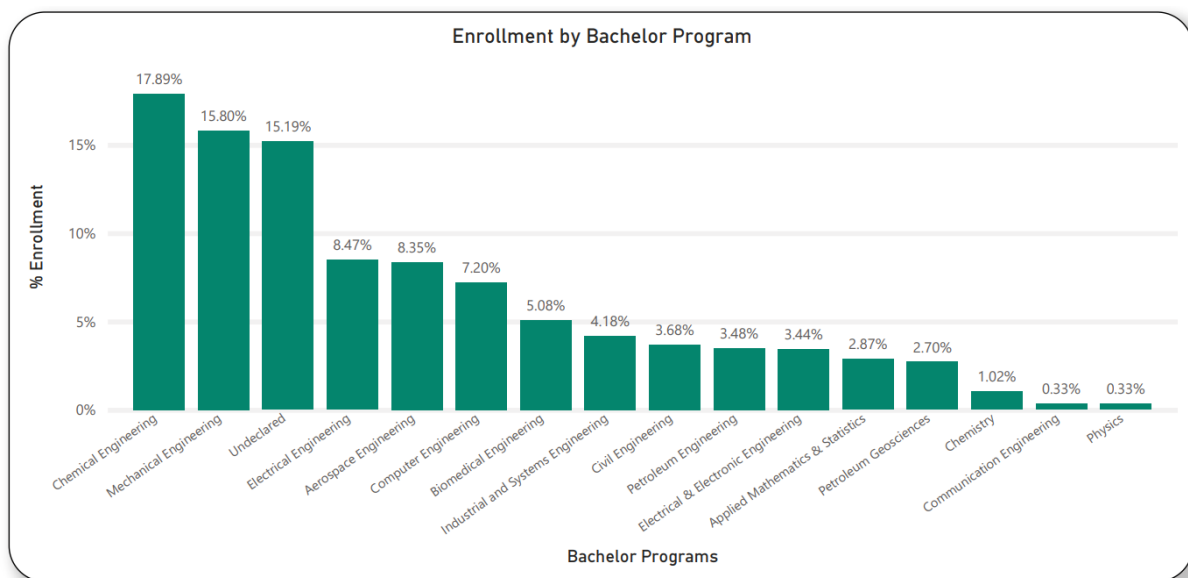
Given the below graphs, more than half of the master students are local. This can tell us that the enrolled locals are talented and of high academic achievements. On the other hand, doctorate programs attract international students more often. This could be due to the preference of the locals to study the PhD abroad.



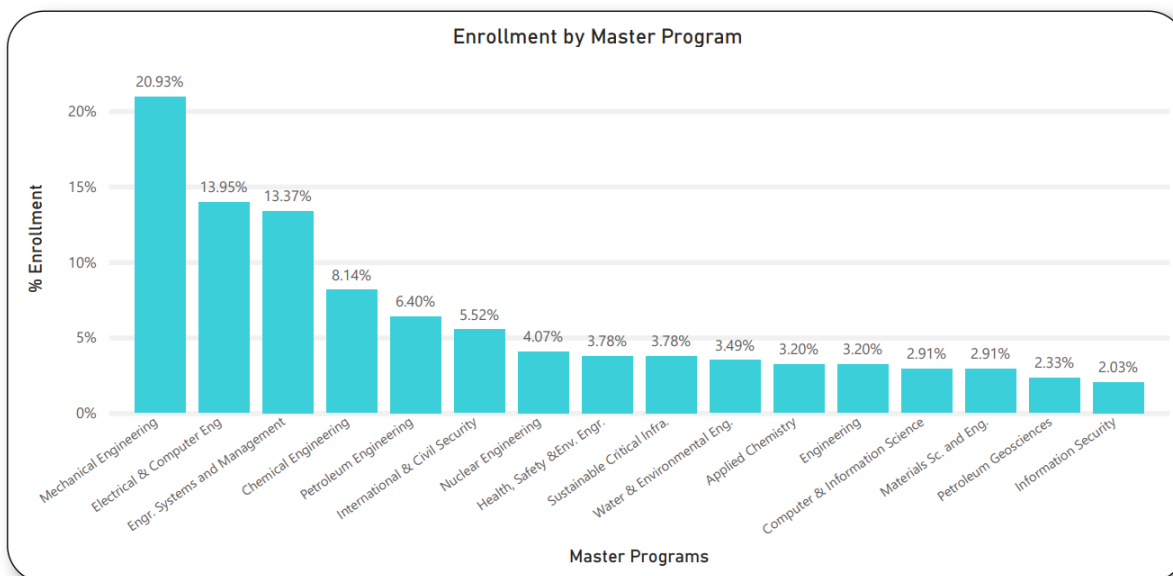
75% of the doctorate programs are in engineering. This is because of the rapid development of the country and its direction of making everything digital and smart.



About 29% of bachelor programs are in software and hardware engineering disciplines (electrical, aerospace, computer, and biomedical). There is not enough information about the nature of the undeclared programs. All in all, we can see the different majors in the bachelor program.

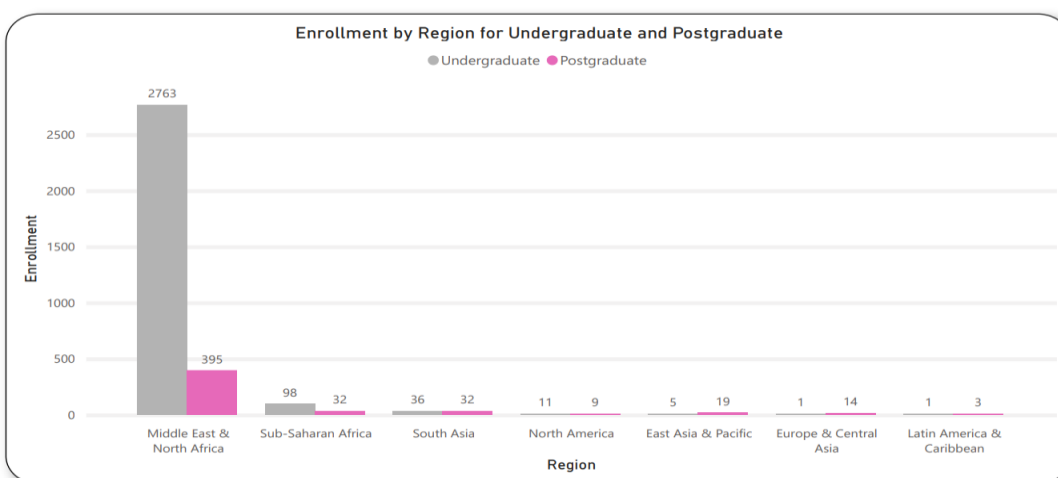


More than one-fifth of the master programs are in mechanical engineering. A point to mention is that the nuclear engineering is a new discipline. This could be the reason for its low enrollment.



About 92.4% of the students enrolled are from the MENA region. Also, Asia represents about 3.13% of the enrolled students. Those students could be locals who live outside or non-locals. We notice that 60% of the Asian students are graduates. MENA graduates represent around 78% of all graduate students.

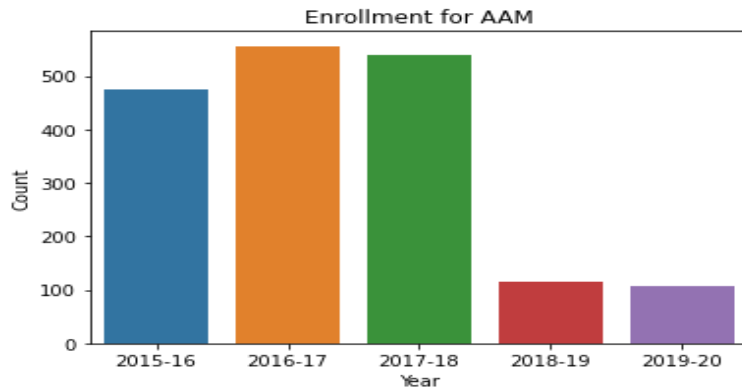
Region	Number of Students
MENA	3158
Sub-Saharan Africa	130
South Asia	68
North America	20
East Asia and Pacific	24
Europe and Central Asia	15
Latin America and Caribbean	4



Analysis of HCT Campus Data:

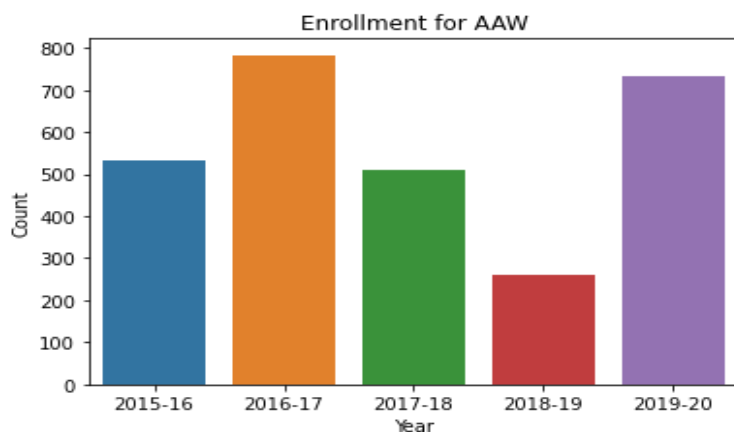
Basic Analysis:

- **AAM Campus:**



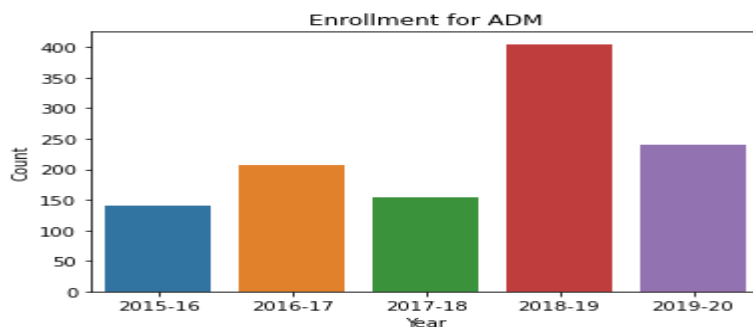
AAM had a very sharp decline in enrollment during Covid with a 79% decrease starting in the 2018-2019 academic year.

- **AAW Campus:**



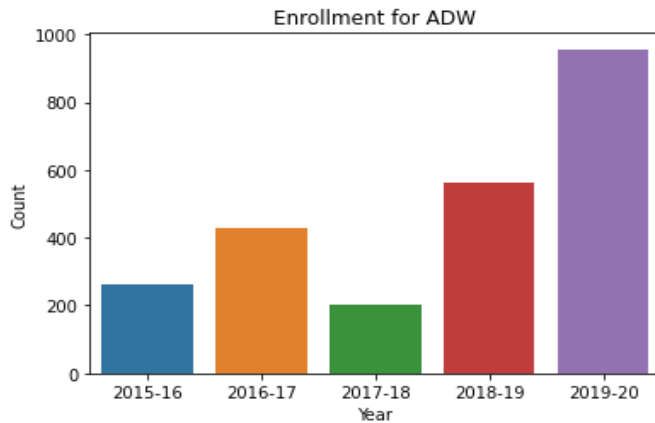
AAW had a 49% decrease in the 2018-19 year, but then more than doubled enrollment during 2019-2020.

- **ADM Campus:**



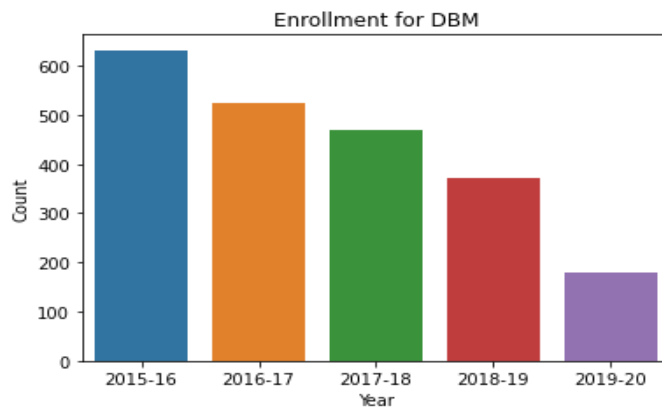
ADM had a 161% Increase during the 2018-19 year. Numbers went down the following year, but still higher than pre-pandemic numbers.

- **ADW Campus:**



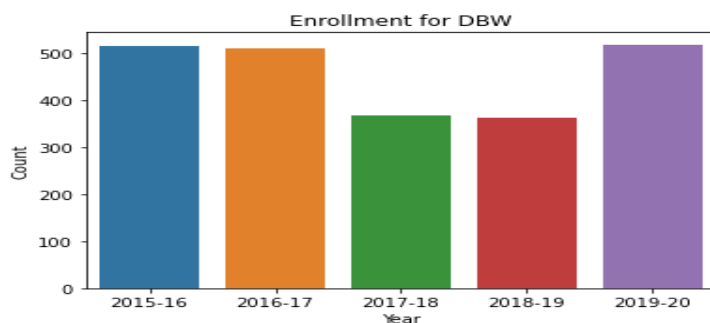
ADW saw a 177% increase during the 2018-19 year. Numbers nearly doubled again the following year.

- **DBM Campus:**



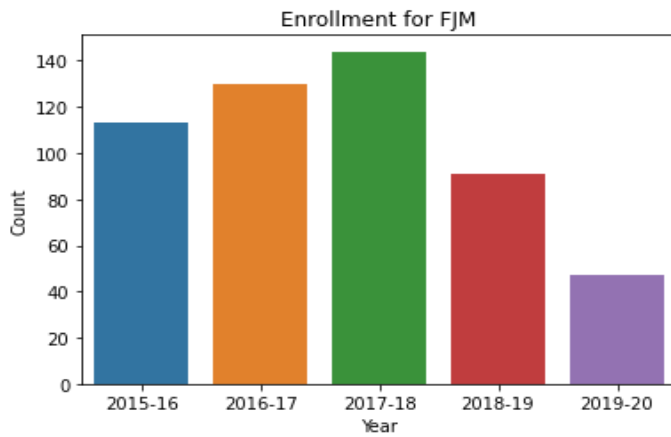
DBM saw a 21% decrease during the 2018-19 year. Numbers had been falling before the pandemic and then continued to fall afterwards with about half as many enrollments the following year.

- **DBW Campus:**



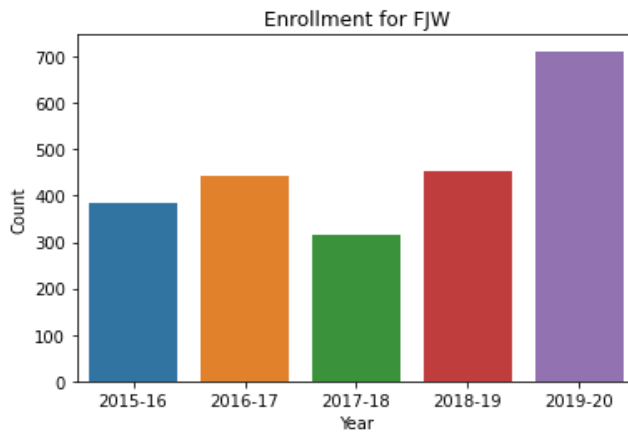
DBW has steady enrollment throughout the period of the database. There is only a 1.4% decrease from 2018-19 following another down year the year prior, and enrollment went back to normal levels the following year.

- **FJM Campus:**



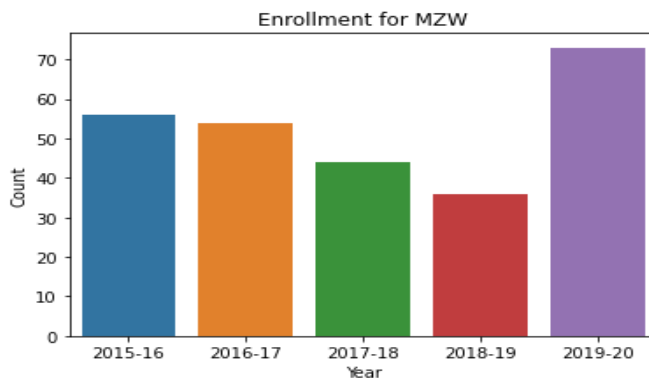
FJM saw a 37% decrease in during the 2018-19 year. Numbers fell to around half the following year.

- **FJW Campus:**



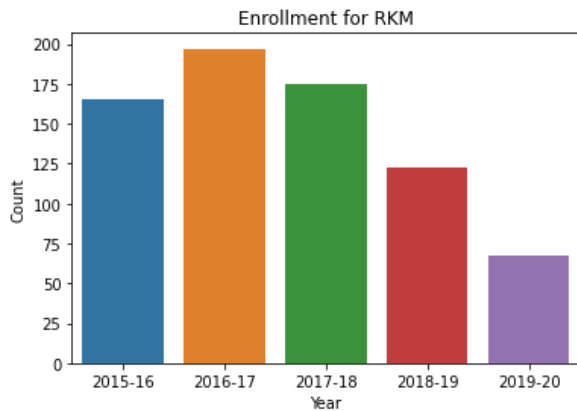
FJW saw a 44% increase during the 2018-19 year. Numbers increased by a similar margin the following year.

- **MZW Campus:**



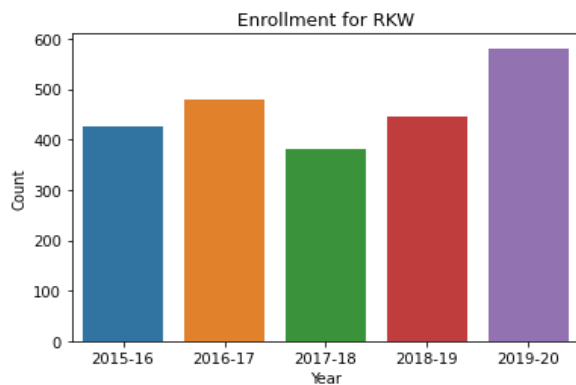
MZW saw a 18% decrease during the 2018-19 year. The following year had enrollment numbers higher than pre-pandemic numbers.

- **RKM Campus:**



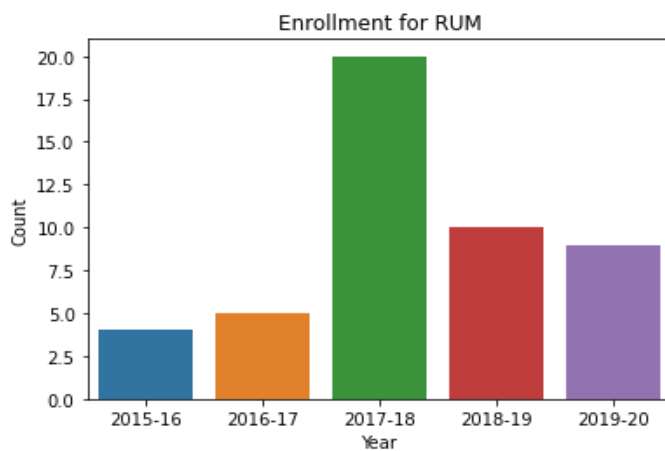
RKM saw a 30% decrease during the 2018-19 year. The following year had a similar decrease in enrollment.

- **RKW Campus:**



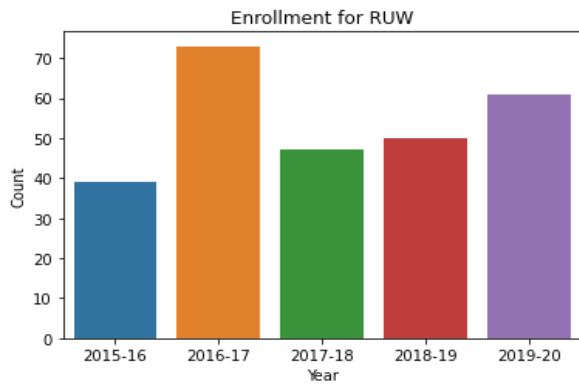
RKW saw a 17% increase in the 2018-19 year. The following year enrollment increased to the highest in the range of years.

- **RUM Campus:**



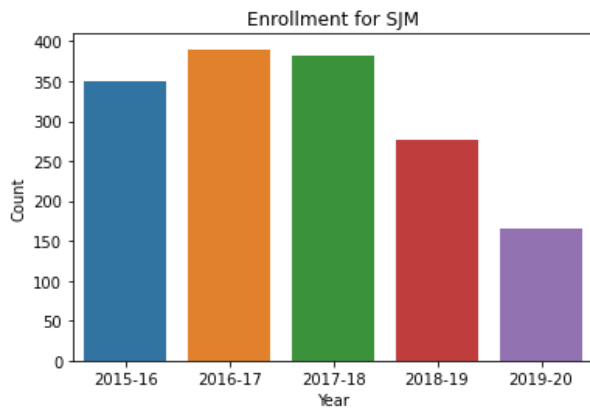
RUM is a small campus that saw a 50% decrease in the 2018-19 year which equates to 10 students. While this is a large percentage, it is still double the enrollment 2 years prior in 2016-17.

- **RUW Campus:**



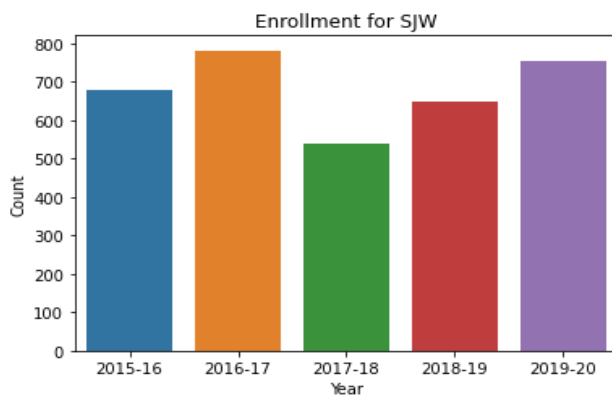
RUW saw a 6% increase in the 2018-19 year and an even larger increase the following year.

- **SJM Campus:**



SJM saw a 27% decrease in the 2018-19 year. This decrease was even larger the following year.

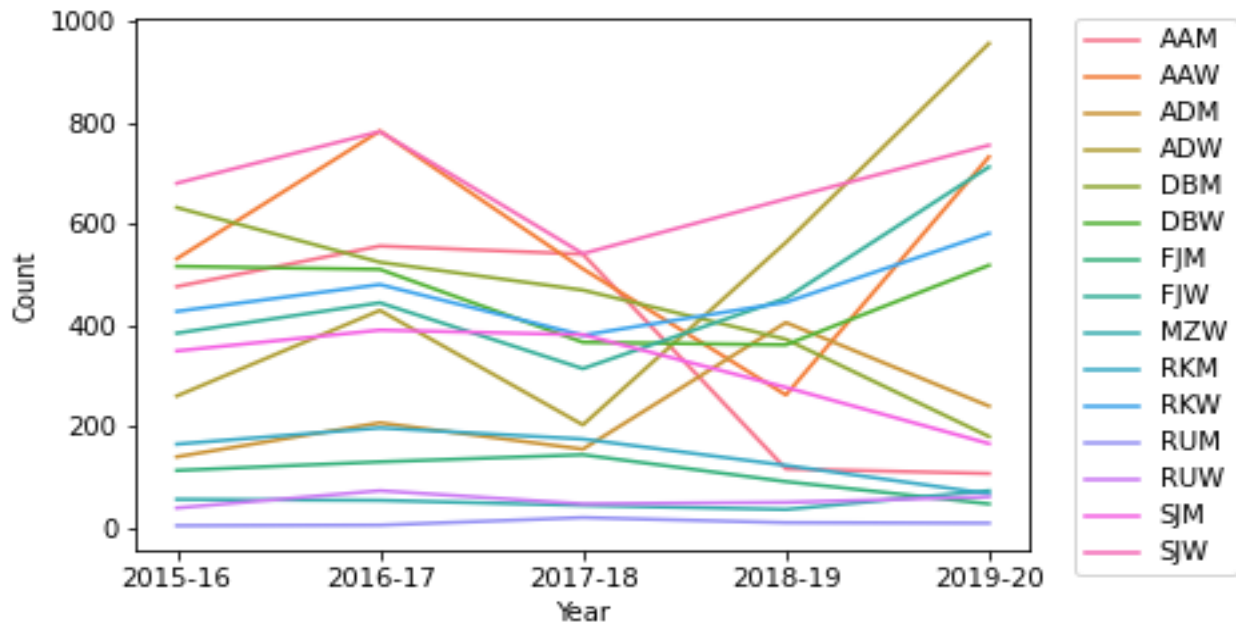
- **SJW Campus:**



SJW had a down year prior to the 2018-19 year. Their numbers increased 20% in 2018-19 and another increase the following year.

- **All Campuses:**

W stands for women campus and **M** stands for men campus. This graph of all the campuses shows that they all had different responses to the Covid outbreak and there was no uniform trend.



Advanced Analysis:

- **UAEU Enrollment Comparison:**

2018-19:

There was not a large change in enrollment overall for either HCT or UAEU.

- ◆ Enrollment for HCT **decreased** by 1.8%
- ◆ UAEU **increased** by only 0.7%

2019-20:

There is a large difference between the enrollment changes for HCT and UAEU in the 2019-20 year.

- ◆ Enrollment for HCT **increased** by 24%
- ◆ Enrollment for UAEU **decreased** by 9%