

## Overview of Project

The project involves analysing university rankings from different systems, assessing the impact of ranking criteria on university positions, and analysing changes in university metrics over time. This analysis has been done using SQL and Excel for data aggregation and exploratory data analysis (EDA). Additionally, a Power BI dashboard has been created to provide a comprehensive view of university rankings. The project involves the following:

- Comparing university rankings across different ranking systems.
- Assessing the impact of ranking criteria on university positions.
- Analysing changes in university metrics (such as student-to-staff ratio) over time.
- Aggregating and transforming data using SQL and Excel for analysis.
- Conducting exploratory data analysis (EDA) to gain insights from the dataset.
- Creating a Power BI dashboard to visualize and present the findings in a comprehensive manner.

The analysis of this dataset provides valuable insights into how different ranking systems evaluate universities, the factors influencing their rankings, and how universities' metrics change over time. This project aims to offer a deeper understanding of university rankings, helping stakeholders in academia, policy, and make informed decisions and assess the performance of universities over time.

The final deliverables for this project would include:

- SQL and Excel scripts for data aggregation and analysis.
- Visualizations and findings from the EDA.
- A Power BI dashboard for a comprehensive view of university rankings and associated data.

## **Objective**

1. **Compare University Rankings:** The primary objective is to compare university rankings across different systems (Times Higher Education, Shanghai Ranking, Centre for World University Rankings) to identify variations and commonalities in how universities are assessed globally.
2. **Assess Ranking Criteria Impact:** Evaluate the impact of ranking criteria on university positions. Determine which criteria have the most significant influence on a university's ranking and identify any patterns across different ranking systems.
3. **Analyse Changes Over Time:** Analyse changes in university metrics over time, such as student-to-staff ratios and other university-specific data. Identify trends, improvements, or declines in university performance.
4. **Data Aggregation:** Utilize SQL and Excel for data aggregation, cleaning, and transformation to prepare the dataset for analysis. This objective aims to ensure that the data is in a suitable format for further exploration.
5. **Exploratory Data Analysis (EDA):** Conduct EDA to uncover insights, trends, and patterns within the dataset. This includes visualizations, summary statistics, and other exploratory techniques to better understand the data.
6. **Create a Power BI Dashboard:** Develop a Power BI dashboard that provides a comprehensive view of university rankings and related data. The dashboard should be interactive and user-friendly, enabling stakeholders to explore the data and findings easily.
7. **Inform Stakeholders:** The project aims to provide valuable information to stakeholders in academia, policy, and higher education. The objective is to offer insights that can inform decisions related to university management, policy development, and global education strategy.
8. **Identify Global Higher Education Trends:** Through the analysis, the project seeks to identify trends and changes in the global higher education landscape, helping stakeholders adapt to evolving educational standards and practices.
9. **Enhance Transparency:** By comparing ranking systems and criteria, the project aims to enhance transparency in the university ranking process. This can assist universities in understanding how they can improve their rankings and make data-driven decisions.
10. **Contribute to Research and Knowledge:** The project also aims to contribute to the broader knowledge of university rankings, criteria, and trends by generating insights that can be valuable for further research in the field of higher education.

These objectives collectively aim to provide a comprehensive understanding of university rankings, their underlying criteria, and the evolving landscape of higher education over time.

## **Significance**

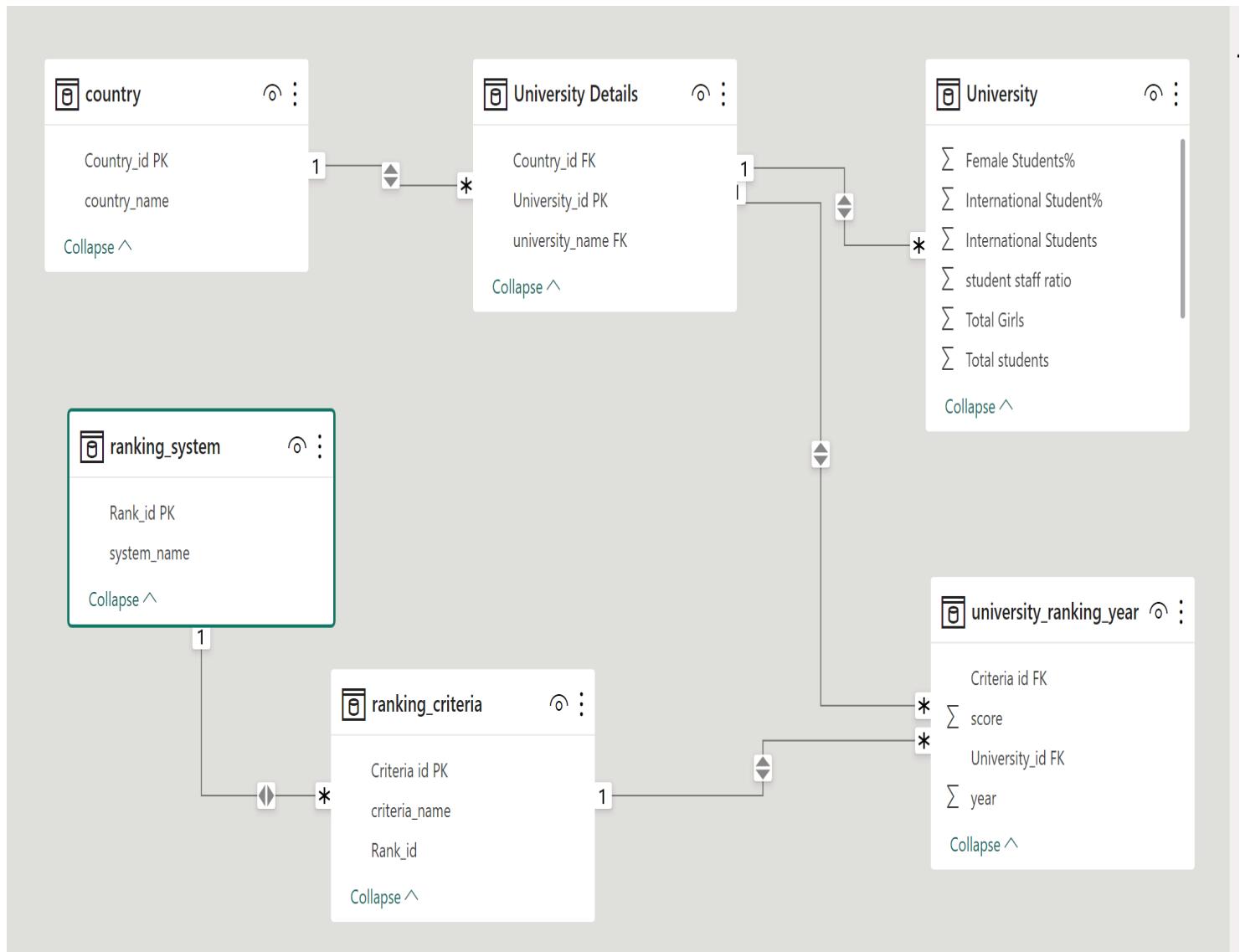
The significance of this project lies in its potential to provide valuable insights and benefits to various stakeholders in the field of higher education, research, and policy-making:

- **Enhanced Transparency in University Rankings:** By comparing rankings across different systems and assessing the impact of criteria, the project can enhance the transparency of university rankings. This transparency is crucial for universities and policymakers to understand how institutions are evaluated and to identify areas for improvement.
- **Informed Decision-Making:** The project's findings can inform universities' strategic decisions. Universities can use the insights to understand which criteria are most important for their rankings and focus on areas that can lead to improvements.
- **Policy Development:** Policymakers in the field of education can benefit from the project by gaining a better understanding of the factors influencing university rankings. This knowledge can inform the development of policies that promote the quality of higher education.
- **Student Decision-Making:** Prospective students and their families often consider university rankings when making educational choices. The project can help students make informed decisions about their academic futures.
- **Awareness of Higher Education Trends:** By analysing changes in university metrics over time, the project can identify trends in higher education. This awareness is essential for adapting to evolving educational standards and practices.
- **Accountability and Quality Assurance:** The project can help hold universities accountable for the quality of education they provide. It encourages universities to focus on criteria that reflect educational excellence and innovation.
- **Global Competitiveness:** Countries and institutions can use the project's insights to enhance their global competitiveness in the higher education sector, attracting students, faculty, and funding from around the world.

In summary, the project's significance lies in its potential to drive positive change, foster transparency, and provide valuable information to a wide range of stakeholders in the field of higher education. It can contribute to the improvement of universities and the development of education policies that benefit both institutions and students.

## ER Diagram

This ER diagram helps visualize how the dataset's entities are related to each other. It provides a structured view of the dataset's structure and how data flows between different components, which is essential for understanding and working with the dataset effectively.



# Data Dictionary

## **Country Table:**

The "Country" table comprises a list of countries represented in the dataset. Each country is uniquely identified by a "country\_id" field. This table serves as a reference to associate universities with their respective countries. It forms a foundational component for understanding the geographical distribution of universities in the dataset.

## **University Table:**

The "University" table contains a comprehensive list of universities. Each university is linked to a specific country through a relationship established with the "Country" table using the "country\_id" field. This table helps establish the connection between universities and their respective countries and provides essential information about the universities themselves.

## **Ranking System Table:**

The "Ranking System" table is responsible for storing information about the various ranking systems used to evaluate universities. It defines and distinguishes different systems utilized for ranking. It allows for categorization and differentiation among ranking methodologies.

## **Ranking Criteria Table:**

In the "Ranking Criteria" table, a comprehensive list of criteria used in university rankings is recorded. These criteria are linked to specific ranking systems through the "ranking\_system\_id" field. This table plays a crucial role in understanding the factors considered when assigning rankings to universities.

## **University Year Table:**

The "University Year" table holds valuable information related to universities over multiple years. It includes data on metrics such as the number of students, the population of female students, the population of international students, and the student-to-staff ratio. This table is linked to universities using the "University\_id" field, allowing for the tracking of university-specific data trends over time.

## **University Ranking Year Table:**

The "University Ranking Year" table is the largest table in the dataset and forms the core of ranking-related data. It establishes connections between ranking criteria, universities,

*scores, and the respective year of ranking. This table helps in understanding how universities are evaluated and ranked within different ranking systems over time. The "ranking\_criteria\_id" links the criteria to universities, enabling the analysis of criteria-specific impacts on university rankings.*

The relationships between these tables are crucial for aggregating, organizing, and analysing data effectively. They provide the necessary structure to explore university rankings, assess criteria impact, and perform time-based analyses. This comprehensive dataset empowers researchers and analysts to gain insights into the dynamics of university rankings and higher education metrics.

## Steps to Connect to Data:

### **Creating a GitHub Account:**

- Go to the GitHub website (<https://github.com/>).
- Click on "Sign up" to create a GitHub account.
- Provide your username, email address, and a strong password.
- Complete the registration process, and you'll have your GitHub account ready.

### **Data Connection in Power BI:**

#### a) To connect a CSV file to Power BI:

- Open Power BI Desktop.
- Click on "Get Data" from the Home tab.
- Select "Text/CSV" if your data is in a CSV file.
- Browse to the location of your downloaded CSV file and click "Open."
- In the Power Query Editor, you can perform transformations and data cleaning as needed before loading the data into Power BI.

#### b) To connect a database with Power BI:

- Click on "Get Data" from the Home tab.
- Choose the appropriate database source (e.g. MySQL).
- Provide the connection details, such as server name, database name, and authentication method.
- Follow the prompts to select tables and configure data import options.
- Perform data transformations if required using Power Query.

### **Data Connection in Excel:**

- Open Excel and choose new workbook.
- Go to "Data" tab and select "Get Data"
- In the drop down list choose "From csv/Text"
- Select your csv file and click on "import" or "wizard"
- Click on "Load" or "okay" to import the data from csv to Excel

### **Data Connection in MySQL:**

- Open MySQL Workbench.
- Choose "Import Wizard" option after clicking on your chosen database.
- Configure Target and schema.
- Click on "Start Import".

## Is there a correlation between number of universities and a country's GDP?

In our existing dataset, we unfortunately lack information about a country's GDP, preventing us from drawing any direct conclusions regarding the relationship between a nation's economic performance and the number of universities. In order to conduct a more comprehensive analysis, it is imperative to integrate GDP data into our dataset, which will enable us to perform further examinations.

Nevertheless, outside of our current dataset, I have come across numerous credible sources(i.e article by WORLD ECONOMIC FORUM) that have consistently suggested a correlation between a country's GDP and the quantity of universities within that nation. These external sources provide substantial evidence to support the notion that the economic prosperity of a country is often intertwined with its investment in higher education and the presence of a well-developed academic infrastructure. Hence, while our dataset may require an update, the overarching concept of this relationship remains a subject of considerable interest and research within the academic and economic communities.

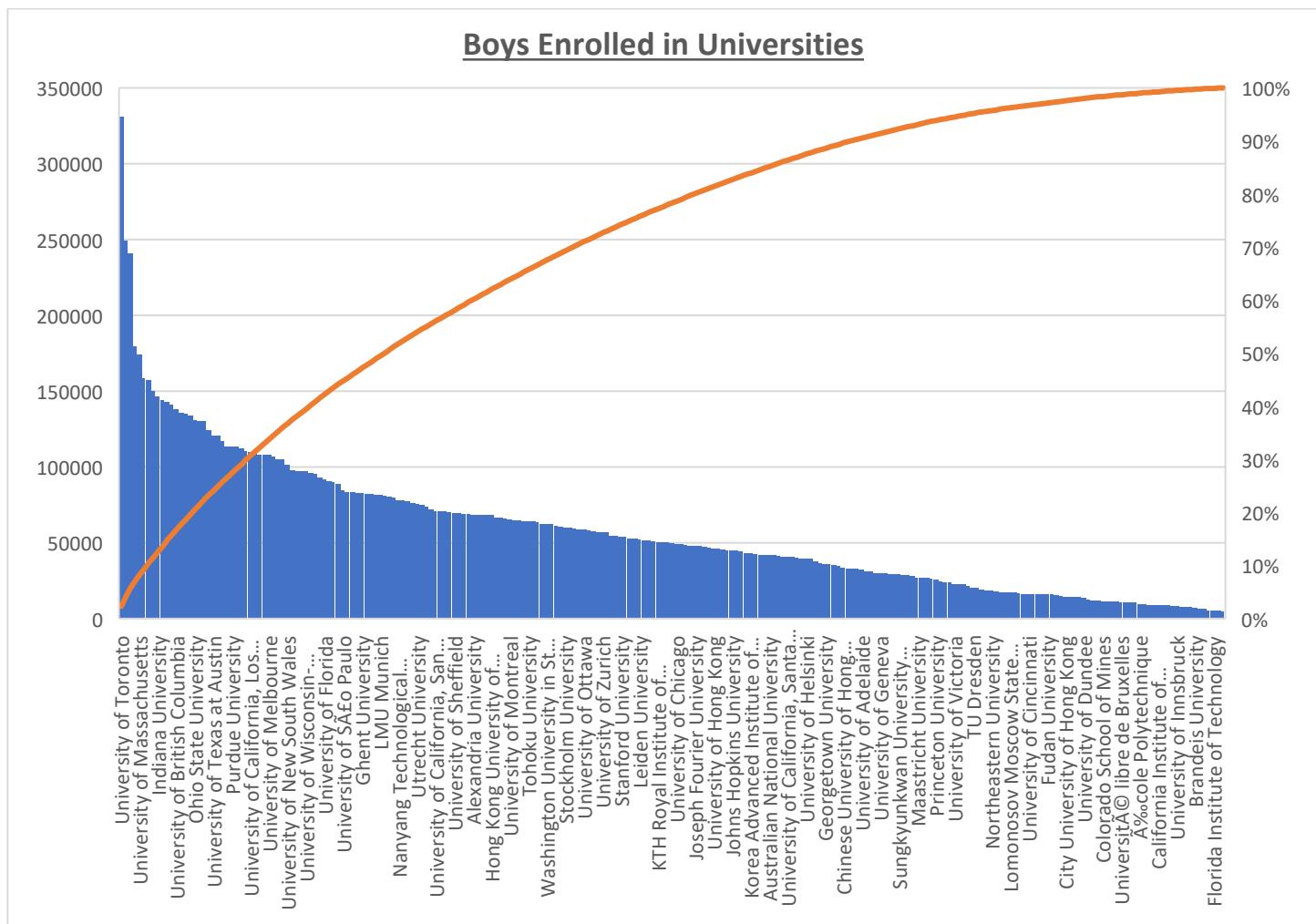
<https://www.weforum.org/agenda/2016/08/theres-a-link-between-the-number-of-universities-in-a-country-and-economic-growth/>

*We don't have the data to answer this question, so I will be showing another analysis.*

## **How does the number of male students differ across universities?**

It's evident that the University of Toronto has the highest number of male students, closely followed by the University of Massachusetts. Additionally, a notable observation is that the majority of male students across different universities originate from the North American continent. The choice of a Pareto graph as the visualization method is driven by the extensive number of universities in the dataset, as it effectively conveys the distribution of male students across these institutions, ensuring a clear representation of the data.

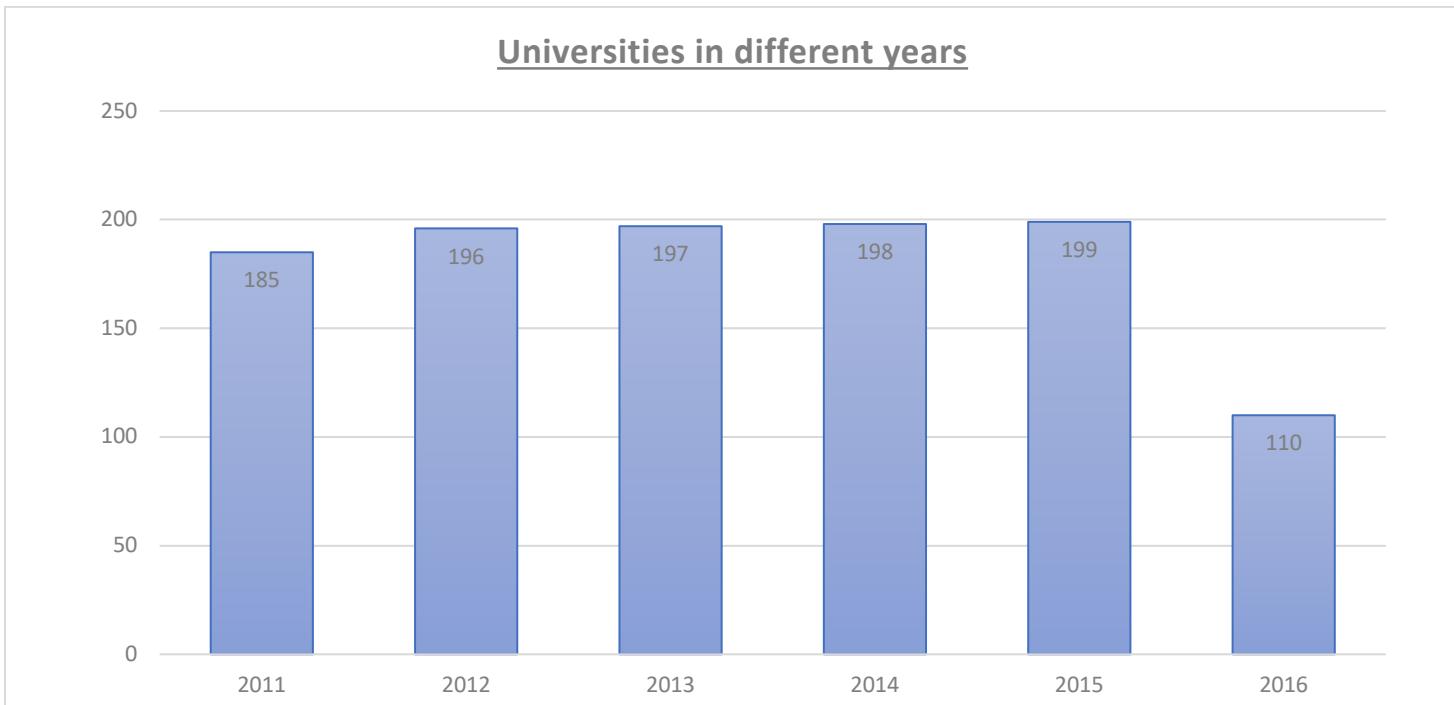
I opted for the Pareto graph due to its effectiveness in pinpointing and giving priority to the most critical factors or categories. In this context, it serves the purpose of emphasizing universities with the highest male student populations, streamlining the focus on essential information. The graphical presentation of a Pareto graph provides a high degree of visual clarity, with bars organized in descending order of magnitude. This structure simplifies the identification of universities with the most substantial male student enrolment and their relative importance.



## **How has the number of universities changed over the years in each country?**

The trend from 2011 to 2015 shows a steady increase in the number of universities. However, there is a notable drop in the count of universities in 2016, which may be attributed to economic recession. During such economic downturns, there is a possibility of reduced enrolment in higher education institutions, potentially leading to a decline in the number of universities established or sustained during that period. This observation highlights the potential impact of economic factors on the educational landscape, necessitating further investigation into the causes and consequences of this decline.

| Year | Number of Universities |
|------|------------------------|
| 2011 | 185                    |
| 2012 | 196                    |
| 2013 | 197                    |
| 2014 | 198                    |
| 2015 | 199                    |
| 2016 | 110                    |



## **Is there a relationship between number of universities and a country's population?**

Evaluating the relationship between the number of universities and a country's population is a crucial undertaking in data analysis with far-reaching implications. This analysis underpins informed decision-making and resource allocation, guiding policymakers in the strategic investment of resources to meet the educational needs of the population. It also serves as a compass for assessing the accessibility and inclusivity of higher education, ensuring that educational opportunities are available to all segments of the population. Moreover, the quality of education is inextricably linked to this relationship, as an imbalance could potentially dilute resources and standards, impacting the overall educational experience. The global competitiveness of a nation's higher education system is influenced by this balance, shaping its ability to attract international talent and participate in the global academic arena. Beyond these considerations, economic development, innovation, and demographic trends are all closely tied to the dynamic interplay between the number of universities and a country's population. In essence, this analysis is a linchpin for policymakers and stakeholders, guiding policies, fostering equity, and shaping the educational landscape in response to the evolving needs of the population.

Unfortunately, our existing dataset lacks information about the population of each country, which limits our capacity to draw immediate conclusions about the relationship between a country's population and the number of universities. To conduct a more comprehensive analysis, it's crucial to integrate population data into our dataset, enabling us to carry out more extensive research on this matter.

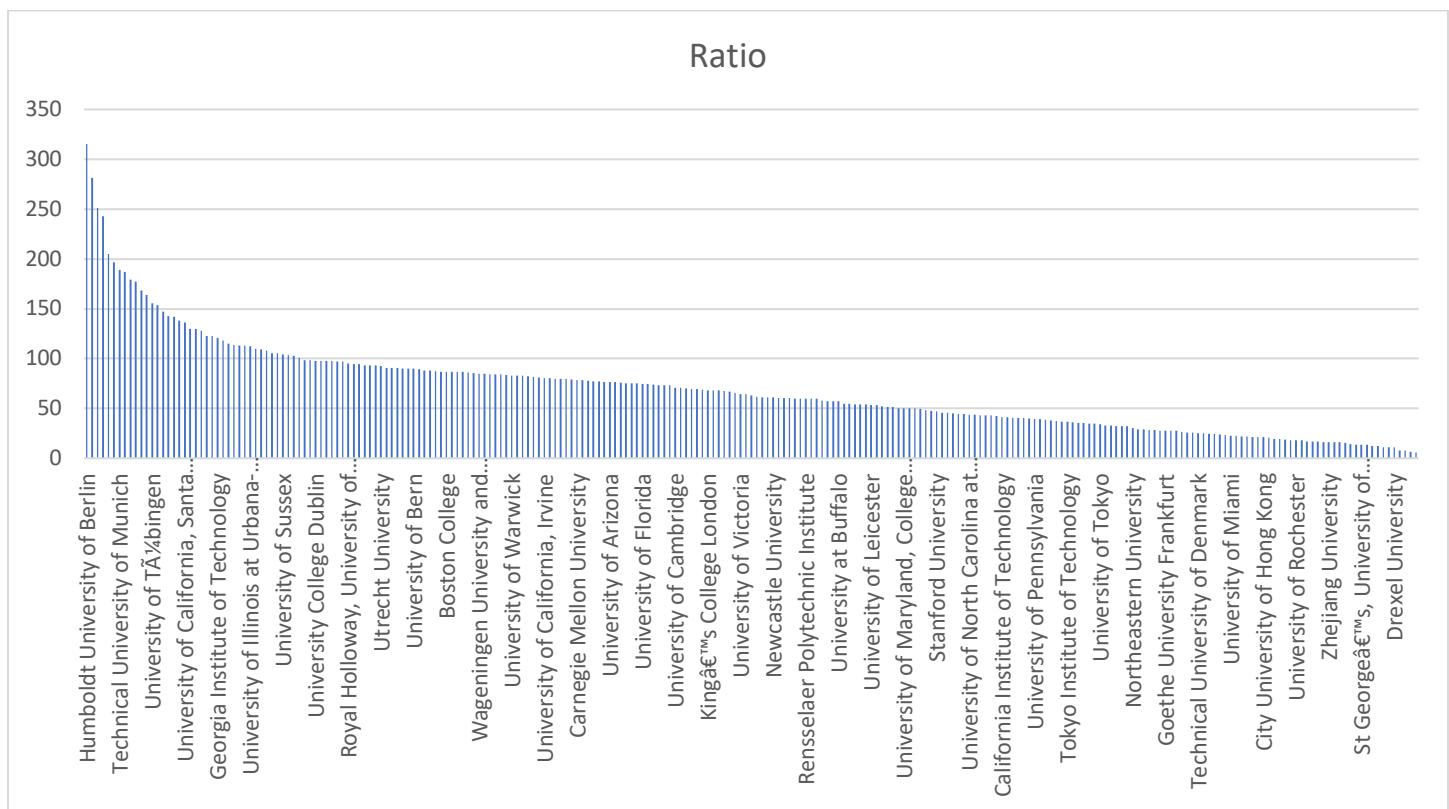
*Instead, I will try finding another insight that is what is the overall student staff ration across universities.*

## What is student staff ratio across universities?

I By extracting the necessary fields from the University and University\_Year tables and merging them through a join operation, we obtain a cumulative ratio of different universities. This cumulative ratio is calculated as the sum of all the yearly ratios up to the year 2016. This analysis aims to provide insight into the trends of these ratios over time.

This examination is essential because it allows us to understand the student-to-faculty ratio, which plays a crucial role in the quality of education. A higher ratio suggests that faculties might have a manageable workload, enabling them to provide individualized attention to students without being overwhelmed. On the other hand, a consistently low ratio across the years may indicate that faculties might not have the capacity to meet each student's educational needs effectively.

In short, this analysis helps us gain a comprehensive view of how the student-to-faculty ratio has evolved over time, ultimately shedding light on the level of attention and guidance that students may receive from their instructors.



## **Are there any common criteria used by different ranking systems?**

When we delve into the analysis of various ranking systems, it becomes apparent that identifying shared criteria for evaluation can be a complex task, especially when the specific criteria employed in these systems differ substantially. However, by exploring the historical origins or etymology of these ranking systems, we can uncover certain commonalities, such as the significance of criteria like citations and research. These criteria, deeply rooted in the foundational principles of academic recognition, tend to maintain a degree of consistency across a wide range of ranking systems.

Conversely, when we shift our focus to domain-specific knowledge and the unique attributes of each academic field or discipline, it becomes clear that there is often minimal or no overlap in the criteria utilized by distinct ranking systems. This discrepancy arises because each academic domain typically has its distinct set of criteria and standards, which are best suited to reflect the quality and impact of research or academic institutions within that specific area of expertise.

In short, although some general criteria, such as citations and research, tend to be shared among ranking systems due to their historical significance and relevance, it is crucial to recognize and understand the limited overlap in specific criteria across these systems. Understanding the shared and distinct criteria is important because it allows us to:

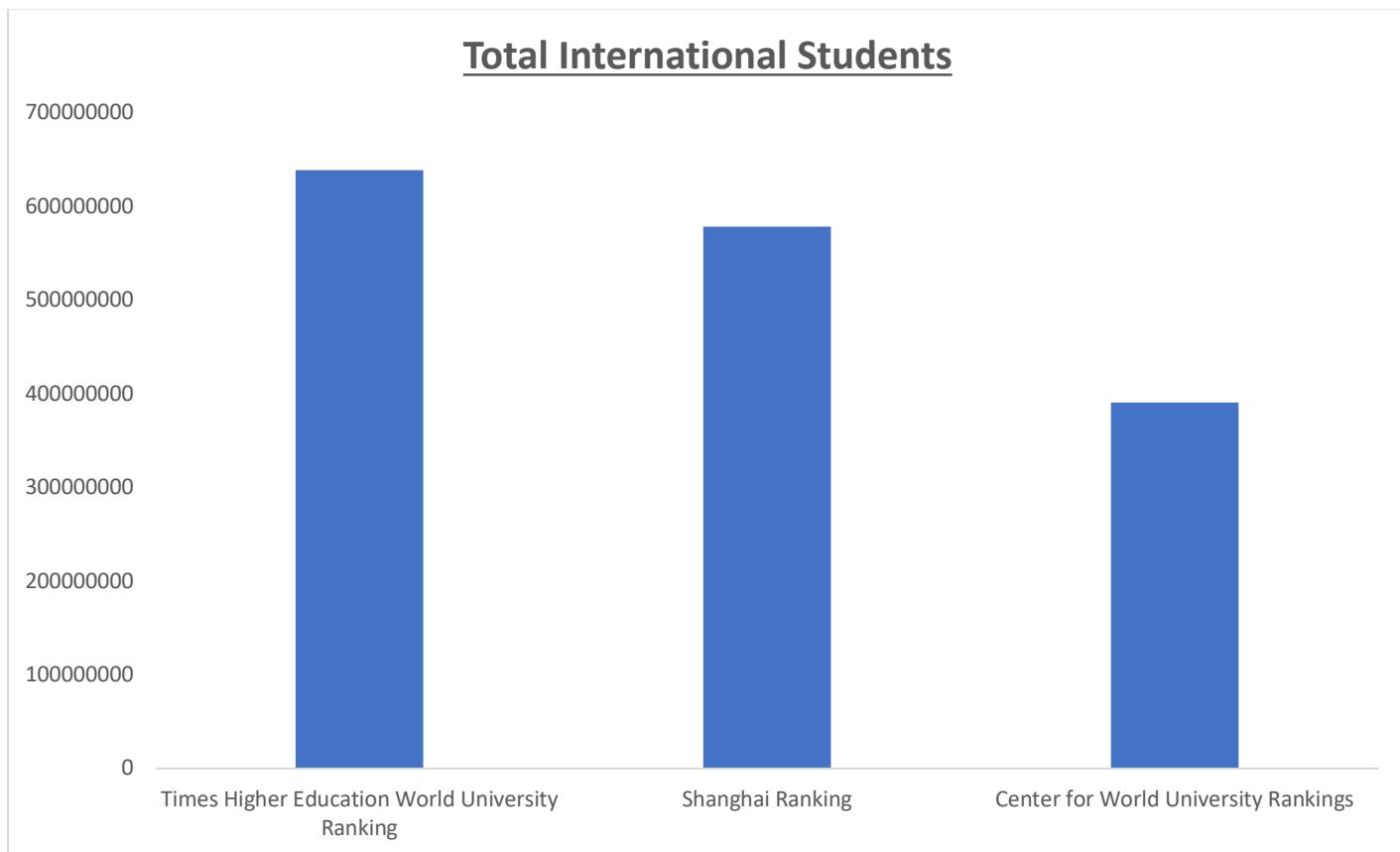
- Compare and Evaluate: By identifying common criteria, we can effectively compare and evaluate universities or academic institutions across different ranking systems.
- Make Informed Decisions: Students, researchers, and educational institutions rely on rankings to make informed decisions
- Improve Quality: Recognizing domain-specific criteria allows academic institutions to tailor their efforts to meet the unique requirements of their field.

| Rank System ID | system_name                                     | criteria_name             |
|----------------|---|---------------------------|
| 1              | Times Higher Education World University Ranking | Teaching                  |
| 1              | Times Higher Education World University Ranking | International             |
| 1              | Times Higher Education World University Ranking | Research                  |
| 1              | Times Higher Education World University Ranking | Citations                 |
| 1              | Times Higher Education World University Ranking | Income                    |
| 1              | Times Higher Education World University Ranking | Total Times               |
| 2              | Shanghai Ranking                                | Alumni                    |
| 2              | Shanghai Ranking                                | Award                     |
| 2              | Shanghai Ranking                                | HiCi                      |
| 2              | Shanghai Ranking                                | N and S                   |
| 2              | Shanghai Ranking                                | Pub                       |
| 2              | Shanghai Ranking                                | PCP                       |
| 2              | Shanghai Ranking                                | Total Shanghai            |
| 3              | Center for World University Rankings            | Quality of Education Rank |
| 3              | Center for World University Rankings            | Alumni Employment Rank    |
| 3              | Center for World University Rankings            | Quality of Faculty Rank   |
| 3              | Center for World University Rankings            | Publications Rank         |
| 3              | Center for World University Rankings            | Influence Rank            |
| 3              | Center for World University Rankings            | Citations Rank            |
| 3              | Center for World University Rankings            | Patents Rank              |
| 3              | Center for World University Rankings            | Total CWUR                |

## How does the choice of ranking system affect a university's international Student's enrolment?

In our analysis, we have employed data from three distinct ranking systems: Times Higher Education, Shanghai Ranking, and the Centre for World University Ranking. By utilizing information from tables like "university year," "university ranking year," and "ranking systems," we've been able to determine the number of international students enrolled in universities across these three ranking systems. This approach allows us to examine the influence of ranking systems on international student enrolment.

Through the use of visual aids, particularly graphs, we can clearly observe that Times Higher Education ranking system exerts the most significant impact on international student enrolment. This visual representation helps us recognize the substantial effect that this specific ranking system has on attracting international students to universities.



## **Are there any criteria that have different weights in different ranking systems?**

We are dealing with three distinct ranking systems, each of which employs unique criteria for assessing universities. Our objective is to determine how frequently a university has been ranked based on specific criteria. This analysis offers insights into the associations between universities, criteria, and ranking systems. Furthermore, it lays the groundwork for the potential implementation of additional ranking systems, which could offer a broader perspective on university rankings.

The importance of universities implementing a greater number of ranking systems lies in several key factors:

- **Diverse Evaluation:** Multiple ranking systems provide a more comprehensive evaluation of universities. Each system may emphasize different criteria and attributes, allowing universities to showcase a broader spectrum of their strengths and areas for improvement.
- **Global Recognition:** By participating in various ranking systems, universities can enhance their global visibility and recognition. Different ranking systems may have varying degrees of international influence, and universities can benefit from increased exposure to a wider audience.
- **Continuous Improvement:** Engaging with various ranking systems encourages universities to strive for continuous improvement. It fosters a culture of excellence and motivates institutions to excel in areas that are deemed important by different ranking methodologies.
- **Adaptability:** Different ranking systems may adapt to evolving educational and research trends differently. By participating in multiple systems, universities can better navigate changes in the academic landscape and respond to shifting priorities in higher education.

In essence, embracing a greater number of ranking systems enhances the universities' competitiveness, visibility, and adaptability in the ever-evolving field of education and research. It provides a more well-rounded perspective on their performance and encourages them to excel on a broader scale.

| Weight of Criteria | criteria_name             |
|--------------------|---------------------------|
| 1024               | Alumni Employment Rank    |
| 1024               | Citations Rank            |
| 1024               | Influence Rank            |
| 1024               | Patents Rank              |
| 1024               | Publications Rank         |
| 1024               | Quality of Education Rank |
| 1024               | Quality of Faculty Rank   |
| 1024               | Total CWUR                |
| 245                | Citations                 |
| 245                | International             |
| 245                | Research                  |
| 245                | Teaching                  |
| 245                | Total Times               |
| 232                | Income                    |
| 93                 | Alumni                    |
| 93                 | Award                     |
| 93                 | HiCi                      |
| 93                 | N and S                   |
| 93                 | PCP                       |
| 93                 | Pub                       |
| 93                 | Total Shanghai            |

## How have the weights of ranking criteria changed over time?

Regarding the changing weights of different ranking systems over the years, understanding these variations is crucial. The evolution of ranking criteria and their relative importance can provide universities with insights into the evolving expectations and priorities of the academic community and students. Adapting to these changing weights can help universities remain competitive and aligned with contemporary educational and research standards. It underscores the significance of ongoing adaptation and improvement in response to evolving assessment methodologies and the dynamic nature of academia.

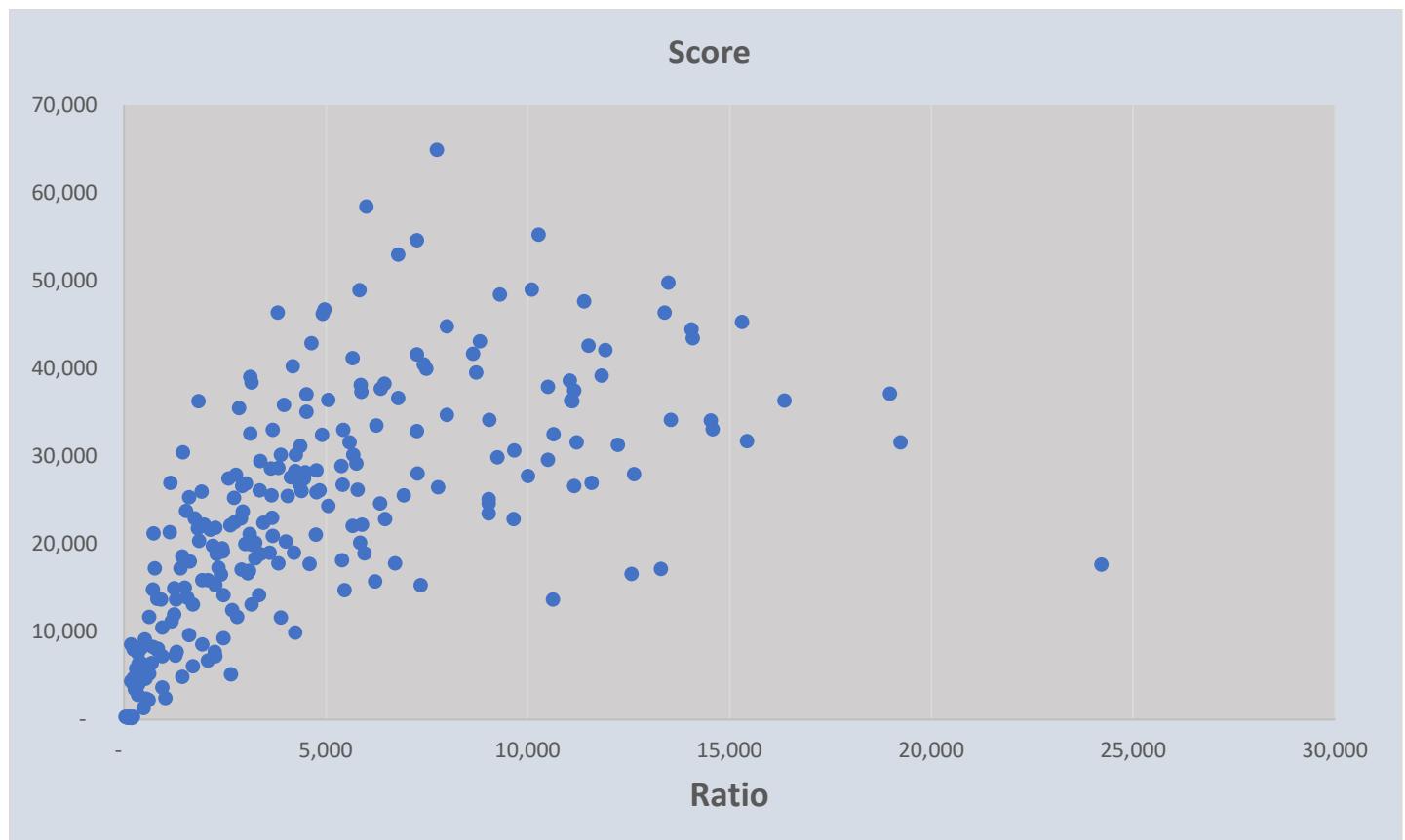
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| criteria_name             | year | Weight of Criteria |
|---------------------------|------|--------------------|
| Total Times               | 2011 | 185                |
| Total Times               | 2012 | 196                |
| Total Times               | 2013 | 197                |
| Total Times               | 2014 | 198                |
| Total Times               | 2015 | 199                |
| Total Times               | 2016 | 110                |
| Total Shanghai            | 2005 | 71                 |
| Total Shanghai            | 2006 | 71                 |
| Total Shanghai            | 2007 | 73                 |
| Total Shanghai            | 2008 | 72                 |
| Total Shanghai            | 2009 | 71                 |
| Total Shanghai            | 2010 | 72                 |
| Total Shanghai            | 2011 | 71                 |
| Total Shanghai            | 2012 | 71                 |
| Total Shanghai            | 2013 | 70                 |
| Total Shanghai            | 2014 | 70                 |
| Total Shanghai            | 2015 | 74                 |
| Total CWUR                | 2012 | 100                |
| Total CWUR                | 2013 | 100                |
| Total CWUR                | 2014 | 1000               |
| Total CWUR                | 2015 | 1000               |
| Teaching                  | 2011 | 185                |
| Teaching                  | 2012 | 196                |
| Teaching                  | 2013 | 197                |
| Teaching                  | 2014 | 198                |
| Teaching                  | 2015 | 199                |
| Teaching                  | 2016 | 110                |
| Research                  | 2011 | 185                |
| Research                  | 2012 | 196                |
| Research                  | 2013 | 197                |
| Research                  | 2014 | 198                |
| Research                  | 2015 | 199                |
| Research                  | 2016 | 110                |
| Quality of Faculty Rank   | 2012 | 100                |
| Quality of Faculty Rank   | 2013 | 100                |
| Quality of Faculty Rank   | 2014 | 1000               |
| Quality of Faculty Rank   | 2015 | 1000               |
| Quality of Education Rank | 2012 | 100                |
| Quality of Education Rank | 2013 | 100                |
| Quality of Education Rank | 2014 | 1000               |
| Quality of Education Rank | 2015 | 1000               |

## **Is there a relationship between a university's score and the student-staff ratio?**

We seek to understand the connection between a university's ranking score and its student-to-staff ratio. This examination is significant because it can unveil crucial insights. For instance, it can reveal whether universities with higher ranking scores tend to maintain favourable student-to-staff ratios, potentially influencing their success. Conversely, it can help us determine if universities that perform poorly in rankings have inadequate faculty resources in comparison to their student population.

This analysis serves a vital purpose. It assists universities in evaluating their control over this factor. By identifying whether they have a strong grip on maintaining a balanced student-to-staff ratio or if they need to augment their faculty resources, universities can take informed steps to enhance their academic environment and performance. In essence, it aids institutions in making data-driven decisions to improve their educational quality.

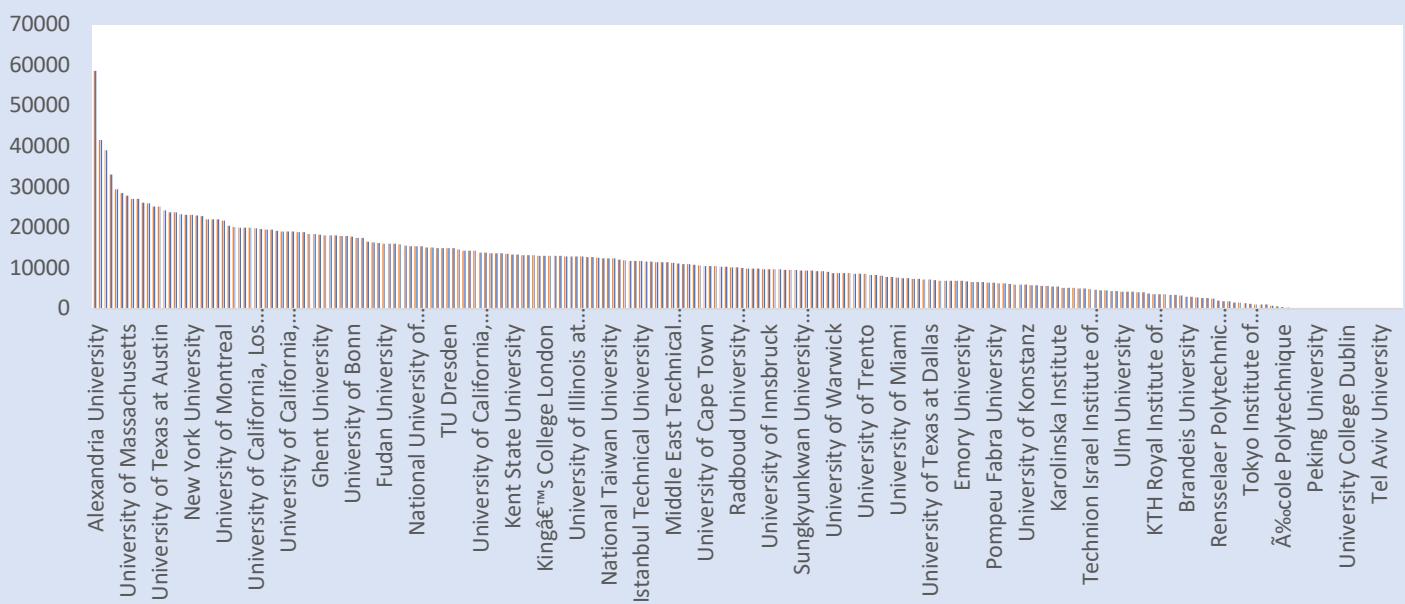


## How does the number of female students differ across universities?

The number of female students in universities is a critical metric with far-reaching implications. It not only reflects the institution's commitment to diversity and inclusivity but also influences educational outcomes, innovation, and the preparation of students for the workforce. Gender balance in higher education is not only important for universities but for society as a whole as it contributes to social progress and gender equality.

- **Diversity and Inclusion:** Assessing the gender distribution helps universities gauge their success in fostering diversity and inclusion. A balanced representation of both genders contributes to a more inclusive and equitable learning environment, which benefits all students.
- **Academic Environment:** The ratio of female students can indicate the nature of the academic environment. A higher proportion of female students may reflect a more welcoming and supportive atmosphere for women, which can be appealing to prospective students.
- **Research and Innovation:** A diverse student body can lead to a broader range of perspectives and ideas, fostering innovation and creativity. Universities that encourage gender diversity may experience positive impacts on research and innovation.
- **Attracting Talent:** For universities, gender diversity can be a competitive advantage in attracting top talent, both in terms of students and faculty. It can help institutions stand out and draw individuals from diverse backgrounds.
- **Equality and Social Progress:** Promoting gender diversity in higher education is an essential step toward gender equality and social progress. It sends a message that all individuals, regardless of gender, have equal opportunities in education.

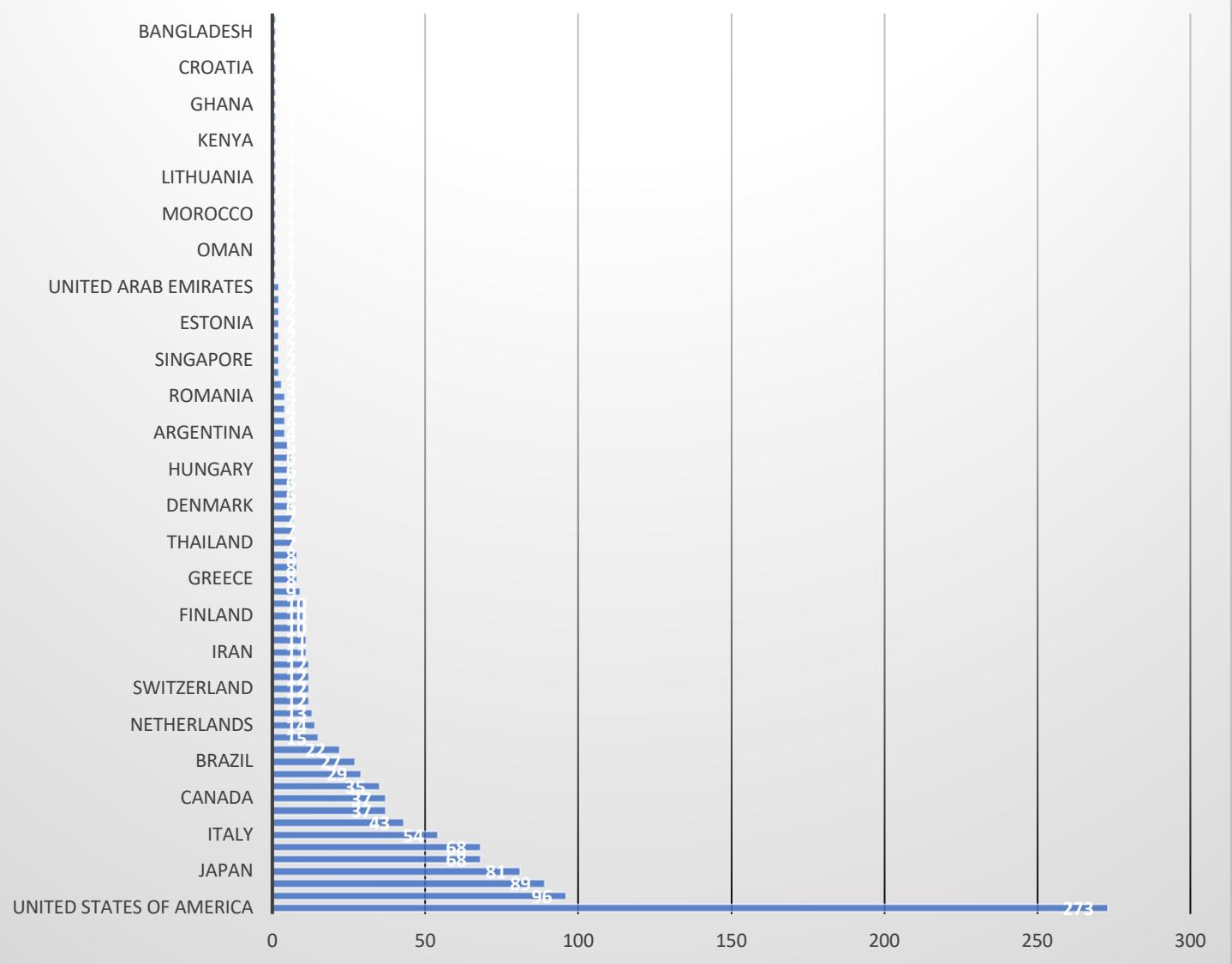
### Girls Enrollment



## What is the distribution of universities across different countries?

The distribution of universities across different countries is of paramount importance for any comprehensive analysis within the field of education, policy-making, and beyond. It offers a global perspective on higher education, shedding light on the state of academia on an international scale. This insight enables meaningful regional comparisons, uncovering disparities and commonalities in educational systems and resources, thus informing educational policies and initiatives. Moreover, the presence of universities within a country is often a key indicator of economic and social development, as institutions of higher learning drive economic growth and societal progress. The diverse distribution of universities encourages academic collaboration, facilitates student mobility, fosters cultural exchange, and supports cross-cultural understanding. It is instrumental in determining a country's global reputation in international rankings and influences student choices for higher education. In essence, the distribution of universities across countries serves as a foundational element for a wide range of analyses and considerations in academia and beyond.

### Universities in a country

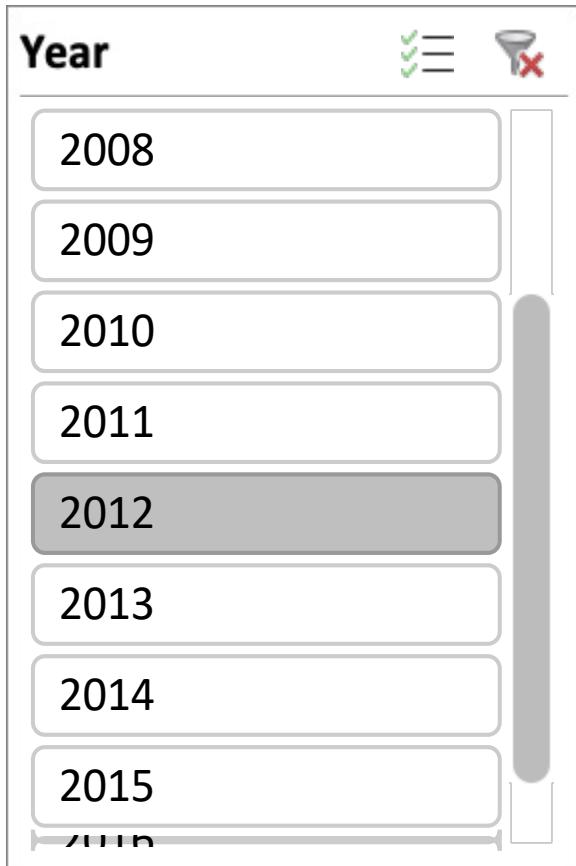


## **How has the ranking of universities changed over years?**

Observing how university rankings have changed over the years is a matter of substantial importance in the realm of higher education. These historical shifts provide insights into the progress and competitiveness of academic institutions, guiding benchmarking efforts and revealing trends in education. Understanding these ranking alterations is essential for making informed decisions in educational policy and resource allocation, helping universities maintain or regain their competitive edge. Furthermore, ranking changes influence students' and faculty members' choices, and they can impact the international reputation of universities, thereby affecting their ability to form global partnerships, secure research funding, and attract talent from around the world. As the academic landscape evolves, universities must adapt, making data-driven decisions to ensure continuous improvement and academic excellence.

It's clear that Harvard University consistently maintained its top-ranking position from the inception of university rankings in 2005 through 2012. However, a significant shift occurred after 2012, with no university managing to maintain the number 1 ranking until 2016. Furthermore, a noteworthy observation is that the ranking scores have exhibited a general upward trend since 2005, signifying overall improvement. Nonetheless, an abrupt decline in scores for all universities is noticeable in the year 2016.

The provided slicer, which allows users to filter and view data for specific years, is of paramount importance for seeing yearly trends.



| University Name                         | Score | Year | Rank |
|---|-------|------|------|
| Harvard University                      | 1287  | 2012 | 1    |
| University of Zurich                    | 1261  | 2012 | 2    |
| Princeton University                    | 1255  | 2012 | 3    |
| Karolinska Institute                    | 1247  | 2012 | 4    |
| Utrecht University                      | 1234  | 2012 | 5    |
| University of Sydney                    | 1233  | 2012 | 6    |
| University of California, Santa Barbara | 1228  | 2012 | 7    |
| University of British Columbia          | 1220  | 2012 | 8    |
| California Institute of Technology      | 1213  | 2012 | 9    |
| University of Cambridge                 | 1206  | 2012 | 10   |
| University of Bristol                   | 1203  | 2012 | 11   |
| Carnegie Mellon University              | 1202  | 2012 | 12   |
| University of Nottingham                | 1191  | 2012 | 13   |
| University of Copenhagen                | 1183  | 2012 | 14   |
| Leiden University                       | 1178  | 2012 | 15   |
| University College London               | 1159  | 2012 | 16   |
| University of California, Berkeley      | 1147  | 2012 | 17   |
| University of Oslo                      | 1146  | 2012 | 18   |
| University of Toronto                   | 1138  | 2012 | 19   |
| University of Geneva                    | 1131  | 2012 | 20   |
| Stanford University                     | 1126  | 2012 | 21   |
| University of Chicago                   | 1119  | 2012 | 22   |
| University of Oxford                    | 1112  | 2012 | 23   |
| McGill University                       | 1107  | 2012 | 24   |
| Brown University                        | 1101  | 2012 | 25   |
| University of Helsinki                  | 1083  | 2012 | 26   |
| Vanderbilt University                   | 1075  | 2012 | 27   |
| Rice University                         | 1070  | 2012 | 28   |
| Boston University                       | 1069  | 2012 | 29   |
| Yale University                         | 1060  | 2012 | 30   |
| University of Southern California       | 1060  | 2012 | 30   |
| Georgia Institute of Technology         | 1054  | 2012 | 31   |
| Northwestern University                 | 1049  | 2012 | 32   |
| University of Maryland, College Park    | 1045  | 2012 | 33   |
| University of California, Davis         | 1036  | 2012 | 34   |
| University of California, Irvine        | 1035  | 2012 | 35   |
| Case Western Reserve University         | 1032  | 2012 | 36   |
| New York University                     | 1025  | 2012 | 37   |
| University of Arizona                   | 1011  | 2012 | 38   |
| Columbia University                     | 1001  | 2012 | 39   |
| University of Rochester                 | 1000  | 2012 | 40   |

|   |     |      |    |
|---|-----|------|----|
| University of California, San Diego               | 996 | 2012 | 41 |
| Ã‰cole Polytechnique                              | 992 | 2012 | 42 |
| Technical University of Munich                    | 990 | 2012 | 43 |
| University of Manchester                          | 989 | 2012 | 44 |
| University of California, Los Angeles             | 979 | 2012 | 45 |
| University of North Carolina at Chapel Hill       | 978 | 2012 | 46 |
| Duke University                                   | 974 | 2012 | 47 |
| University of Edinburgh                           | 948 | 2012 | 48 |
| University of Pennsylvania                        | 943 | 2012 | 49 |
| Cornell University                                | 940 | 2012 | 50 |
| Tufts University                                  | 929 | 2012 | 51 |
| Kyoto University                                  | 922 | 2012 | 52 |
| Imperial College London                           | 920 | 2012 | 53 |
| University of Florida                             | 908 | 2012 | 54 |
| Arizona State University                          | 908 | 2012 | 54 |
| University of Utah                                | 896 | 2012 | 55 |
| Osaka University                                  | 892 | 2012 | 56 |
| Tohoku University                                 | 859 | 2012 | 57 |
| Tel Aviv University                               | 858 | 2012 | 58 |
| University of Texas at Austin                     | 855 | 2012 | 59 |
| Dartmouth College                                 | 844 | 2012 | 60 |
| University of Virginia                            | 842 | 2012 | 61 |
| Emory University                                  | 838 | 2012 | 62 |
| University of Colorado Boulder                    | 821 | 2012 | 63 |
| Ã‰cole normale supÃ©rieure - Paris                | 807 | 2012 | 64 |
| Hebrew University of Jerusalem                    | 792 | 2012 | 65 |
| Nagoya University                                 | 787 | 2012 | 66 |
| Seoul National University                         | 770 | 2012 | 67 |
| Rockefeller University                            | 750 | 2012 | 68 |
| University of Minnesota, Twin Cities              | 747 | 2012 | 69 |
| Johns Hopkins University                          | 742 | 2012 | 70 |
| University of Washington                          | 694 | 2012 | 71 |
| Massachusetts Institute of Technology             | 687 | 2012 | 72 |
| University of Texas MD Anderson Cancer Center     | 654 | 2012 | 73 |
| Weizmann Institute of Science                     | 652 | 2012 | 74 |
| Sapienza University of Rome                       | 651 | 2012 | 75 |
| University of California, San Francisco           | 641 | 2012 | 76 |
| University of Queensland                          | 639 | 2012 | 77 |
| Swiss Federal Institute of Technology in Lausanne | 638 | 2012 | 78 |
| Texas A&M University, College Station             | 635 | 2012 | 79 |
| University of Illinois at Urbana-Champaign        | 631 | 2012 | 80 |
| Ruprecht Karl University of Heidelberg            | 630 | 2012 | 81 |

|  |     |      |     |
|--|-----|------|-----|
| Rutgers University-New Brunswick                   | 629 | 2012 | 82  |
| Washington University in St. Louis                 | 628 | 2012 | 83  |
| University of Tokyo                                | 613 | 2012 | 84  |
| University of Melbourne                            | 612 | 2012 | 85  |
| Mines ParisTech                                    | 596 | 2012 | 86  |
| University of Paris-Sud                            | 595 | 2012 | 87  |
| Ludwig Maximilian University of Munich             | 594 | 2012 | 88  |
| Williams College                                   | 582 | 2012 | 89  |
| Technion – Israel Institute of Technology          | 574 | 2012 | 90  |
| McMaster University                                | 573 | 2012 | 91  |
| Pennsylvania State University, University Park     | 568 | 2012 | 92  |
| Pierre-and-Marie-Curie University                  | 555 | 2012 | 93  |
| The University of Queensland                       | 541 | 2012 | 94  |
| University of Texas Southwestern Medical Center    | 537 | 2012 | 95  |
| Ghent University                                   | 521 | 2012 | 96  |
| University of Pittsburgh                           | 518 | 2012 | 97  |
| University of Basel                                | 517 | 2012 | 98  |
| Uppsala University                                 | 505 | 2012 | 99  |
| Purdue University, West Lafayette                  | 505 | 2012 | 99  |
| Ohio State University, Columbus                    | 504 | 2012 | 100 |
| Aarhus University                                  | 500 | 2012 | 101 |
| University of Pittsburgh - Pittsburgh Campus       | 469 | 2012 | 102 |
| University of Freiburg                             | 468 | 2012 | 103 |
| Stockholm University                               | 453 | 2012 | 104 |
| University of Illinois at Urbana-Champaign         | 449 | 2012 | 105 |
| Michigan State University                          | 443 | 2012 | 106 |
| University of Michigan                             | 442 | 2012 | 107 |
| ETH Zurich – Swiss Federal Institute of Technology |     |      |     |
| Zurich   | 435 | 2012 | 108 |
| University of Hong Kong                            | 434 | 2012 | 109 |
| National University of Singapore                   | 433 | 2012 | 110 |
| Australian National University                     | 418 | 2012 | 111 |
| Peking University                                  | 415 | 2012 | 112 |
| University of Washington - Seattle                 | 412 | 2012 | 113 |
| École Polytechnique Fédérale de Lausanne           | 404 | 2012 | 114 |
| KU Leuven  | 398 | 2012 | 115 |
| University of Wisconsin-Madison                    | 397 | 2012 | 116 |
| Wageningen University and Research Center          | 397 | 2012 | 116 |
| Pohang University of Science and Technology        | 390 | 2012 | 117 |
| Hong Kong University of Science and Technology     | 382 | 2012 | 118 |
| Kingston's College London                          | 379 | 2012 | 119 |
| University of Cape Town                            | 375 | 2012 | 120 |

|   |     |      |     |
|---|-----|------|-----|
| Delft University of Technology                                | 375 | 2012 | 120 |
| Tsinghua University   | 374 | 2012 | 121 |
| LMU Munich  | 372 | 2012 | 122 |
| University of Montreal  | 364 | 2012 | 123 |
| Eindhoven University of Technology                            | 364 | 2012 | 123 |
| Pennsylvania State University                                 | 361 | 2012 | 124 |
| Ã‰cole Normale SupÃ©rieure                                    | 360 | 2012 | 125 |
| Ohio State University   | 351 | 2012 | 126 |
| Korea Advanced Institute of Science and Technology<br>(KAIST) | 349 | 2012 | 127 |
| KTH Royal Institute of Technology                             | 340 | 2012 | 128 |
| University of St Andrews                                      | 339 | 2012 | 129 |
| University of Glasgow   | 339 | 2012 | 129 |
| Swiss Federal Institute of Technology in Zurich               | 339 | 2012 | 129 |
| University of Alberta   | 337 | 2012 | 130 |
| Heidelberg University   | 336 | 2012 | 131 |
| Washington University in St Louis                             | 335 | 2012 | 132 |
| Monash University   | 334 | 2012 | 133 |
| University of Auckland  | 334 | 2012 | 133 |
| University of Massachusetts                                   | 333 | 2012 | 134 |
| Durham University   | 329 | 2012 | 135 |
| Technical University of Denmark                               | 328 | 2012 | 136 |
| University of GÃ¶ttingen                                      | 327 | 2012 | 137 |
| University of Lausanne  | 324 | 2012 | 138 |
| Royal Holloway, University of London                          | 323 | 2012 | 139 |
| Queenâ€™s University  | 323 | 2012 | 139 |
| Lund University   | 322 | 2012 | 140 |
| University of Sheffield                                       | 321 | 2012 | 141 |
| University of Sussex  | 320 | 2012 | 142 |
| University of Bern  | 320 | 2012 | 142 |
| University of Minnesota                                       | 319 | 2012 | 143 |
| University of Amsterdam                                       | 319 | 2012 | 143 |
| Queen Mary University of London                               | 318 | 2012 | 144 |
| University of Michigan, Ann Arbor                             | 317 | 2012 | 145 |
| Pierre and Marie Curie University                             | 316 | 2012 | 146 |
| Trinity College Dublin  | 316 | 2012 | 146 |
| University of Southampton                                     | 311 | 2012 | 147 |
| Tokyo Institute of Technology                                 | 309 | 2012 | 148 |
| University of Wisconsinâ€”Madison                             | 309 | 2012 | 148 |
| University of Western Australia                               | 308 | 2012 | 149 |
| University of Aberdeen  | 307 | 2012 | 150 |
| University of New South Wales                                 | 306 | 2012 | 151 |

|   |     |      |     |
|---|-----|------|-----|
| University of Groningen                     | 302 | 2012 | 152 |
| RWTH Aachen University                      | 302 | 2012 | 152 |
| Nanyang Technological University            | 302 | 2012 | 152 |
| University of Delaware                      | 302 | 2012 | 152 |
| Lancaster University                        | 301 | 2012 | 153 |
| University of Leeds                         | 297 | 2012 | 154 |
| University of Vienna                        | 296 | 2012 | 155 |
| University of Warwick                       | 292 | 2012 | 156 |
| VU University Amsterdam                     | 292 | 2012 | 156 |
| Stony Brook University                      | 291 | 2012 | 157 |
| University of Twente                        | 291 | 2012 | 157 |
| University of Birmingham                    | 290 | 2012 | 158 |
| Birkbeck, University of London              | 290 | 2012 | 158 |
| University College Dublin                   | 290 | 2012 | 158 |
| Newcastle University                        | 289 | 2012 | 159 |
| Erasmus University Rotterdam                | 289 | 2012 | 159 |
| University of Dundee                        | 289 | 2012 | 159 |
| University of Notre Dame                    | 288 | 2012 | 160 |
| Chinese University of Hong Kong             | 288 | 2012 | 160 |
| University of Exeter                        | 286 | 2012 | 161 |
| University of Reading                       | 284 | 2012 | 162 |
| University of East Anglia                   | 281 | 2012 | 163 |
| University of Bergen                        | 280 | 2012 | 164 |
| University of Liverpool                     | 279 | 2012 | 165 |
| UniversitÃ© catholique de Louvain           | 278 | 2012 | 166 |
| University of Konstanz                      | 278 | 2012 | 166 |
| University of California, Santa Cruz        | 277 | 2012 | 167 |
| City University of Hong Kong                | 277 | 2012 | 167 |
| Free University of Berlin                   | 276 | 2012 | 168 |
| Rensselaer Polytechnic Institute            | 275 | 2012 | 169 |
| University of Leicester                     | 275 | 2012 | 169 |
| Ã‰cole normale supÃ©rieure de Lyon          | 273 | 2012 | 170 |
| Humboldt University of Berlin               | 272 | 2012 | 171 |
| Purdue University                           | 271 | 2012 | 172 |
| Goethe University Frankfurt                 | 271 | 2012 | 172 |
| Radboud University Nijmegen                 | 269 | 2012 | 173 |
| University of Victoria                      | 269 | 2012 | 173 |
| Texas A&M University                        | 266 | 2012 | 174 |
| Karlsruhe Institute of Technology           | 264 | 2012 | 175 |
| Rutgers, the State University of New Jersey | 263 | 2012 | 176 |
| Brandeis University                         | 263 | 2012 | 176 |
| Pompeu Fabra University                     | 262 | 2012 | 177 |

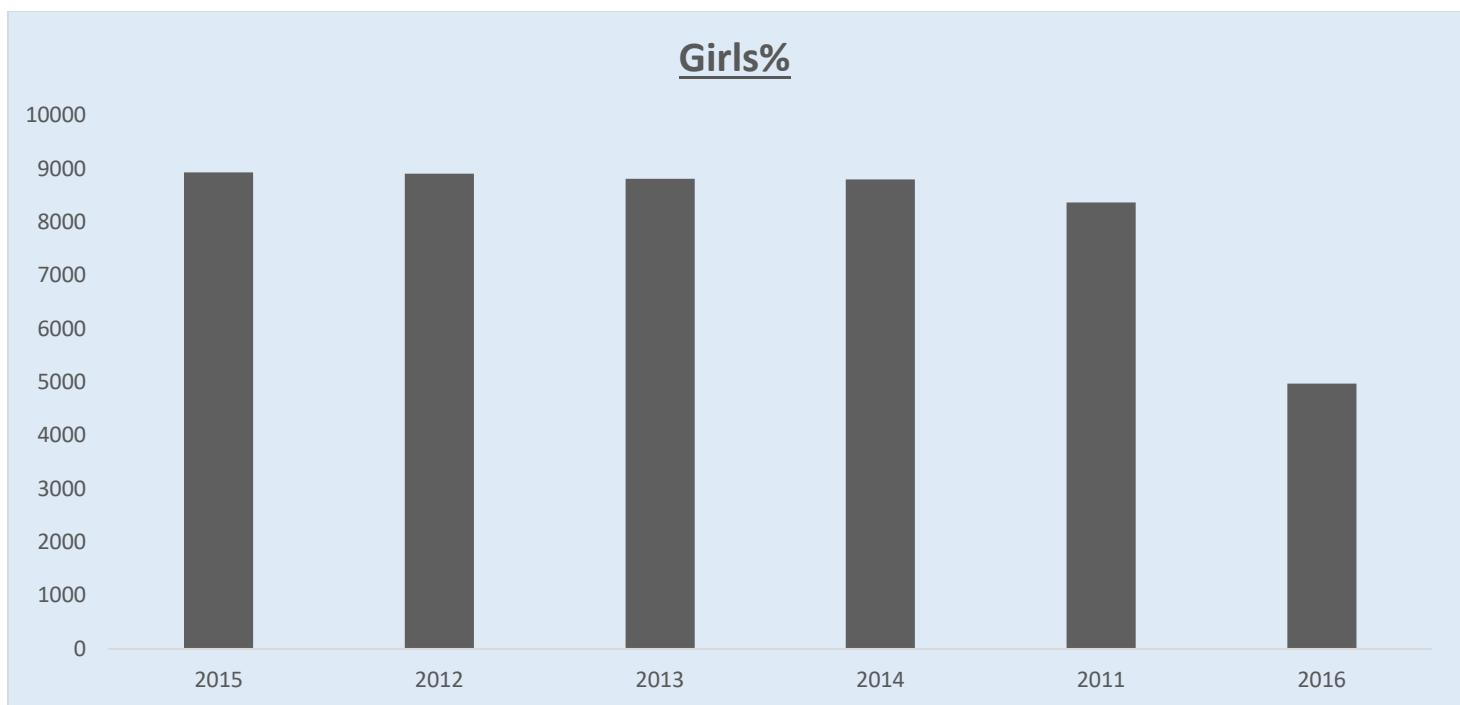
|   |     |      |     |
|---|-----|------|-----|
| University of Ottawa                          | 259 | 2012 | 178 |
| University of California, Riverside           | 258 | 2012 | 179 |
| University of TÃ¼bingen                       | 258 | 2012 | 179 |
| Wake Forest University                        | 256 | 2012 | 180 |
| Iowa State University                         | 253 | 2012 | 181 |
| National Taiwan University                    | 252 | 2012 | 182 |
| University of Illinois at Chicago             | 251 | 2012 | 183 |
| Paris Diderot University â€“ Paris 7          | 247 | 2012 | 184 |
| William & Mary                                | 244 | 2012 | 185 |
| Indiana University                            | 243 | 2012 | 186 |
| Maastricht University                         | 243 | 2012 | 186 |
| University of SÃ£o Paulo                      | 239 | 2012 | 187 |
| George Washington University                  | 238 | 2012 | 188 |
| Boston College                                | 236 | 2012 | 189 |
| Georgetown University                         | 227 | 2012 | 190 |
| University of Science and Technology of China | 225 | 2012 | 191 |
| University of Iowa                            | 221 | 2012 | 192 |
| Yeshiva University                            | 218 | 2012 | 193 |
| University of Miami                           | 214 | 2012 | 194 |
| King's College London                         | 186 | 2012 | 195 |

## What is the trend in percentage of female students over time?

Analyzing the trend in the percentage of female students over time holds considerable significance for a multitude of reasons. First and foremost, it serves as a vital gauge for measuring progress towards gender equality in higher education. An upward trend can indicate improved opportunities and access for female students, contributing to a more equitable and inclusive educational landscape. Furthermore, it provides insights into the educational environment, as an increasing percentage of female students often signifies a welcoming and supportive atmosphere, fostering diversity and inclusion that benefits the entire student body. This trend also influences academic outcomes, with research demonstrating that diverse classrooms lead to more comprehensive discussions and better problem-solving, ultimately enhancing the quality of education. Additionally, it is pivotal in preparing students for the workforce, ensuring that both men and women receive the skills and knowledge necessary for a balanced and inclusive professional environment. Notably, the trend has a ripple effect, as a higher percentage of female graduates can positively impact gender diversity in the workforce, contributing to innovation and a broader range of perspectives.

Policymakers rely on this data to make informed decisions, and it serves as a catalyst for policies and initiatives aimed at promoting gender diversity and equity in higher education. In essence, monitoring the trend in the percentage of female students is a holistic approach to fostering gender equality, inclusion, and diversity, ultimately benefiting not only higher education but society as a whole.

In sum, the analysis of the trend in the percentage of female students over time is multifaceted and holds importance in various contexts, including social, educational, economic, and cultural. It provides valuable insights for universities, policymakers, and society at large to ensure gender equity and foster inclusive and diverse educational environments.



## How has the ranking scores of universities evolved over years?

The evolution of ranking scores for universities over the years holds paramount importance in the realm of higher education. This analysis serves as a powerful tool for assessing the performance of academic institutions and provides quantifiable evidence of their progress or regression. It allows universities to engage in comparative analysis, enabling them to measure their performance against peers and competitors. This benchmarking process aids in setting goals, tracking improvements, and identifying areas that may require strategic attention or investment. Furthermore, the data on score evolution is instrumental for government bodies and policymakers, who rely on it to make informed decisions regarding educational policies and resource allocation. A decline in ranking scores can serve as a crucial signal for addressing deficiencies and enhancing education quality. These scores also play a pivotal role in shaping the international reputation of universities, influencing their ability to attract global talent, secure research funding, and forge international partnerships. As the competitive landscape in higher education continuously evolves, monitoring score evolution empowers universities to adapt and remain competitive, aligning their strategies with historical data and fostering a commitment to academic excellence and continuous improvement.

To trace the evolution of university rankings over the years, we have organized universities into yearly cohorts and aggregated their total scores across various criteria. This analysis has allowed us to identify universities that have consistently performed well from 2011 to 2016. Notably, institutions like the University of Cambridge and the University of Chemistry and Technology have maintained their positions in the top 10 throughout this period, highlighting their sustained excellence.

Moreover, we've observed a general upward trajectory in scores from 2011, indicating overall improvement in university performance. However, it's important to note a significant drop in scores in the year 2016, suggesting a unique challenge or shift in that specific period. This analysis provides valuable insights into universities' long-term performance trends and can aid in understanding the factors contributing to their success or decline, thus informing future strategies and decisions.

Below are the tables to explain in detail and I have applied color highlights to ensure visual clarity and to indicate common universities that are being presented in the analysis. This color-coding serves to make these universities stand out, facilitating easier identification and comparison across different data points and tables.

| University Name                                | Score | Year | Rank |
|--|-------|------|------|
| Henan Normal University                        | 4829  | 2015 | 1    |
| University of Pau and Pays de l'Adour          | 4788  | 2015 | 2    |
| Yuan Ze University                             | 4786  | 2015 | 3    |
| Dokuz Eylül University                         | 4767  | 2015 | 4    |
| University of Thessaly                         | 4738  | 2015 | 5    |
| Hunan Normal University                        | 4719  | 2015 | 6    |
| University of Hyderabad                        | 4668  | 2015 | 7    |
| Mansoura University                            | 4668  | 2015 | 8    |
| University of Chemistry and Technology, Prague | 4645  | 2015 | 9    |
| Shanghai Normal University                     | 4644  | 2015 | 10   |

| University Name   | Score | Year | Rank |
|---|-------|------|------|
| California Institute of Technology                          | 551   | 2016 | 1    |
| Massachusetts Institute of Technology                       | 549   | 2016 | 2    |
| University of Oxford  | 545   | 2016 | 3    |
| ETH Zurich â€“ Swiss Federal Institute of Technology Zurich | 529   | 2016 | 4    |
| Johns Hopkins University                                    | 524   | 2016 | 5    |
| University of Cambridge                                     | 522   | 2016 | 6    |
| Stanford University   | 521   | 2016 | 7    |
| Imperial College London                                     | 507   | 2016 | 8    |
| Harvard University  | 497   | 2016 | 9    |
| Princeton University  | 496   | 2016 | 10   |

| University Name                        | Score | Year | Rank |
|--|-------|------|------|
| University of Pau and Pays de l'Adour  | 4599  | 2014 | 1    |
| University of AlmerÃ¡a                 | 4549  | 2014 | 2    |
| Shaanxi Normal University              | 4545  | 2014 | 3    |
| Tamkang University                     | 4527  | 2014 | 4    |
| Federal University of Santa Maria      | 4519  | 2014 | 5    |
| Shanghai Normal University             | 4516  | 2014 | 6    |
| Fu Jen Catholic University             | 4493  | 2014 | 7    |
| Yuan Ze University                     | 4492  | 2014 | 8    |
| University of Chemistry and Technology | 4489  | 2014 | 9    |
| I-Shou University                      | 4489  | 2014 | 10   |

| University Name                    | Score | Year | Rank |
|------------------------------------|-------|------|------|
| Harvard University                 | 1171  | 2011 | 1    |
| California Institute of Technology | 986   | 2011 | 2    |
| University of Cambridge            | 983   | 2011 | 3    |
| Stanford University                | 952   | 2011 | 4    |
| University of Oxford               | 898   | 2011 | 5    |
| University of California           | 893   | 2011 | 6    |
| Princeton University               | 868   | 2011 | 7    |
| Columbia University                | 817   | 2011 | 8    |
| University of Chicago              | 803   | 2011 | 9    |
| Yale University                    | 788   | 2011 | 10   |

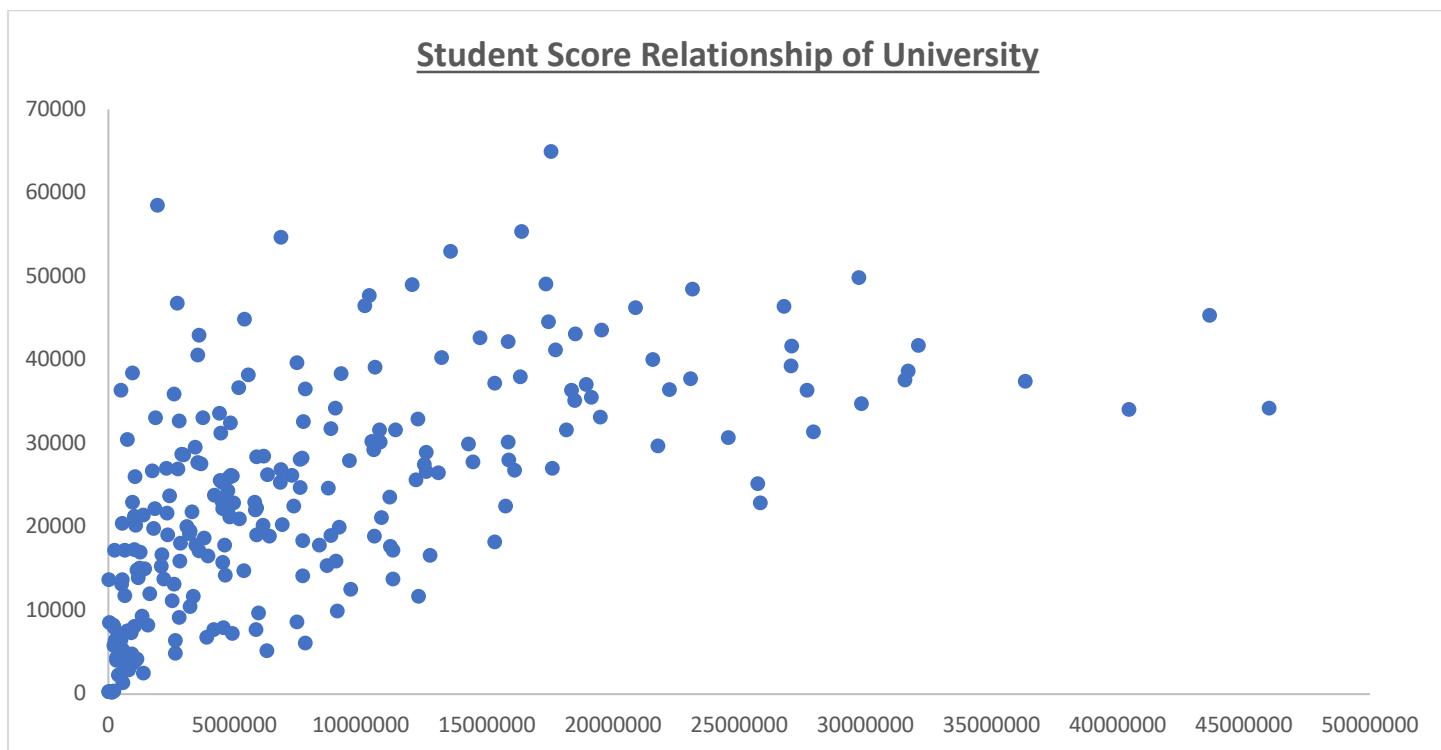
| University Name                    | Score | Year | Rank |
|------------------------------------|-------|------|------|
| University of California           | 1300  | 2013 | 1    |
| California Institute of Technology | 1284  | 2013 | 2    |
| Harvard University                 | 1276  | 2013 | 3    |
| Princeton University               | 1263  | 2013 | 4    |
| Carnegie Mellon University         | 1241  | 2013 | 5    |
| University of Sydney               | 1234  | 2013 | 6    |
| Karolinska Institute               | 1209  | 2013 | 7    |
| University of British Columbia     | 1203  | 2013 | 8    |
| University of Cambridge            | 1175  | 2013 | 9    |
| Utrecht University                 | 1171  | 2013 | 10   |

| University Name                    | Score | Year | Rank |
|------------------------------------|-------|------|------|
| Harvard University                 | 1287  | 2012 | 1    |
| University of Zurich               | 1261  | 2012 | 2    |
| Princeton University               | 1255  | 2012 | 3    |
| Karolinska Institute               | 1247  | 2012 | 4    |
| Utrecht University                 | 1234  | 2012 | 5    |
| University of Sydney               | 1233  | 2012 | 6    |
| University of California           | 1228  | 2012 | 7    |
| University of British Columbia     | 1220  | 2012 | 8    |
| California Institute of Technology | 1213  | 2012 | 9    |
| University of Cambridge            | 1206  | 2012 | 10   |

## Is there a relationship between universities ranking score and the number of students over time?

Analysing the connection between a university's ranking score and its student population over time holds substantial significance for a range of stakeholders in the realm of higher education. This investigation aims to unveil whether a correlation exists between the academic ranking score and the size of the student body, offering valuable insights into the academic excellence of institutions. Such insights can significantly impact resource allocation decisions, as institutions with a strong positive correlation may need to invest in accommodating a growing student population while simultaneously maintaining their academic standing. Moreover, this analysis informs universities about the unique experiences of students in institutions of varying sizes, contributing to the enhancement of educational quality. The findings can also guide institutions in balancing enrolment growth with the preservation of academic excellence. Policymakers rely on this data to shape higher education policies, with the relationship between ranking scores and student population influencing funding allocation, enrolment strategies, and academic quality standards.

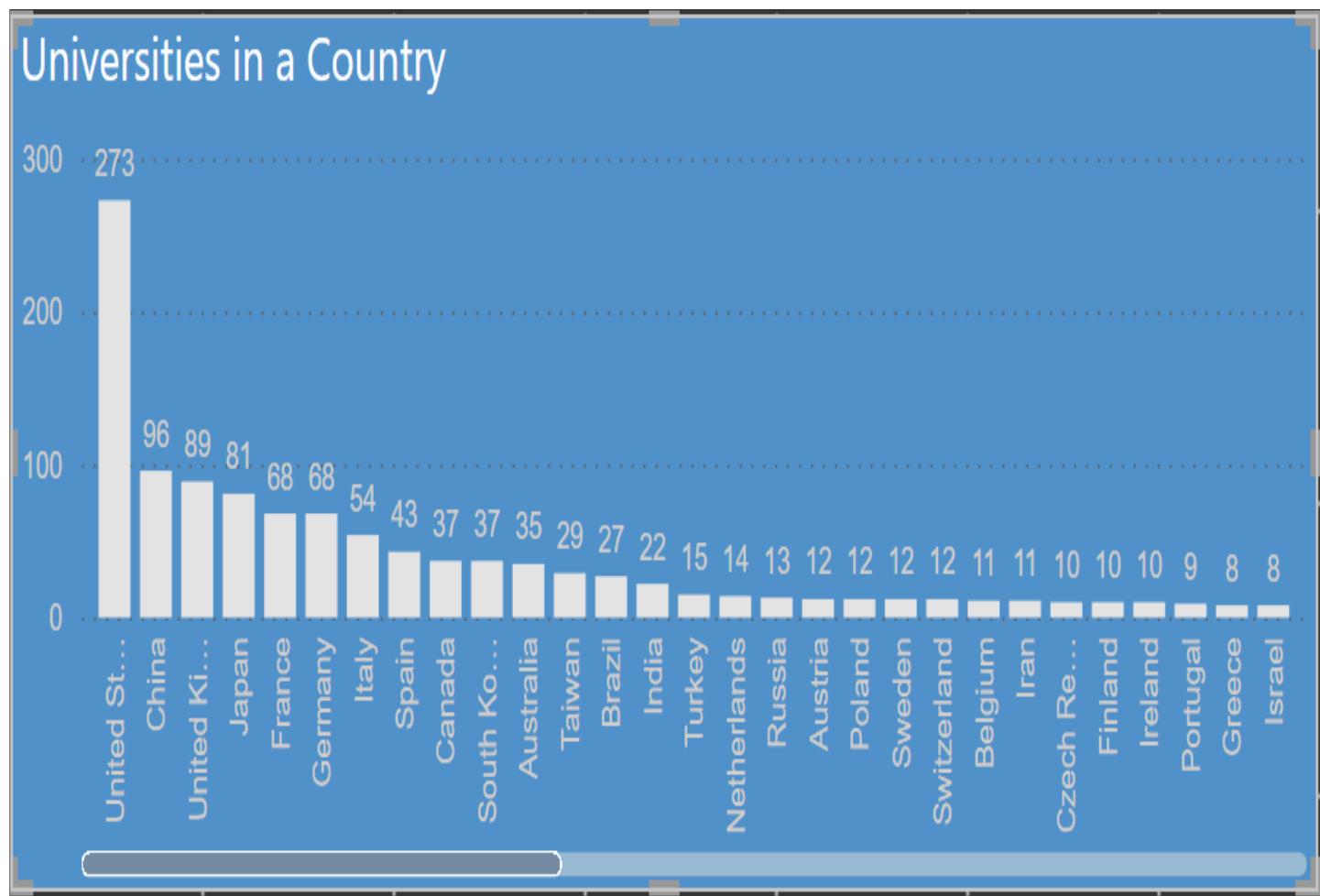
I employed the correlation function in MS Excel to assess the relationship between university ranking scores and the number of universities over time. The result revealed that the value is approaching 1, which signifies a positive relationship and indicates a strong association between these scores and the quantity of universities. In simpler terms, as the ranking scores increase, the number of universities also tends to rise significantly, suggesting a clear and robust connection between the two variables.



## **How many universities are there in each country?**

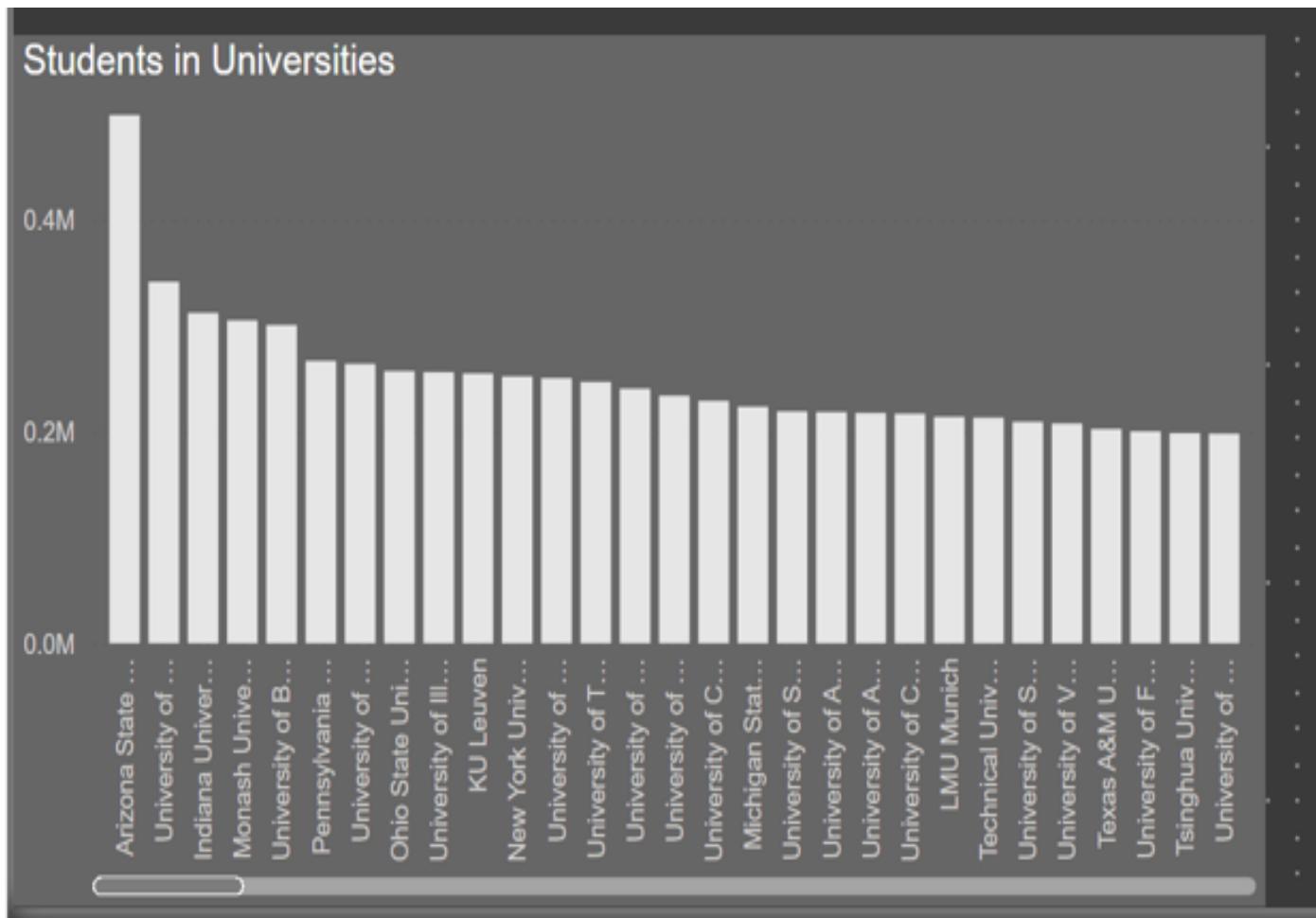
The count of universities in each country is a cornerstone of data analysis, offering invaluable insights into the educational fabric of nations. This data provides a comprehensive view of the educational landscape within each country, shedding light on the scale and diversity of higher education institutions they host. Beyond this, it serves as a vital benchmark for comparing and assessing countries in terms of their educational infrastructure, guiding policymakers in the efficient allocation of resources. The number of universities directly influences the accessibility of higher education for the population, playing a pivotal role in shaping the opportunities available to students. Moreover, it has a substantial impact on the quality of education, as an excessive number of universities relative to the population may strain resources and potentially compromise educational standards.

The majority of universities are located in the United States, and we can observe that a significant number of universities are found in both developed and developing countries.



## Which university has highest number of students?

Arizona State University boasts the highest enrollment of students, followed by the University of Massachusetts and Indiana University. An important observation is that the universities with the highest student enrollments are primarily located in North America. This geographical concentration underscores the educational prominence and appeal of North American institutions, drawing students from around the world. It reflects the continent's global reputation for higher education and its capacity to accommodate a diverse and substantial student population.



## How does the percentage of international students vary across universities?

Analysing the evolution of the number of universities over time is a critical aspect of data analysis with profound implications. This dynamic perspective allows us to discern long-term educational trends, providing insights into the changing educational landscape. Moreover, it serves as a valuable tool for evaluating the effectiveness of educational policies, reforms, and investments.

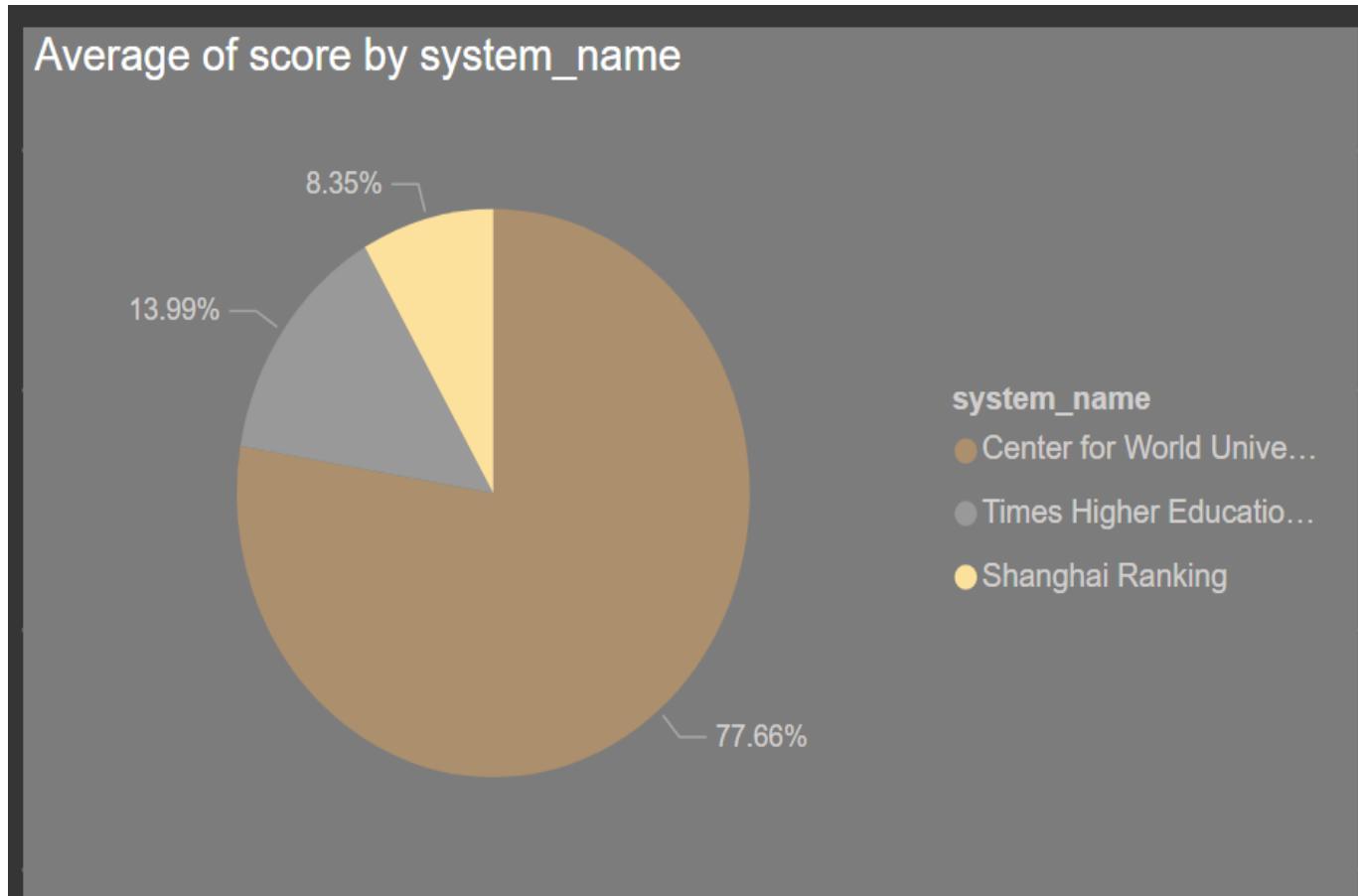
The presented values are expressed as percentages, with some exceeding 100%. This is due to the cumulative sum of percentage changes across all years since 2011. It serves as a means to assess how the number of students has evolved during this period. This cumulative approach captures the overall change in student enrolment and highlights the extent of growth or decline since the initial reference year of 2011. It provides a comprehensive perspective on the long-term trend in student population and reveals the cumulative impact of yearly changes.

| university name   | al Student% |
|---|-------------|
| Ã‰cole Normale SupÃ©rieure                                  | 120         |
| Ã‰cole normale supÃ©rieure de Lyon                          | 70          |
| Ã‰cole Polytechnique  | 150         |
| Ã‰cole Polytechnique FÃ©dÃ©rale de Lausanne                 | 324         |
| Aarhus University   | 70          |
| Alexandria University                                       | 1           |
| Arizona State University                                    | 54          |
| Australian National University                              | 210         |
| Autonomous University of Barcelona                          | 10          |
| Birkbeck, University of London                              | 114         |
| BoÄyaziÄi University                                      | 14          |
| Boston College  | 95          |
| Boston University   | 102         |
| Brandeis University   | 66          |
| California Institute of Technology                          | 162         |
| Carnegie Mellon University                                  | 210         |
| Case Western Reserve University                             | 85          |
| CharitÃ© - UniversitÄtsmedizin Berlin                       | 16          |
| Chinese University of Hong Kong                             | 88          |
| City University of Hong Kong                                | 84          |
| Colorado School of Mines                                    | 36          |
| Cornell University  | 114         |
| Dalhousie University  | 18          |
| Dartmouth College   | 80          |
| Delft University of Technology                              | 125         |
| Drexel University   | 18          |
| Duke University   | 102         |
| Durham University   | 144         |
| Eindhoven University of Technology                          | 70          |
| Emory University  | 90          |
| Erasmus University Rotterdam                                | 108         |
| ETH Zurich â€“ Swiss Federal Institute of Technology Zurich | 222         |
| Florida Institute of Technology                             | 52          |
| Free University of Berlin                                   | 100         |
| Fudan University  | 11          |

## What is the average score for universities according to each ranking system?

universities employ these average scores for strategic planning and decision-making. By understanding their relative standing and how they compare to their peers, institutions can pinpoint areas for development and growth, allowing them to tailor their strategies to enhance their performance within a specific ranking system. In essence, the calculation of average scores is not merely a numerical exercise; it is a pivotal tool that influences decisions, policies, and global recognition within the realm of higher education.

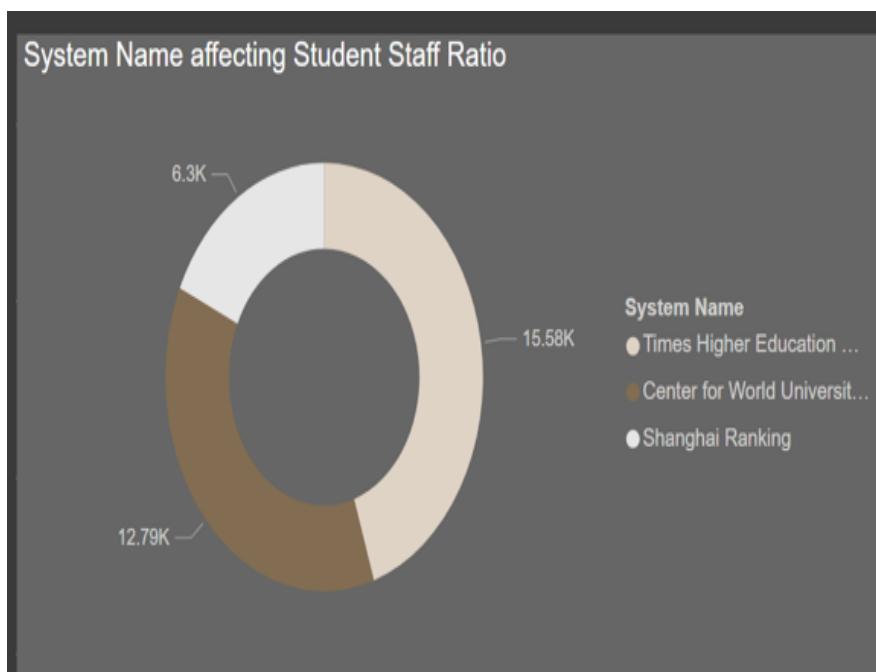
The high average score in the Centre for World University Ranking followed by Times Higher Education provides valuable information about the methodology, competitiveness, and global recognition of universities within this specific ranking system, offering insights for various stakeholders in the field of higher education.



## How does the ranking system affect student staff ratio?

The impact of a university's ranking system on its student-staff ratio is multifaceted and plays a pivotal role in shaping the dynamics of higher education institutions. University rankings can significantly influence the student-staff ratio through various channels. One of the most direct impacts stems from the university's perceived quality and reputation, as higher-ranked institutions tend to attract a greater number of students, thereby increasing the student-staff ratio as enrolments grow.

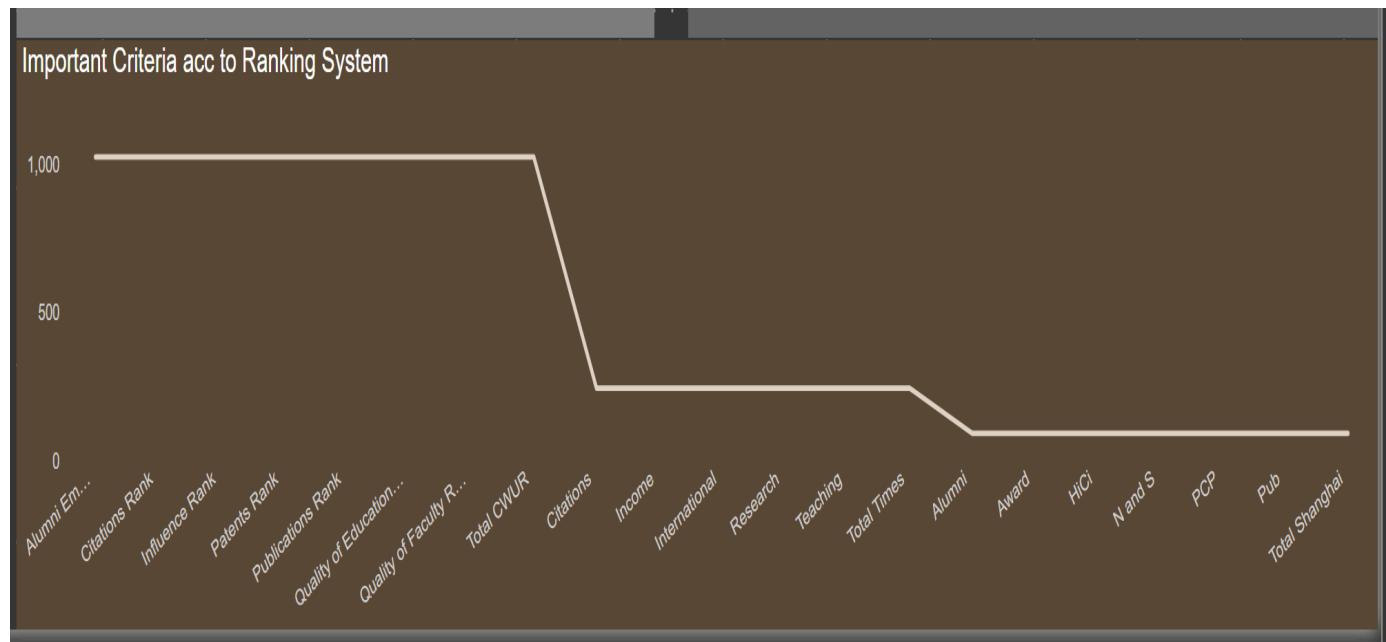
The Times Higher Education ranking system stands out for having the most favourable student-staff ratio. This observation underscores the influential role that ranking systems play in shaping the dynamics of the student-staff ratio within universities. These systems not only serve as markers of institutional prestige but also act as catalysts for change across various dimensions. They exert their influence on the allocation of resources, the recruitment of faculty, the planning of curricula, and the determination of class sizes.



## What are the most important criteria considered by ranking system?

The prominence of these criteria fosters global recognition, as institutions that excel in key areas gain international acclaim, attracting a diverse and talented community of scholars and researchers. The criteria considered most important by ranking systems serve as the bedrock of the evaluation process for higher education institutions. These criteria are carefully chosen to reflect the core principles of educational excellence, research impact, and institutional reputation.

Notably, the Times Higher Education ranking system sees the highest utilization of criteria by universities, signifying a widespread reliance on this system for evaluating and comparing academic institutions. Following closely in usage is the Shanghai ranking system, indicating its significance in shaping the global landscape of higher education evaluation.

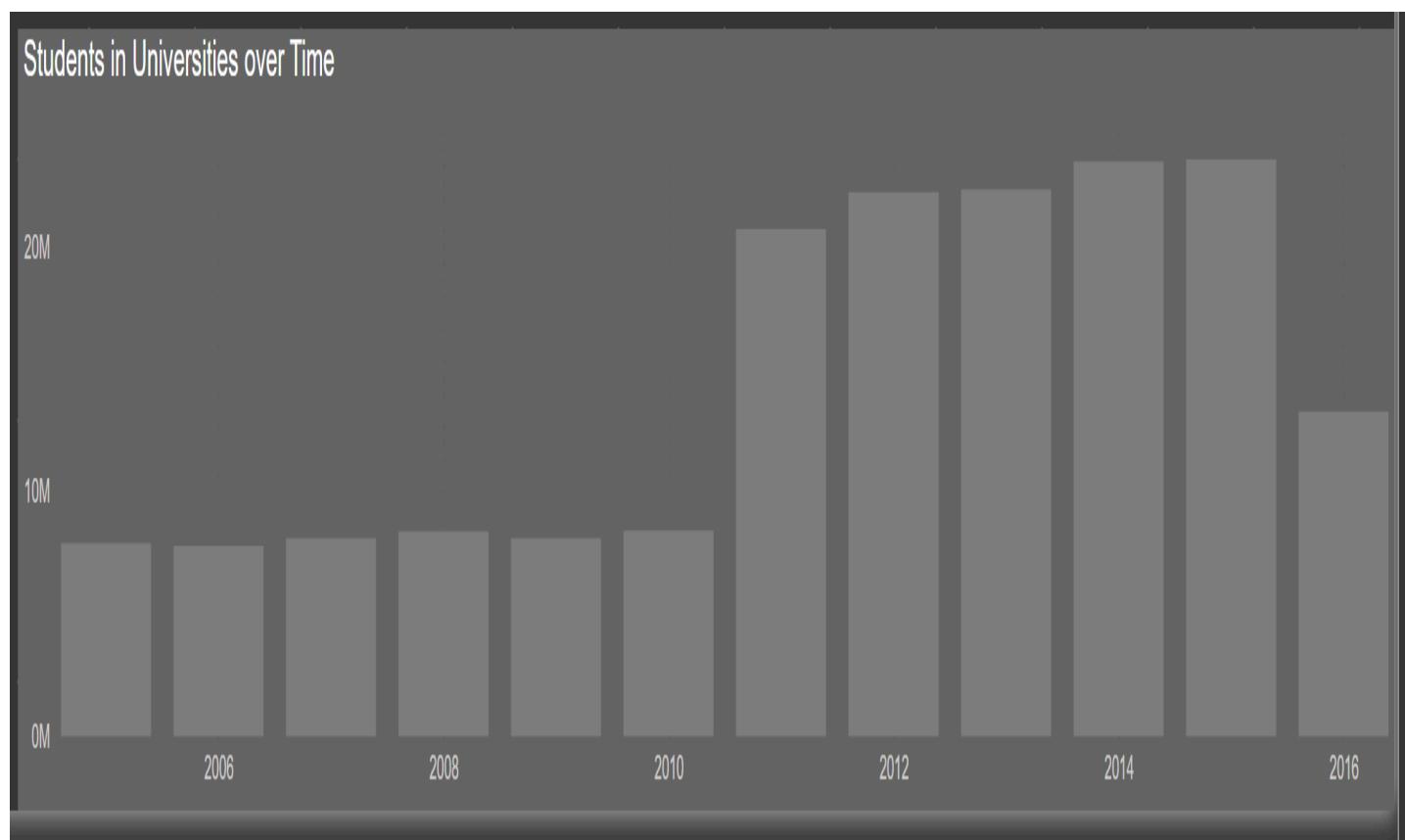


## How does the number of students change in universities over time?

From 2005 to 2010, there was a steady increase in the number of students enrolling in universities. Several reasons can contribute to this growth. These years coincided with a period of global economic expansion, creating opportunities for higher education and career development.

Between 2010 and 2015, there was a significant increase in student enrolment. This period likely witnessed the continuation of economic growth, as well as a demographic cohort of young individuals reaching university age.

However, the dip in student enrolment observed in 2016 may be attributed to a range of factors. Economic conditions can change, potentially affecting individuals' decisions to pursue higher education. A variety of global or regional events, including economic crises, political instability, or public health concerns, can disrupt enrolment patterns. The fluctuations in student enrolment reflect the interplay of economic, demographic, policy, and societal factors. These changes respond to evolving circumstances and priorities, shaping the landscape of higher education over time.



## Is there a correlation between university's ranking score and student staff ratio over the years?

In the context of our exploratory data analysis (EDA), we employed the correlation function in Microsoft Excel to assess the relationship between a university's ranking score and its student-staff ratio over a span of years. The correlation value obtained through this analysis was approximately 0.6. This correlation value suggests a significant and positive relationship between the two variables.

A correlation value of 0.6 indicates that there is a moderate to strong positive association between a university's ranking score and its student-staff ratio. In other words, as the ranking score tends to increase, the student-staff ratio also tends to rise. This finding suggests that universities with higher ranking scores are more likely to have larger student-staff ratios, potentially due to increased enrolment or resource allocation.

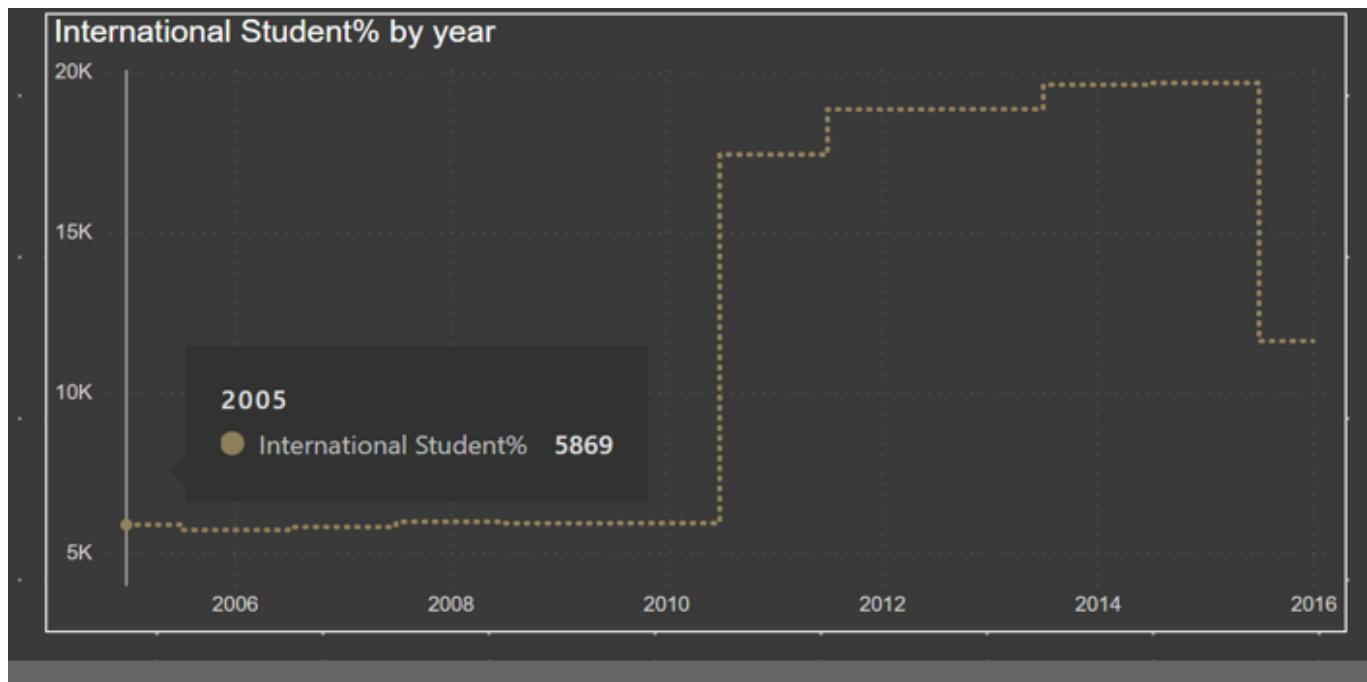
It's important to note that while correlation indicates a statistical relationship, it does not imply causation. Other factors may contribute to the observed relationship, such as the size and budget of the university. This insight gained from EDA provides valuable information for further analysis and investigation into the dynamics of university performance and student-staff ratios over the years.

| year | student staff ratio | s |
|------|---------------------|---|
| 2006 | 3,813.50            |   |
| 2005 | 3,928.50            |   |
| 2009 | 4,066.10            |   |
| 2007 | 4,181.60            |   |
| 2008 | 4,317.30            |   |
| 2010 | 4,334.70            |   |
| 2016 | 8,373.70            |   |
| 2011 | 13,189.70           |   |
| 2012 | 14,090.30           |   |
| 2013 | 14,197.70           |   |
| 2014 | 15,324.00           | 2 |
| 2015 | 15,431.30           | 2 |

## How does the percentage of international students vary across different years?

Analysing the evolving trends in the number of universities over time is a fundamental aspect of data analysis with profound implications. This dynamic view enables us to discern and comprehend long-term educational patterns, offering insights into the ever-changing educational landscape. Furthermore, it serves as a valuable tool for assessing the effectiveness of educational policies, reforms, and investments.

The values presented in the analysis are expressed as percentages, and they often exceed 100%. This might seem counterintuitive, but it occurs because these percentages result from the cumulative sum of changes across universities worldwide. This cumulative approach is employed to evaluate how the number of students has transformed during the specified period. It provides a comprehensive perspective on the long-term trend in student population, shedding light on the cumulative impact of annual changes and highlighting the overall growth or decline since the initial reference year of 2011. In essence, it offers a holistic view of the student population's evolution, underlining the cumulative influence of yearly fluctuations.

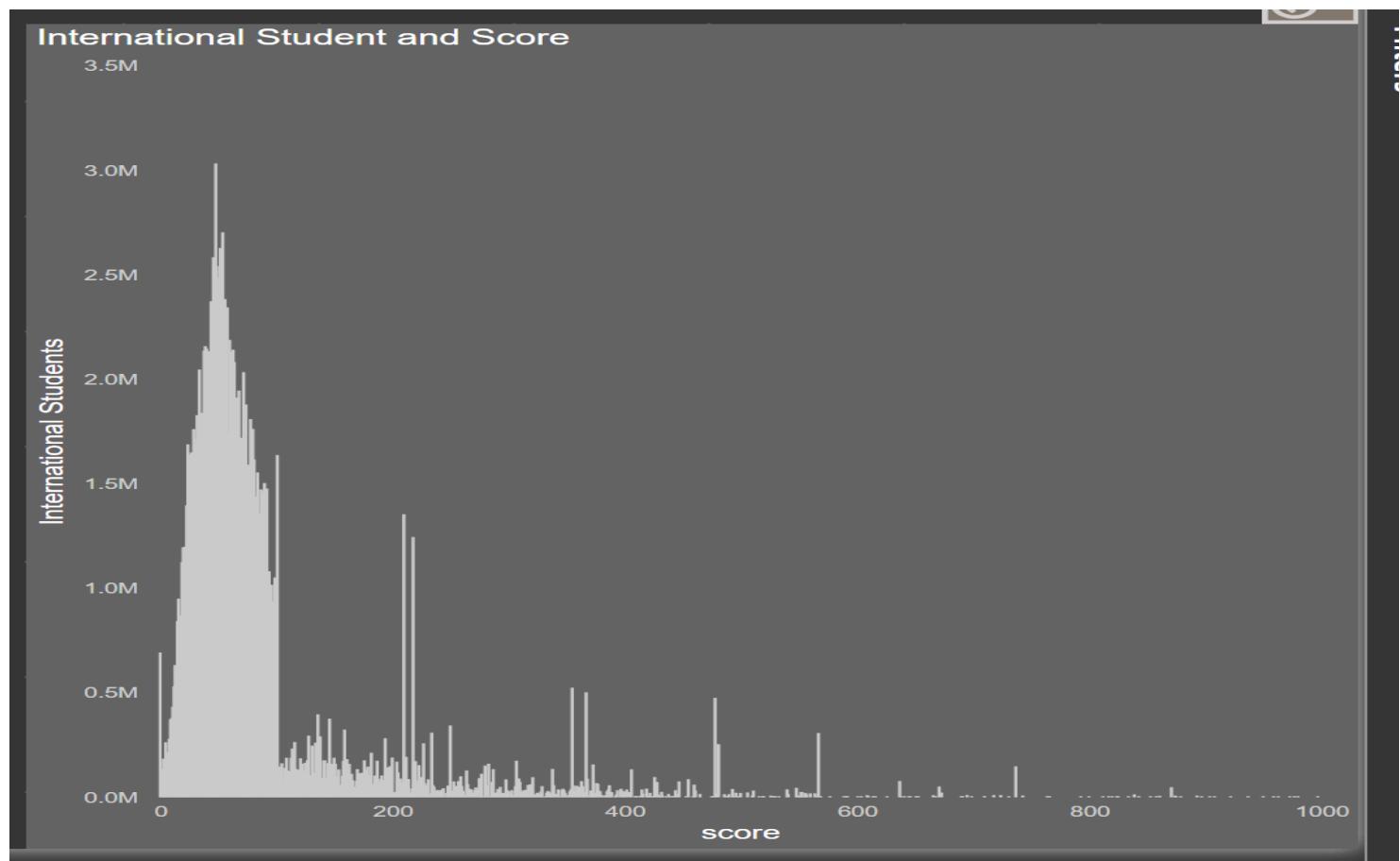


## Is there a correlation between universities score and the number of international students?

This analysis can help assess whether universities with higher ranking scores tend to attract more international students. It is important to note that correlation does not imply causation; it only measures the strength and direction of the relationship. Other factors may also influence the number of international students, such as a university's location, international programs, and scholarship offerings.

It appears that there is no clear or direct relationship between a university's score and the number of international students.

This lack of a direct relationship suggests that a university's ranking score does not strongly determine the number of international students it attracts. Other factors, such as a university's location, specific international programs, scholarship offerings, cultural appeal, or marketing efforts, may play a more significant role in influencing international student enrolment.

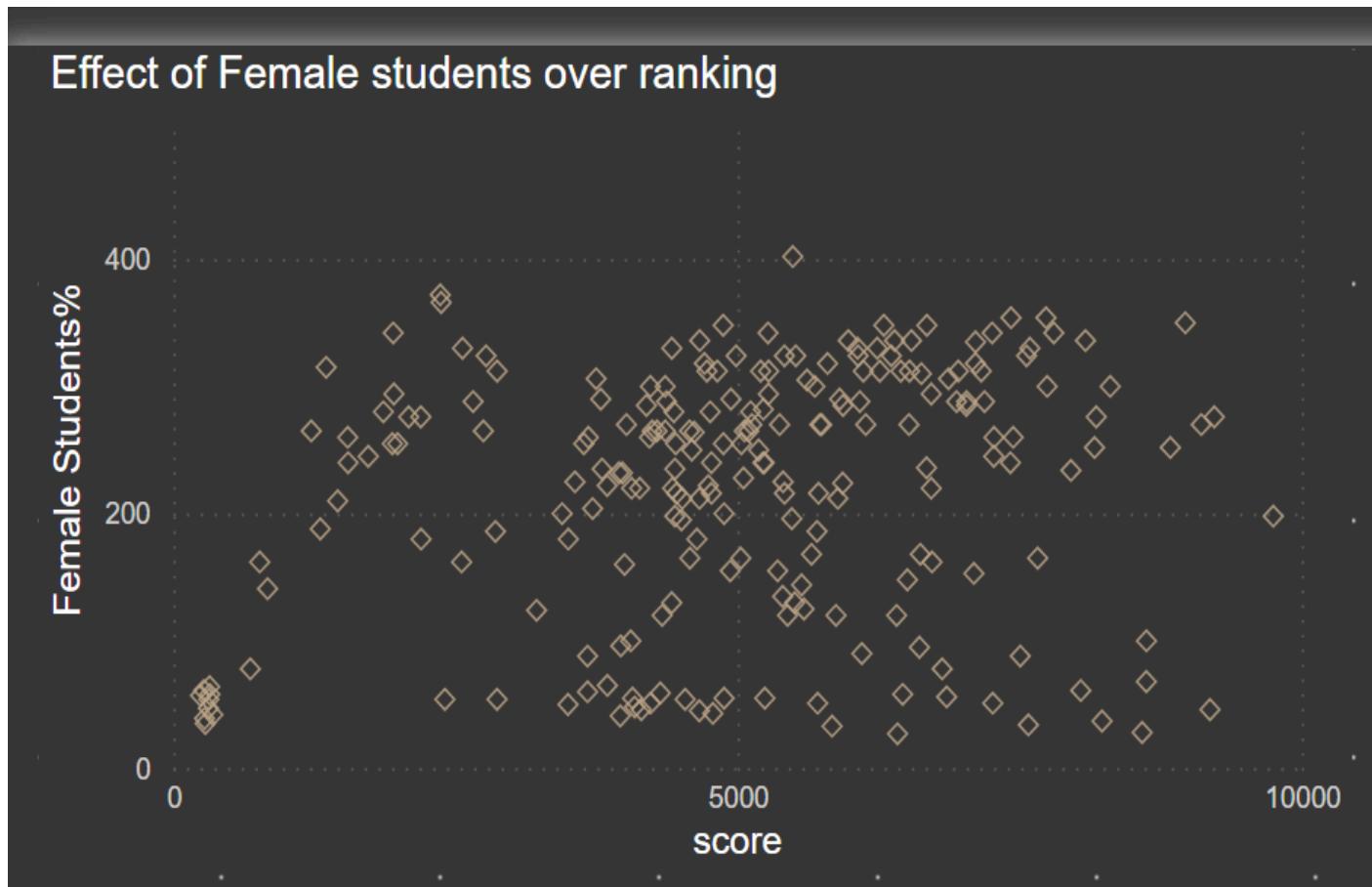


## How does the percentage of female students impact a university ranking?

It's important to note that while the percentage of female students can indirectly influence a university's ranking, it is just one of many factors considered in the complex process of university rankings. Rankings typically encompass a wide range of criteria, including academic excellence, research output, faculty quality, international reputation, and more. Therefore, while gender diversity and female representation are valuable, they are just one piece of the larger puzzle in university rankings.

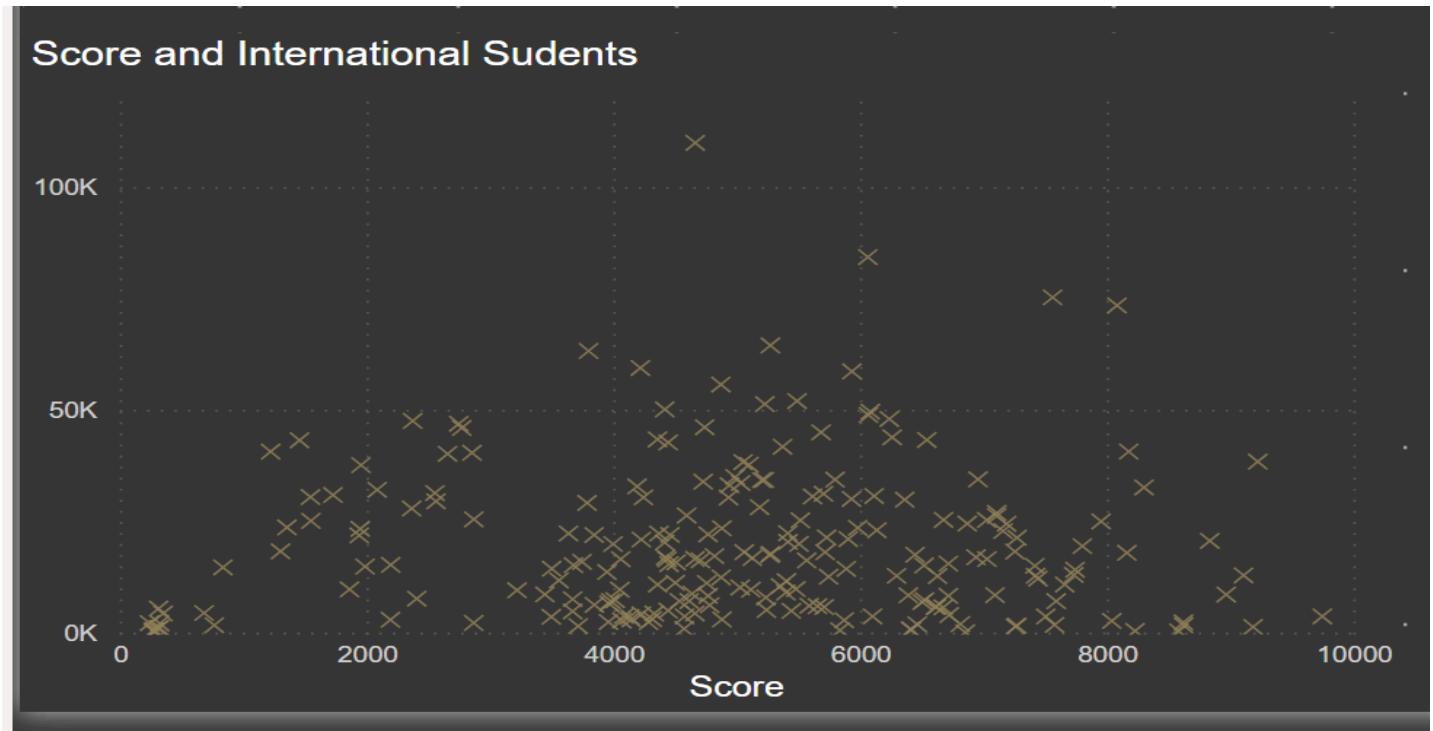
In scatter plot graph, the absence of a clear and discernible pattern, such as a line forming among data points, suggests that there is no strong or significant relationship between the two variables being compared. When points are scattered randomly without forming a distinct pattern, it indicates a lack of correlation or association between the variables.

The fact that data points are clustered within the 200%-400% range for the percentage of female students and around a score of 5000 suggests that many universities fall within these specific value ranges. This could be because a significant number of universities have a similar representation of female students and tend to score around 5000 according to the ranking system.



## What is the impact of university's ranking on the number of international students it attracts?

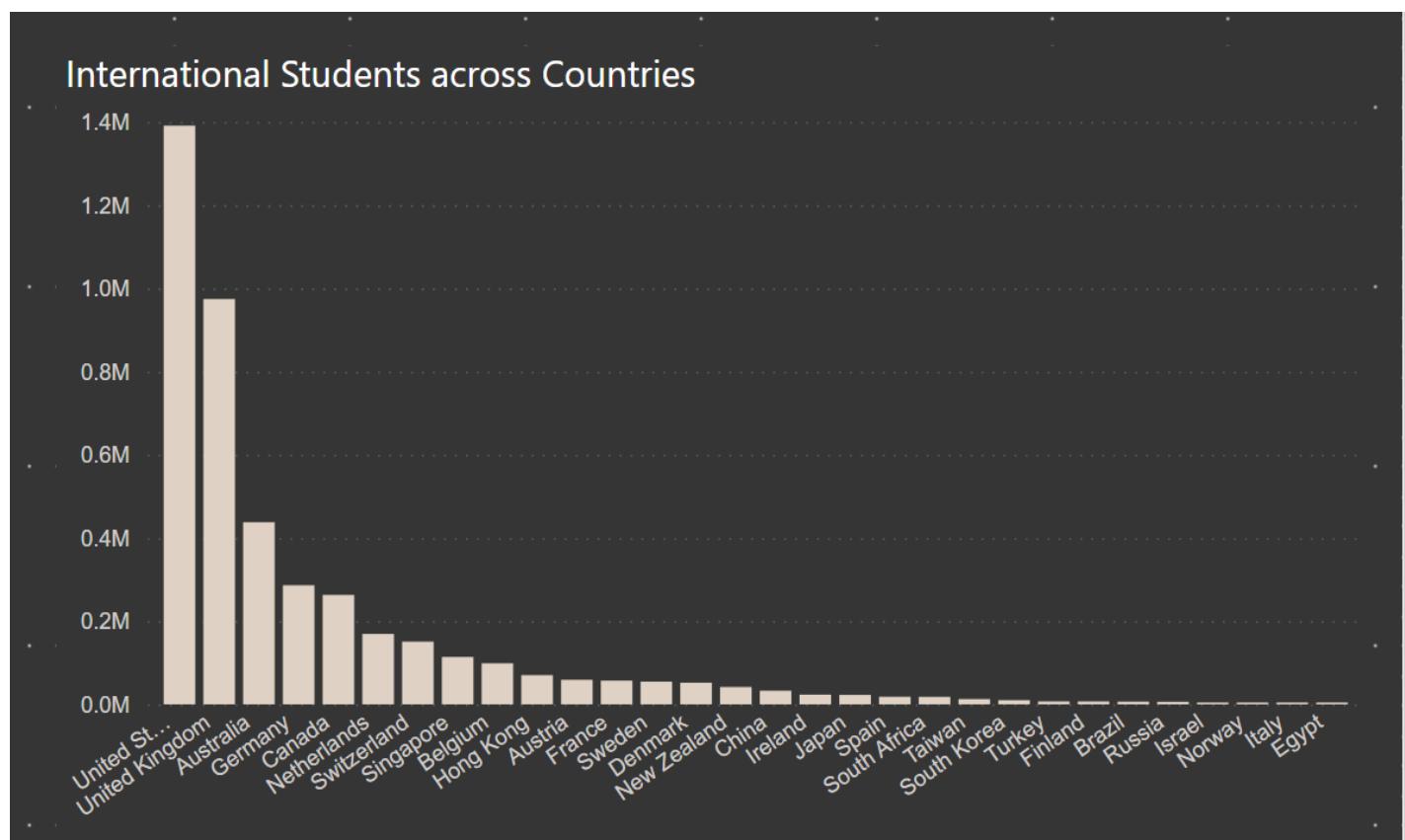
The concentration of data points between a strength of international students up to 50,000 and scores between 4,000 and 6,000 in a dataset can offer valuable insights into the characteristics and performance of universities within that range. This concentration often suggests that a significant proportion of the represented universities share common attributes or outcomes in terms of international student enrolment and their corresponding scores. These universities likely offer an educational experience that appeals to a specific segment of international students or they may operate in regions or sectors where such characteristics are the norm. It can be seen as a benchmark range that defines the competitive landscape for universities aspiring to attract international students while maintaining a certain level of academic quality. Exploring the specific reasons behind this concentration, such as the presence of popular programs, favourable geographic locations, or effective recruitment strategies, can provide a deeper understanding of the dynamics at play within this range and guide universities in shaping their international student enrolment strategies. Furthermore, analysing the outliers falling outside this concentration can shed light on what distinguishes them and the factors contributing to their exceptional or subpar performance in this context.



## What is the distribution of international students across different countries?

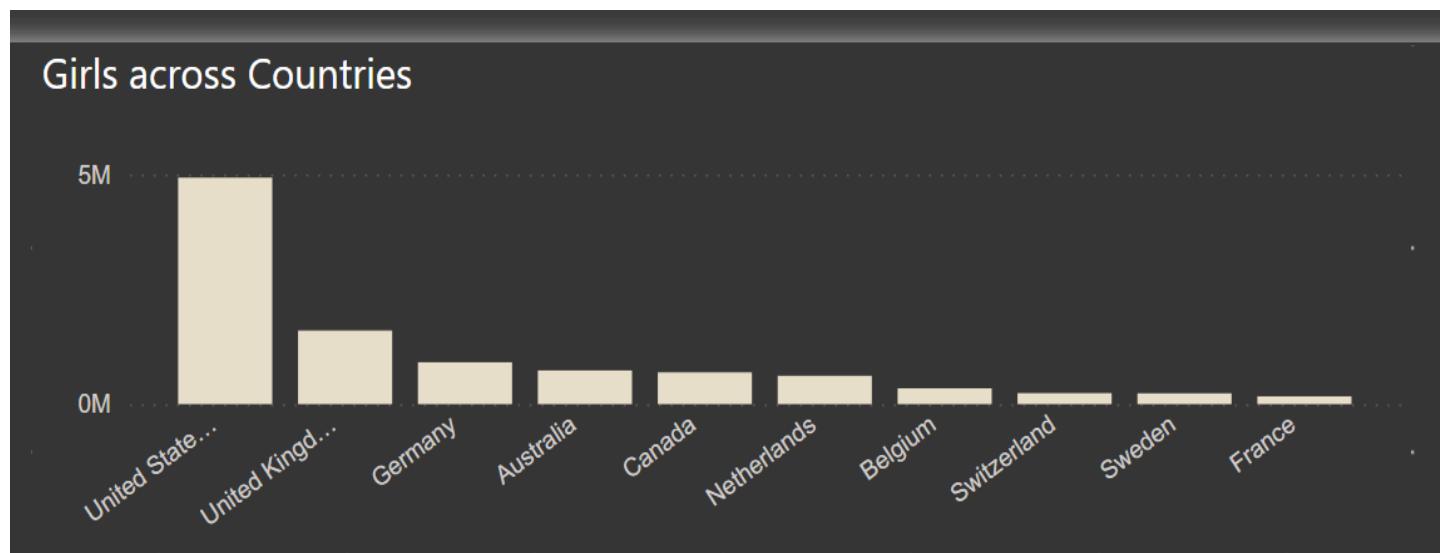
The distribution of international students across different countries is a reflection of the diverse choices and preferences of students seeking higher education opportunities abroad. This distribution is characterized by a variety of factors, including the reputation of the host country's education system, economic considerations, cultural and language affinity, and government policies.

The United States, the United Kingdom, and Australia stand out as leading destinations for international students due to a combination of factors that make them highly appealing. These countries offer world-class education, a wide array of academic programs, and a culturally diverse environment. Their use of English as the primary language of instruction and communication provides a significant advantage to international students aiming to develop strong language skills. Additionally, these countries are known for their safety, quality of life, and excellent post-graduation work opportunities, making them ideal choices for those seeking a well-rounded educational experience. Moreover, the global recognition of their educational institutions and degrees ensures that international students are well-prepared for future career opportunities on a global scale. The scholarship opportunities and extensive alumni networks further enhance the attractiveness of these countries as educational destinations. While these countries lead in terms of international student numbers, the educational landscape is rich with other countries that offer diverse and valuable experiences for students worldwide.



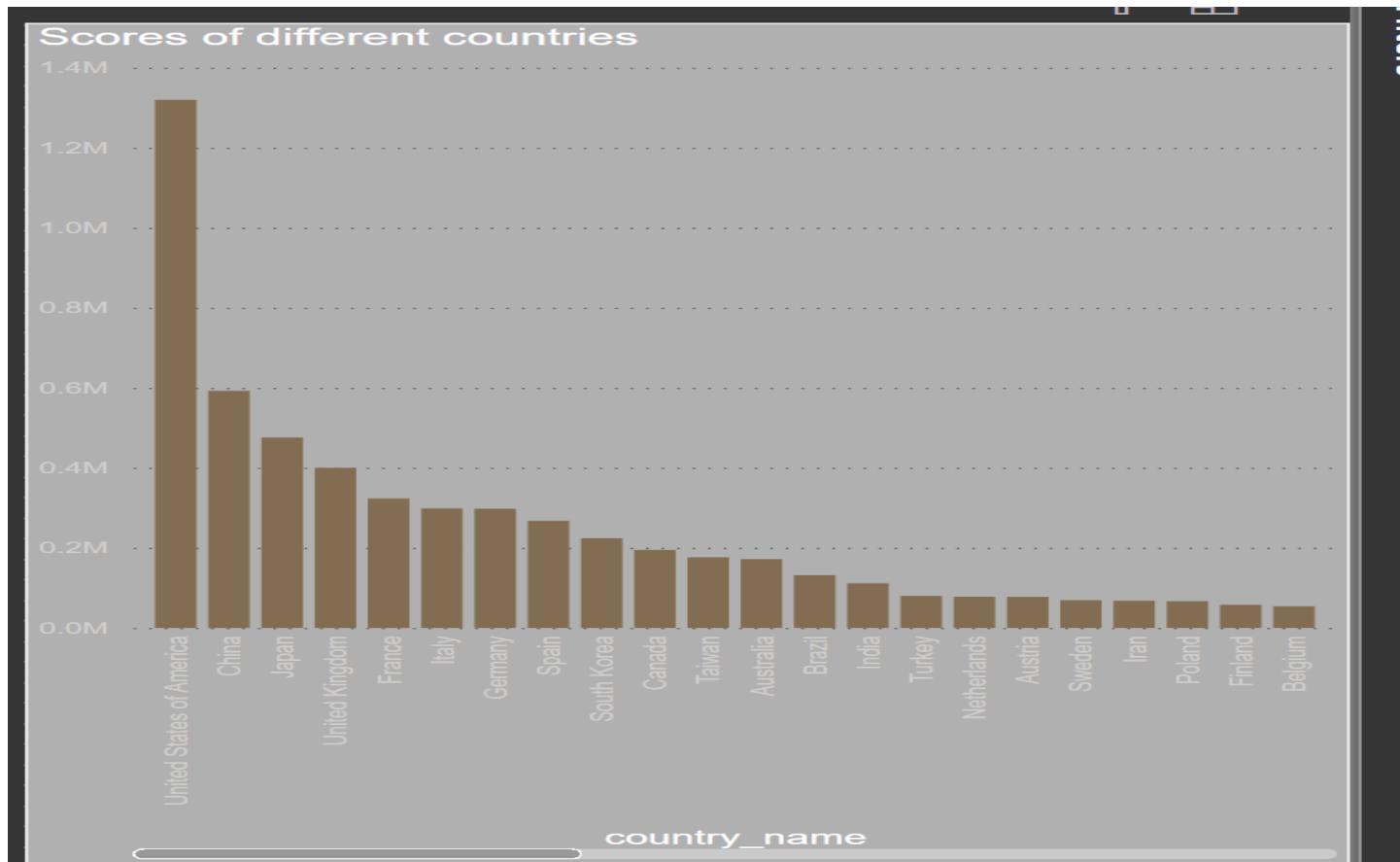
## Which country has the highest number of females enrolled in universities?

The USA, the UK, and Germany's status as top countries with the highest enrolment of female students reflects their strong appeal as educational destinations. These nations, characterized by their developed economies, offer a range of advantages for female students seeking higher education. They provide quality education, a culturally diverse atmosphere, and a strong commitment to gender equality, all of which create a supportive and inclusive environment for women pursuing academic excellence. Additionally, their proficiency in English as a language of instruction, post-graduation work opportunities, and a focus on research and innovation make these countries attractive options for female students with a wide array of interests and career aspirations. While these nations lead in terms of female enrolment, it's important to note that the global landscape of women in education is evolving, with various countries making concerted efforts to provide inclusive and empowering educational experiences for women worldwide.



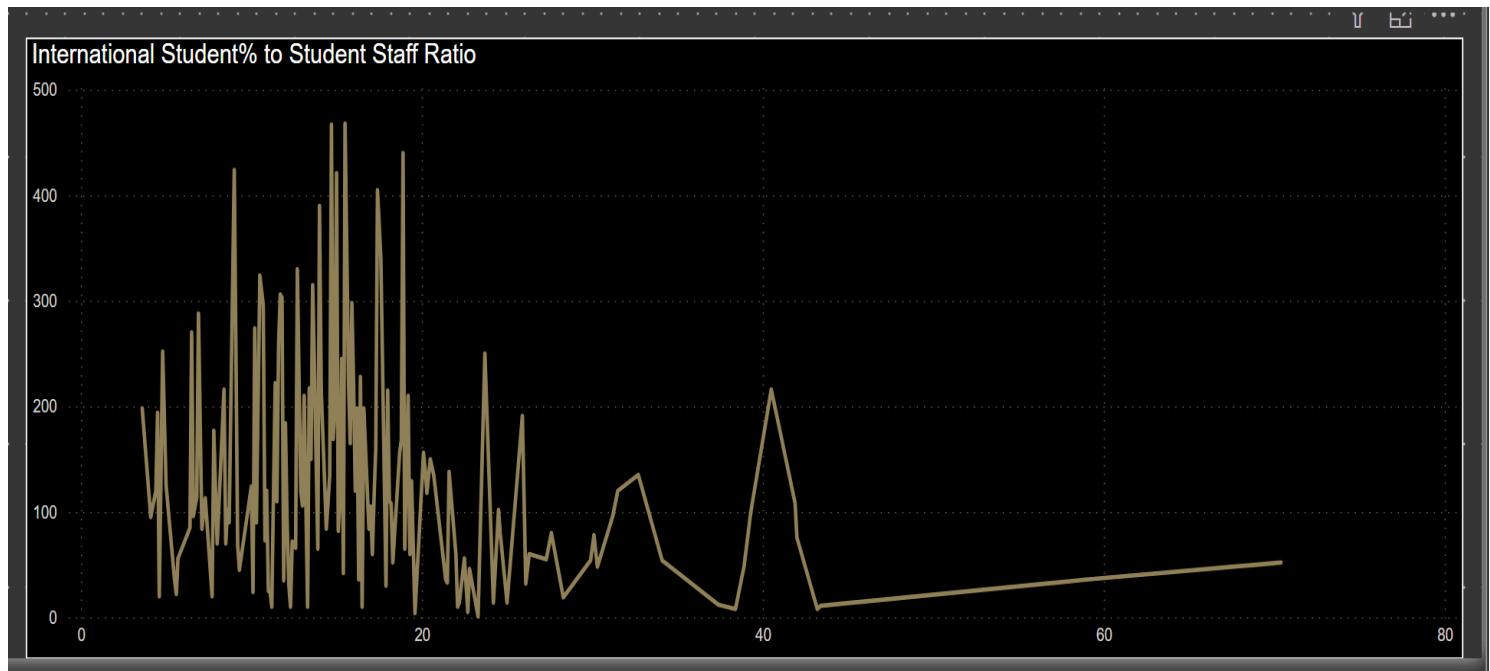
## Are there any significant trends or patterns in the rankings of universities from different countries?

The rankings of universities from different countries reveal several significant trends and patterns within the global higher education landscape. These patterns highlight the influence of factors like regional strengths, government policies, research output, and resources on a university's ranking. Leading countries, such as the United States, China and Japan often dominate the top positions due to their well-established education systems and prestigious institutions. However, emerging economies have shown remarkable progress, with universities in Asia, the Middle East, and Latin America making strides in the rankings. Research output and impact, influenced by prolific research and high citation rates, continue to play a crucial role. Government policies, funding availability, and the support of research and innovation have a substantial impact.



## How does the percentage of international students affect a university's student staff ratio?

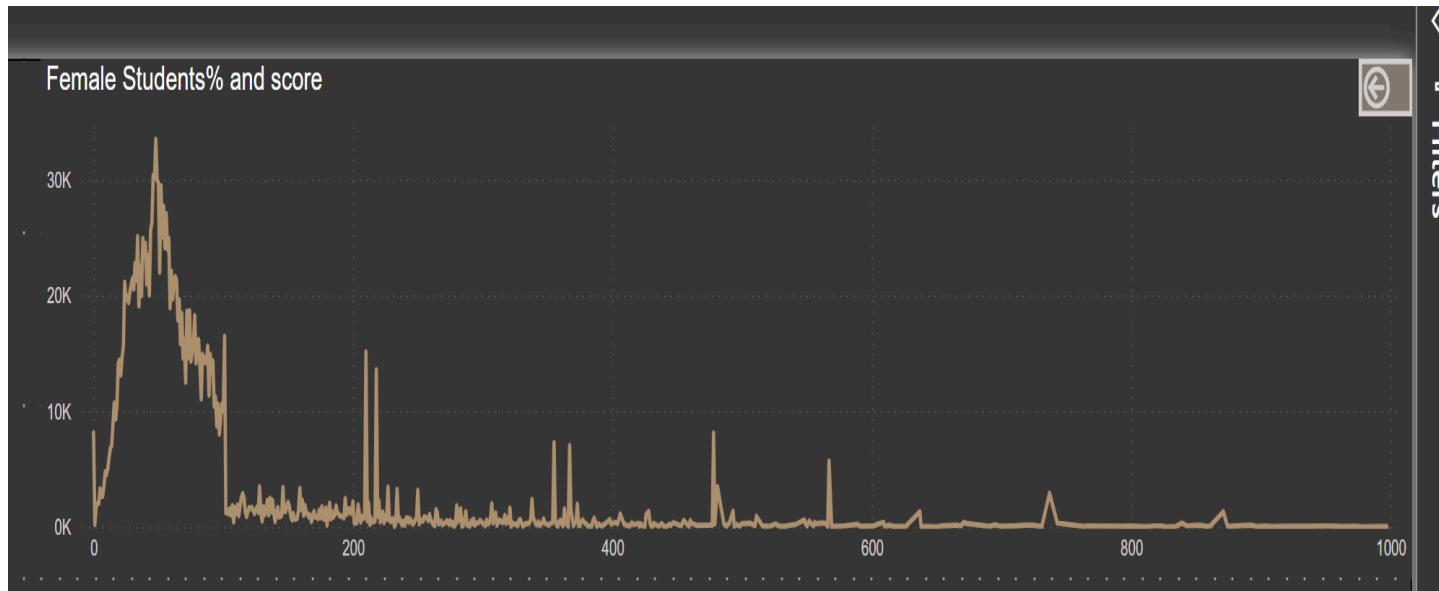
In a line chart where you observe a concentration of lines for international student percentages up to 300% and student-staff ratios up to 20, it indicates a notable clustering of universities around these specific values. This concentration signifies that a significant portion of the analyzed universities fall within this range. Such a pattern can be attributed to several factors, including shared practices, benchmarks, and competitive positioning. Universities often seek to strike a balance between international student enrollments and student-staff ratios, and these specific ranges may represent optimal or competitive values within the higher education landscape. Furthermore, government policies, institutional priorities, and regional or global trends can influence universities to gravitate towards these particular values. While the chart highlights this concentration, deeper analysis is essential to understand the unique circumstances and strategies of universities falling within this range and the implications for their overall competitiveness and academic performance.



## Is there a relationship between university's ranking score and percentage of female students enrolled?

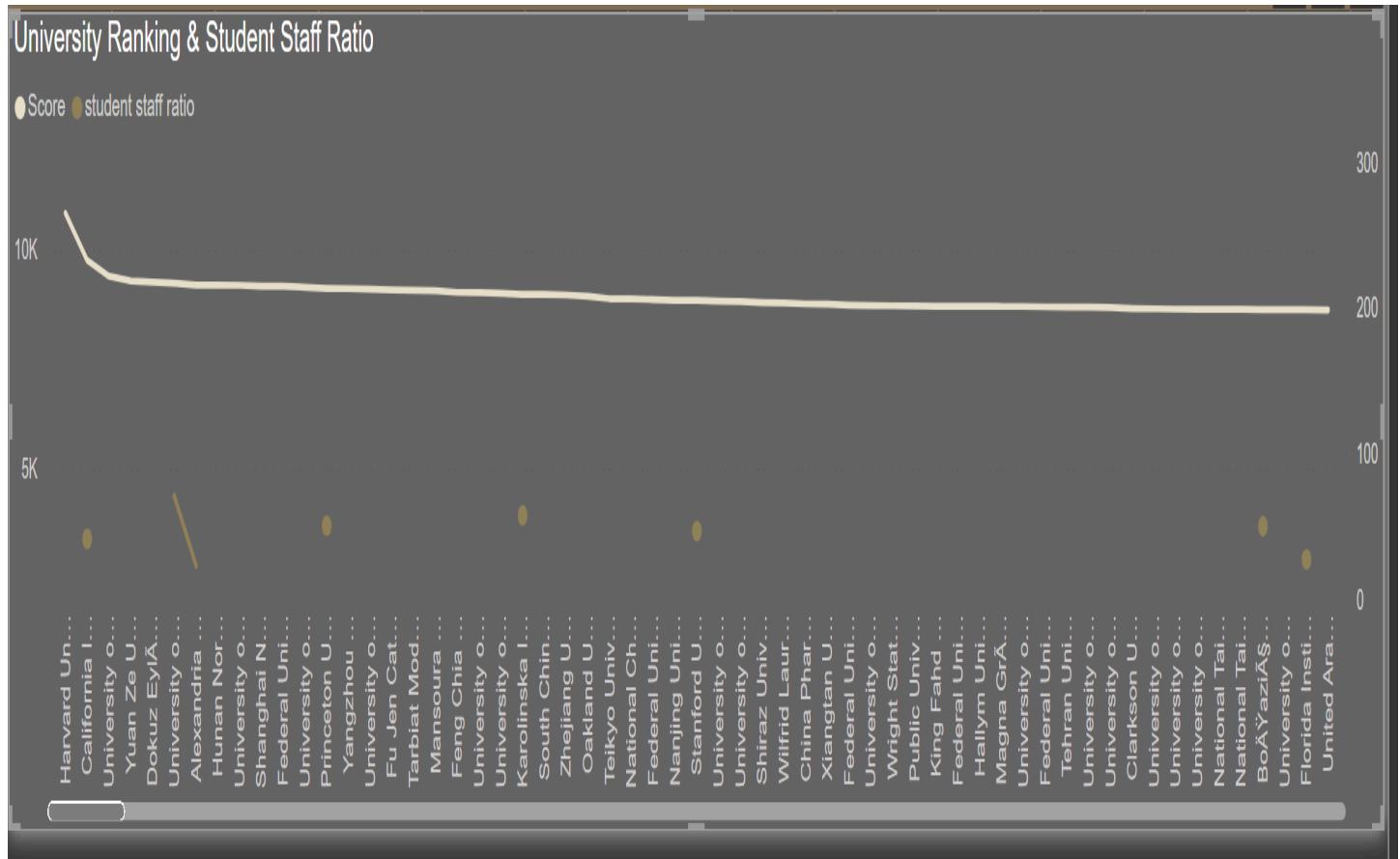
The lack of a visible relationship between a university's ranking score and the percentage of female students enrolled suggests that these two variables do not exhibit a strong or discernible correlation. In other words, there is no clear, consistent pattern that indicates that universities with higher ranking scores tend to have a particular percentage of female students, or vice versa.

It's important to note that while there may not be a direct relationship between ranking scores and the percentage of female students, gender diversity and inclusion remain important aspects of higher education. Many universities actively promote diversity and equality in their student populations, contributing to a broader social and educational benefit.



## Is there a correlation between university's ranking and student staff ratio?

The relationship between a university's ranking and its student-staff ratio is not a one-size-fits-all scenario. While there may be cases where a strong relationship exists, it is not universally applicable to all universities. The extent of the relationship can be influenced by the specific ranking system, the university's priorities, regional factors, and the dynamic nature of student-staff ratios over time.



## **Conclusion**

In this analysis, we set out to compare university rankings across different systems, assess the impact of ranking criteria on university positions, and analyze changes in university metrics over time. We utilized SQL and Excel for data aggregation and exploratory data analysis (EDA) and created a Power BI dashboard to provide a comprehensive view of university rankings.

Our dataset included information on university rankings from three distinct systems: Times Higher Education World University Ranking, Shanghai Ranking, and the Center for World University Rankings. We also had data on various ranking criteria, such as Citations and Quality of Education, which are used in these ranking systems. Additionally, we examined university-specific data, including the number of students and the student-to-staff ratio, over multiple years.

Through our analysis, we identified various trends and insights in the data. We observed that university rankings can vary significantly across different systems due to their unique criteria and methodologies. While some criteria, like research output and academic reputation, are common across ranking systems, there are also distinct, domain-specific criteria that differ among them.

We noted that the number of universities ranked and their performance evolved over the years, with universities from different countries and regions exhibiting diverse trends. Some universities maintained consistent rankings, while others saw fluctuations.

Furthermore, we explored the relationships between ranking criteria, student demographics, and university rankings. Notably, we found that certain criteria had a strong impact on a university's ranking, while others showed a less significant influence.