Program Assessment: In-Depth Data Visualization Report

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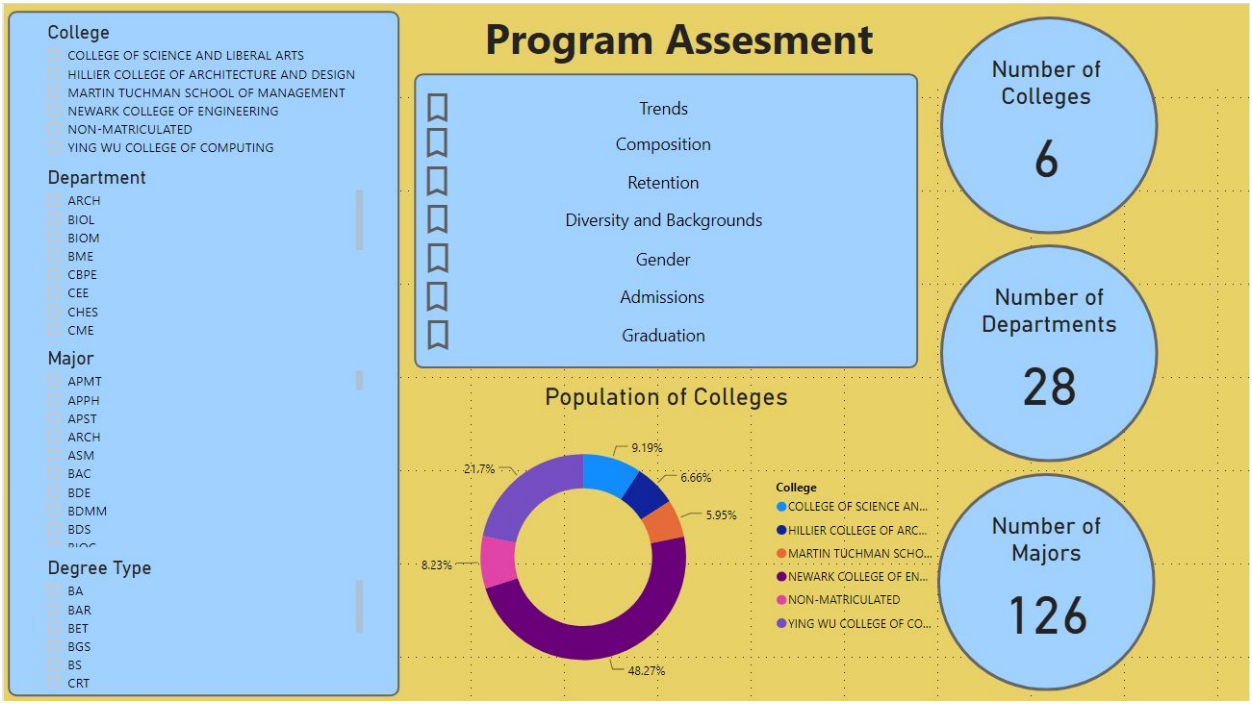
Report Description:

This report was created to easily be able to make conclusions and illustrate trends based on data stored about the student's success and background in particular schools, departments, programs, and degree types in NJIT's SQL database. It is a multi-page, interactive report that was created using PowerBI, containing over 25 charts. The report consists of sub-reports pertaining to trends, composition, retention, diversity, gender, admissions, and graduation. Each sub-report provides a specific look on how the program has evolved over past years and where it currently stands.

Through the use of PowerBI, the report was made interactive allowing for the end user to be able to answer specific questions such as "What are the average SAT scores of the females admitted into NJIT's undergraduate Biology program?" or "What is the average GPA of graduate students graduating with a Computer Science M.S. over the past 10 years?" The report allows for data to be visualized for not only specific programs, but also entire departments or schools.



Data Collection:

Data was collected from the RESSQLTS1.NJIT.EDU database from multiple different tables and turned into specific views. The tables and fields used are as follows:

```
[WORKDB].[dbo].[SURE_ENROLLMENTS]
     College, Department, Major, DegType, Term, SID, ftftu,
     regstat, student_level, GPA, Ethnicity

[WORKDB].[dbo].[DegreesAwardedFile]
     AY, SHRDGMR_MAJR_CODE_1, SHRDGMR_DEGC_CODE, SID, Term,
     SHRDGMR_DEGC_CODE,SHRDGMR_LEVL_CODE, Gender, GPA

[WORKDB].[dbo].[SURE Enrollment F2019 10D]
     SID, Major, DegType

[WORKDB].[dbo].[Admissions_2014]
        .[dbo].[Admissions_2015]
        .[dbo].[Admissions_2016]
        .[dbo].[Admissions_2017]
        .[dbo].[Admissions_2018]
     School, Dept, Major, Deg, Levl, AdmitDesc, SAT_M,
     SAT_V_Crit_Read, Gender, Ethnicity,
```

The look up tables used are as follows:

```
[WORKDB].[dbo].[lkp NJIT_Program_Codes]
[WORKDB].[dbo].[lkp Schools]
[WORKDB].[dbo].[lkp Gender_Code]
[WORKDB].[dbo].[lkp Application Status Code]
```

See Appendix A for SQL code used to collect data and generate views.

Views:

1. Program_Composition_View
   CAPTURES - basic data about each program for each term
   WITH THE FIELDS - College, Department, Major, Degree Type, Term, New, Total, Graduates, GPA
   USING - a list of terms, Sure_Enrollments, DegreesAwardedFile, lkp NJIT_Program_Codes, lkp Schools

2. Program_Retention_View
   CAPTURES - retention and continuation rates about each program for each cohort
   WITH THE FIELDS - College, Department, Major, Degree Type, Term, Initial_Enrollment, Fall_2015_Continue, Retained_2015, Fall_2016_Continue, Retained_2016, Fall_2017_Continue, Retained_2017, Fall_2018_Continue, Retained_2018, Fall_2019_Continue, Retained_2019
   USING - Sure_Enrollments, SURE Enrollment F2019 10D

3. Program_Gend_Ethn_View
   CAPTURES - gender and ethnicity of students in each program for each term
   WITH THE FIELDS - College, Department, Major, Degree Type, Ethnicity, Gender
   USING - Sure_Enrollments

4. Program_Admission_View
   CAPTURES - various data on applicants that were accepted to each program each year
   WITH THE FIELDS - Year, College, Department, Major, Degree Type, Level, Admission Description, SAT Math Score, SAT Reading Score, Ethnicity, Gender
   USING - Admissions_2014, Admissions_2015, Admissions_2016, Admissions_2017, Admissions_2018

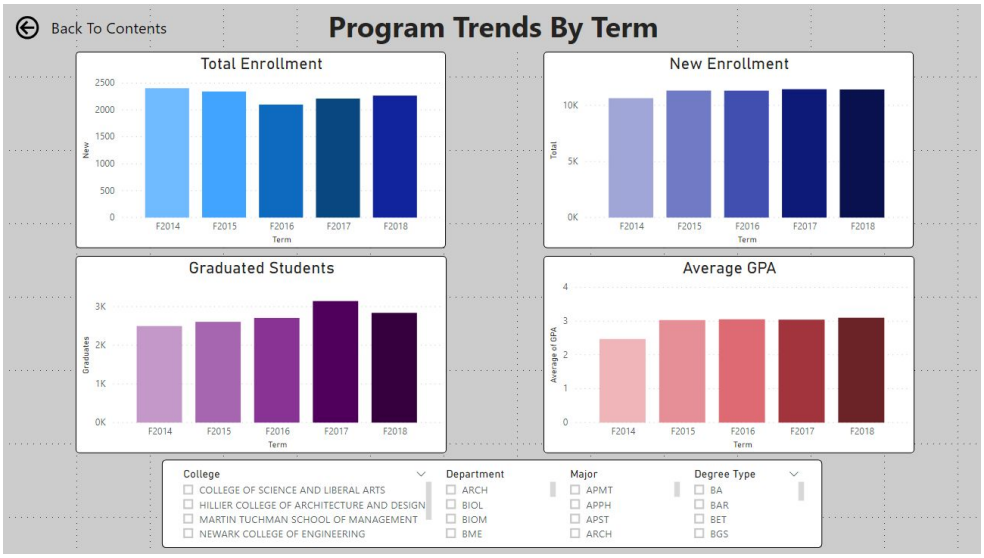
5. Program_Graduation_View
   CAPTURES - basic data on the graduating students in each program each year
   WITH THE FIELDS - Year, College Code, College, Dept Code, Major Code, Degree Code, Level, Gender, GPA
   USING - DegreesAwardedFile, lkp Schools

Sub-Reports:

Each report has a filter that can be used to narrow down college, department, major, and degree type.

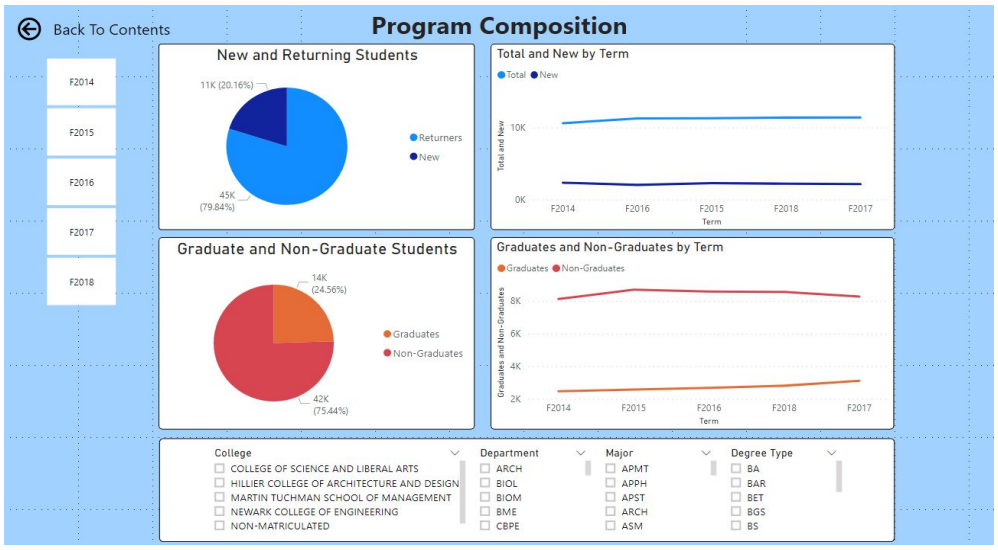
1. **Program Trends**: A report on trends pertaining to schools, department, major, and degree type. The report shows total and new enrollment trends for the last five semesters. It also reports data regarding average GPA and graduates per year. The data is grouped by each academic year and presented in the form of bar charts.

   View Used: Program_Composition_View



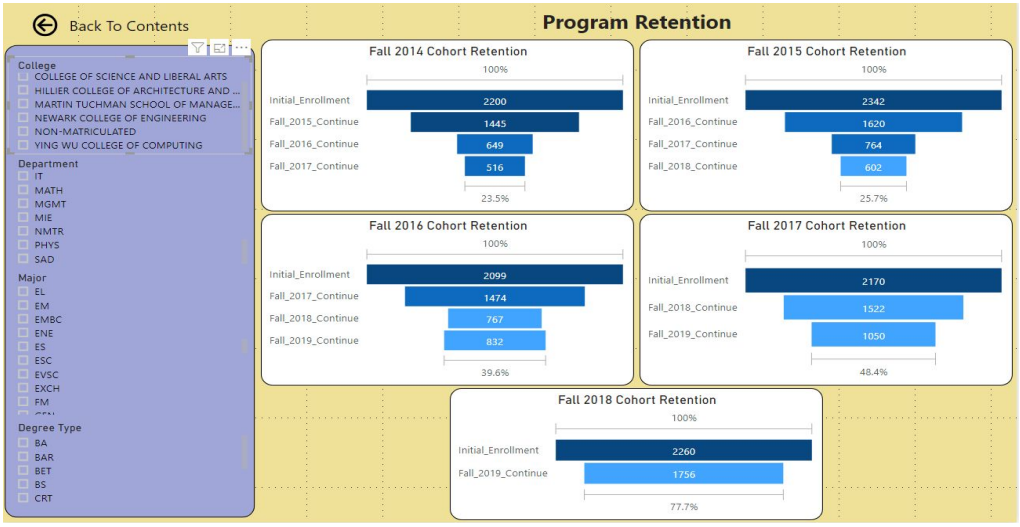
2. **Program Composition:** A report on the make-up of students contrasting new and returning students and also contrasting those who graduate during the year and who did not. There are two pie charts that can easily show the ratio of new to returning and graduating to non-graduating. By using the semester picker on the side, ratios from specific semesters can be chosen. There are also two line charts that plot the two contrasting values so that trends can easily be identified.

   View Used: Program_Composition_View



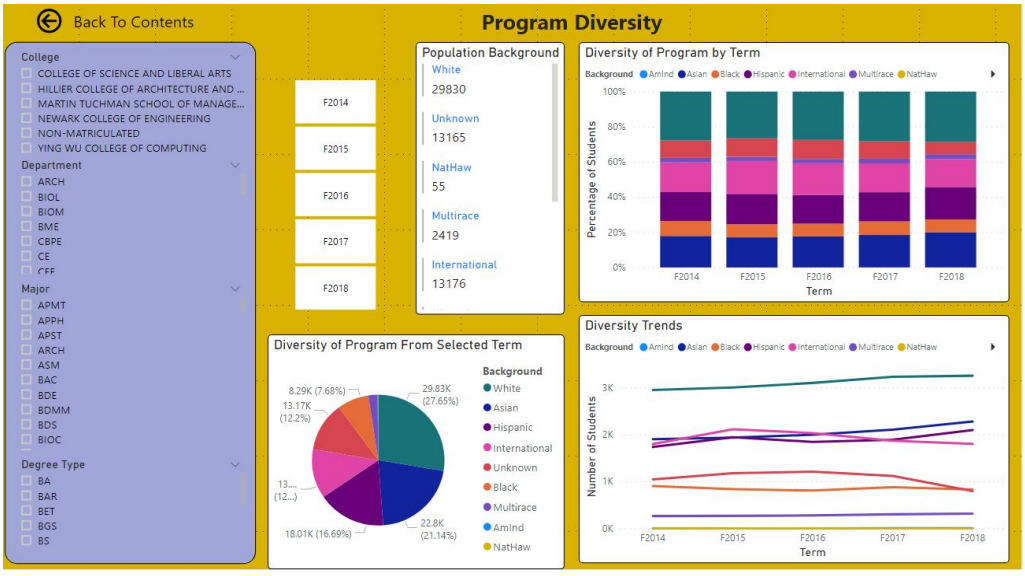
3. **Program Retention:** A report designed to show retention of cohorts since 2014 within specific programs, departments and colleges. The report is made of up 5 funnel charts, one for each cohort, that are used to represent the amount of students that continue each year. It is easy to spot retention trends and the four year retention rate. There may be instances where a cohort grows, this is possible if students switch into the program from another one.

   View Used: Program_Rentention_View



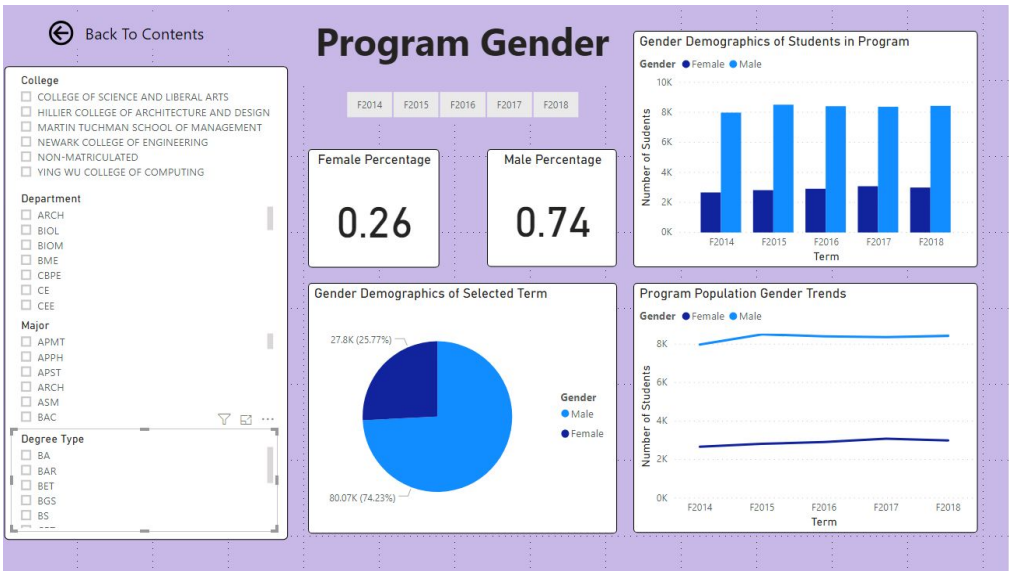
4. **Program Diversity:** A report that compares the background and diversity of programs, departments and schools. There is a percentage bar chart graph to show trends of student body diversity and a pie chart that can show a single instance/year. Using the term selector the pie chart can show specific years data. There is also a multi-lined chart that can be used to see the trends of specific backgrounds in student populations. Finally, there is a menu that can show exact numbers of certain backgrounds in the population.

   View Used: Program_Gend_Ethn_View



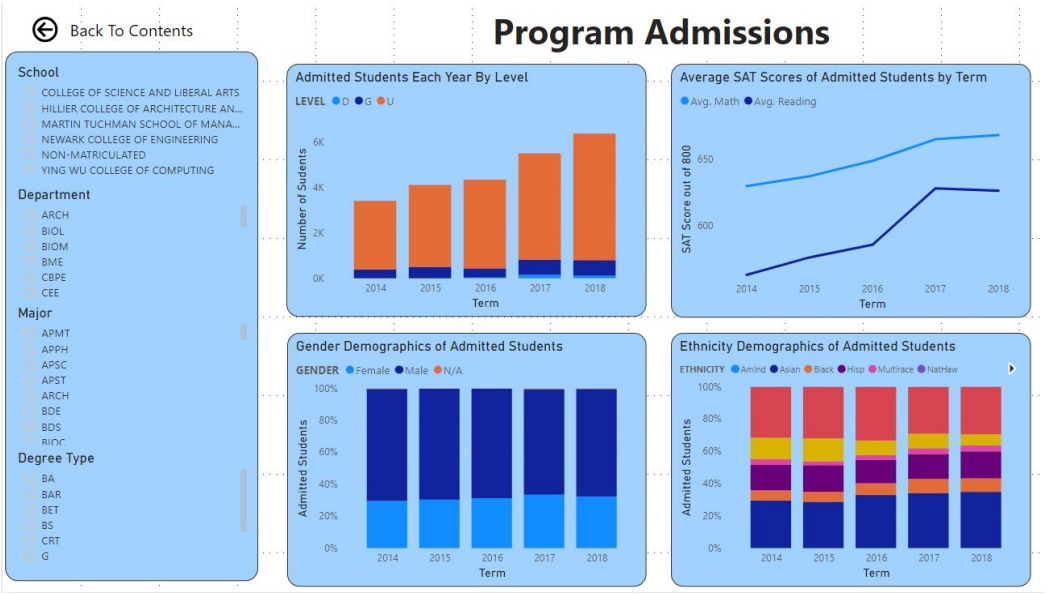
5. **Program Gender:** A report that compares the female and male population sizes in different programs. The exact ratio and a pie chart is used to show the percentage male/female based on the year selected by the term selector. There is also a multi-bar chart that compares the two populations and a line chart that does the same to easily identify trends over the past five years.

   View Used: Program_Gend_Ethn_View



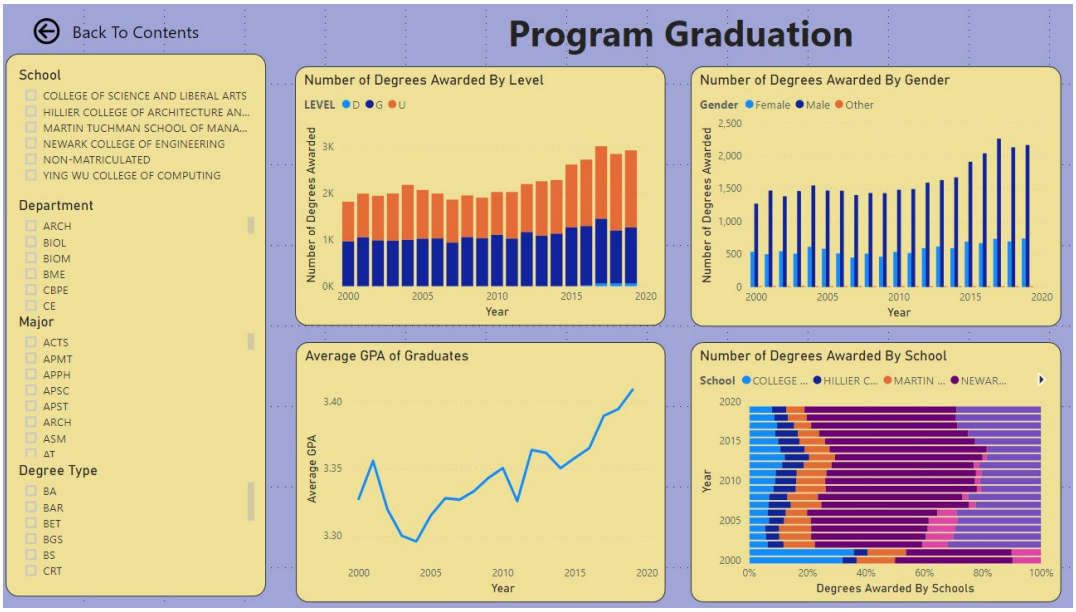
6. **Program Admissions:** A diverse report that takes the many factors into account to give an accurate picture of the trends of students admitted into a program, school, or department. There is a stacked column chart that shows the number of doctorate, graduate, and undergraduate students by term. There are two full stacked column charts to show the trends in the admissions of male/female and also race/ethnicity by term. Finally, there is a line chart that shows the trends of Avg. SAT Scores of admitted students, both Math and Reading. By clicking on the key of any chart, the end user can look at more detailed information like, the “Avg. SAT Math score of Females admitted” or “The trend of applications with Asian background being admitted into a graduate program”.

   View Used: Program_Admission_View



7. **Program Graduations:** A report made up of four charts that illustrate the trends of those who graduate from a program, school, or department. There is a stacked column chart that shows the number of doctorate, graduate and undergraduate program graduates by term. There is a horizontally oriented bar graph that shows the degree awarded by school over the last twenty years. Note the shift after 2002, this is when the Ying Wu College of Computing was founded. There is a line graph that plots the trend of average GPA over the last twenty years and finally there is a multi bar graph that illustrates the ratio of male to females earning a degree each year.

   View Used: Program_Graduation_View



Updating The Report:

This report should be updates close to the start of the new year, every year. (January 1st)

Updating the report is not difficult and only requires basic knowledge of SQL. Read through the Appendix A script that is used to create the data views that generate the charts in the report. Throughout the SQL code there will be comments that start with the word ‘UPDATE’. Follow the directions to update the script and then execute it. This can be done in Microsoft SQL Server Management Studio.

After the views are updated simply refresh the report through PowerBI and the new data should be present in the report. If there are any issues contact Madison Miatke, student researcher, mdm56@njit.edu or another employee in NJIT’s Office of Institutional Effectiveness.