



6 Month Certificate Course on AI & Data Science,

Offered by,

**Center for Microprocessor Applications for Training Education and Research (CMATER)
Computer Science & Engineering Department,
Jadavpur University, Kolkata-700032**

**Project Title: Comprehensive Analysis of Global College Data using
Tableau**

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Batch: 9th batch

Year: 2025 – 2026

Software Used: Tableau Public Edition

Dataset: College Data.csv (50,000 records and 12 attributes)

Tableau Public Link :

https://public.tableau.com/views/College_data_dashboard_by_Srijit/Dashboard1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Introduction

The purpose of this project is to study and understand how different factors affect the performance of colleges and their students across the world. Using a large dataset that includes information about students, faculty, research work, and placements, this analysis tries to find out what makes some colleges perform better than others.

To make sense of the large amount of data, the visualization tool Tableau has been used. Tableau helps in turning large and complex datasets into colorful and easy-to-understand charts, graphs, and dashboards. Instead of just reading numbers, we can now see clear patterns and relationships between academic results, family income, gender balance, and other important aspects of college life.

The dataset used in this project contains 50,000 records, each representing a college from different countries such as India, Japan, Singapore, Switzerland, the United Kingdom, and the United States. Every record provides detailed information, including the total number of students, the number of male and female students, the average CGPA, the annual family income of students, the branch of study, the sports activities offered, the number of research papers published, the placement rate, and the faculty count of the institution.

Through this analysis, we aim to understand several key questions:

- How do academic results differ across countries and branches of study?
- Does family income influence students' CGPA or placement rate?
- Do colleges with more faculty members produce more research work?
- How does gender balance vary from country to country?
- Does participation in sports have any connection with academic or placement performance?

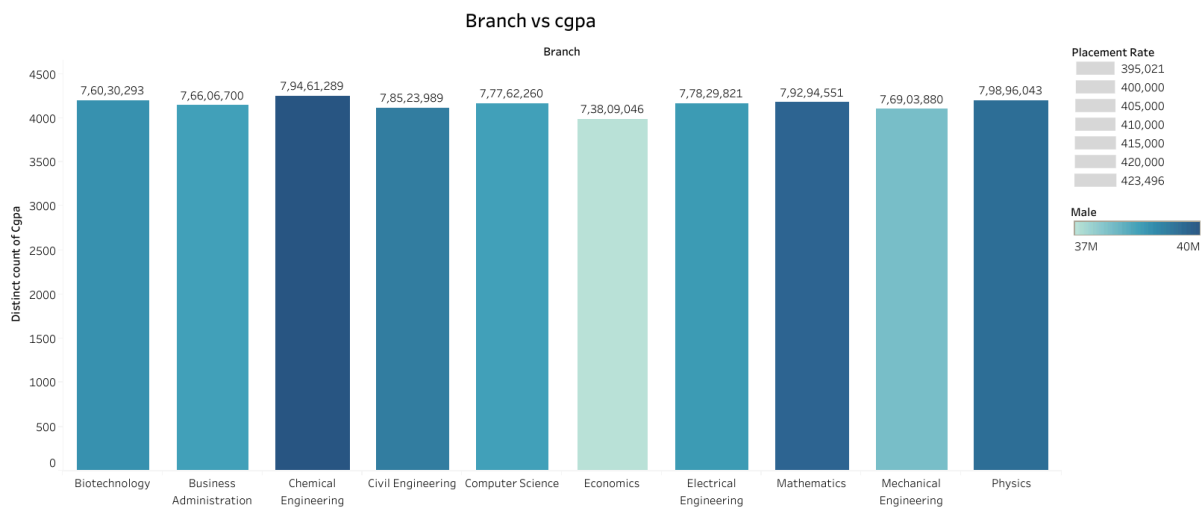
By exploring these questions through interactive Tableau dashboards, this project highlights the relationships between academic and non-academic factors. The goal is not only to analyze the data but also to tell a story about how education systems perform globally and what factors help students and colleges succeed.

In simple terms, this project is about seeing how education, opportunity, and performance come together. The Tableau dashboard gives a visual summary of all these aspects, making it easier to understand how academic achievement, research strength, gender equality, economic background, and extracurricular activities shape the overall performance of educational institutions worldwide.

Branch-wise Academic Performance :

This part of the project focuses on studying how students perform academically in different branches of study. The goal is to understand which fields show stronger academic results and which ones have comparatively lower averages. For this purpose, the average CGPA (Cumulative Grade Point Average) has been used as a main indicator of academic performance across various disciplines such as Physics, Mathematics, Computer Science, Biotechnology, Civil Engineering, Mechanical Engineering, Electrical Engineering, Economics, Chemical Engineering, and Business Administration.

The data for each branch was analyzed using a horizontal bar chart, which clearly shows how the average CGPA differs from one field to another. This type of visualization makes it easier to compare performance at a glance, without needing to go through large tables of numbers. From the analysis, it was observed that branches like Physics and Mechanical Engineering stand out with the highest average CGPA. This suggests that students in these areas are performing exceptionally well academically, possibly due to stronger faculty involvement, better lab facilities, or a more research-oriented environment. On the other hand, branches such as Business Administration and Civil Engineering showed moderate CGPA averages, indicating that while their academic performance is steady, it may not be as high as in some of the science or engineering fields.

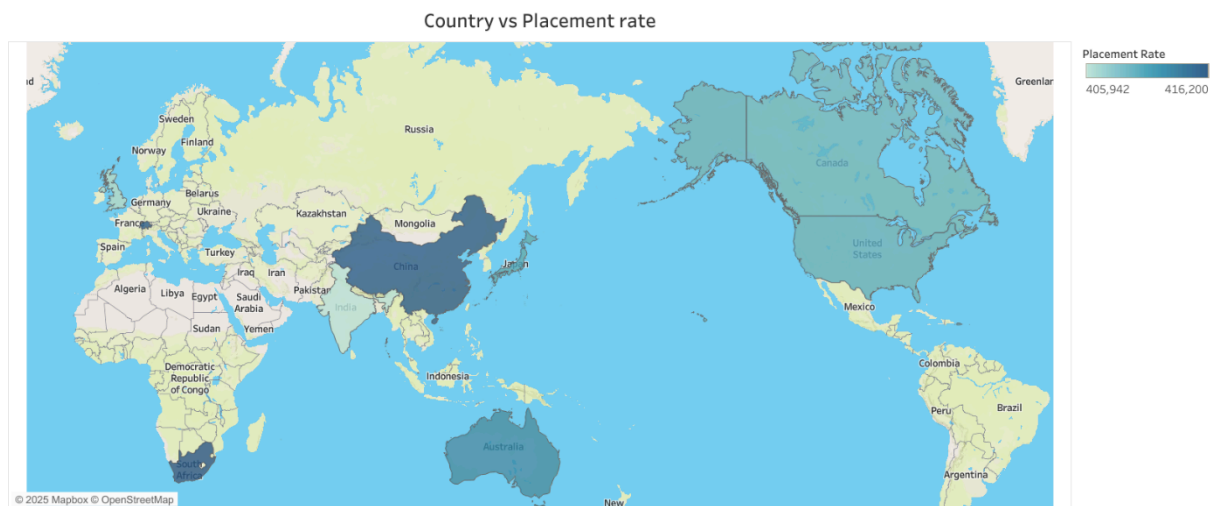


The visualization also helps in identifying patterns that could be useful for academic planning. For instance, understanding which branches are performing better could help colleges focus more attention or resources on those that are struggling. Similarly, branches with high CGPA averages could be studied further to understand what teaching methods or academic policies contribute to their success.

In simple terms, this sheet helps us see how students from different branches are performing academically and provides a clear, visual comparison of their overall results. It turns raw data into an insightful picture of how different areas of study are doing, helping educators and researchers understand where improvements or deeper studies may be needed.

Country vs Placement Rate :

This part of the project focuses on understanding how placement opportunities differ from one country to another. The aim is to study how effectively colleges across different nations are able to place their students in suitable jobs after graduation. To do this, a geographical map was used in Tableau to visualize the average placement rate of colleges in each country. The map gives a clear and visually engaging picture of global employment trends in higher education.



In this map-based visualization, each country is represented with a color scale that reflects its placement performance — countries with higher placement rates appear in deeper or brighter colors, while those with lower rates are shown in lighter shades. This approach makes it easy to spot regional differences and compare the overall success of colleges worldwide.

From the analysis, it was found that countries like Singapore, Japan, and the United States have some of the highest placement rates. These nations are known for their strong educational systems, industry partnerships, and job-oriented curricula, which likely contribute to their high employability levels. Students in these countries seem to benefit from better campus recruitment systems and a strong connection between academic learning and real-world job markets.

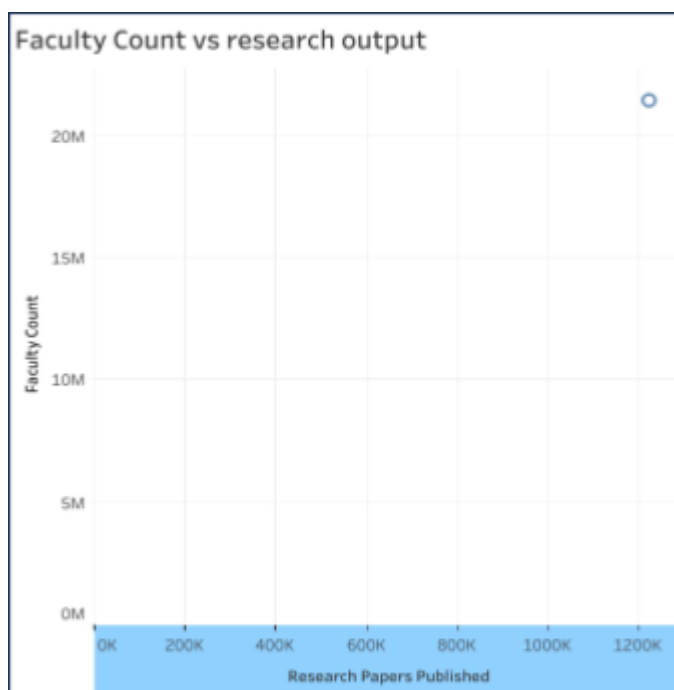
On the other hand, countries such as India, China, and South Africa show moderate placement outcomes. While these regions have large numbers of students graduating every year, competition for jobs, economic diversity, and varying quality among institutions can influence placement success. However, these countries also show signs of improvement, as many colleges are adopting global education standards and investing more in skill-based learning and internship programs.

Overall, this visualization highlights the global variation in employment success among graduates and gives a clear picture of where students are most likely to secure jobs after completing their studies. It also encourages us to think about the factors that help some countries perform better in placements — such as stronger university-industry ties, better career guidance, and a focus on practical learning.

The filled map not only makes these differences easier to interpret but also transforms statistical data into a story about education and opportunity across the world. It helps educators, policymakers, and researchers understand how the higher education system connects with the global job market and what improvements can be made to bridge the gap where placement rates are lower.

Faculty Count vs Research Output :

This part of the project focuses on exploring the relationship between the number of faculty members in a college and its overall research productivity. The main idea is to see whether institutions with more teachers and researchers tend to produce more research papers and contribute more to academic knowledge. To visualize this relationship, a scatter plot was



created in Tableau, where each point on the chart represents a college, showing its faculty strength along one axis and the number of research papers published along the other.

The scatter plot provides a clear and meaningful pattern, it shows that as the faculty count increases, the research output also tends to rise. In other words, colleges that have a larger number of teaching and research staff are generally able to produce more research publications. This makes sense because when there are more qualified educators and researchers, there is greater opportunity for collaboration, innovation, and

academic activity.

From the analysis, it was noticed that Engineering and Physics departments stand out prominently for their strong research performance. These fields often require laboratory work, experimentation, and continuous innovation, which naturally lead to more research papers and scientific contributions. The presence of experienced faculty members and research scholars in these departments further strengthens their productivity.

This visualization helps us understand the crucial role that teachers and academic staff play in shaping a college's research success. Research is not just about individual effort; it thrives in an environment that supports mentorship, discussion, and shared expertise. Hence, institutions with a well-balanced and adequately sized faculty body tend to perform better in producing quality research output.

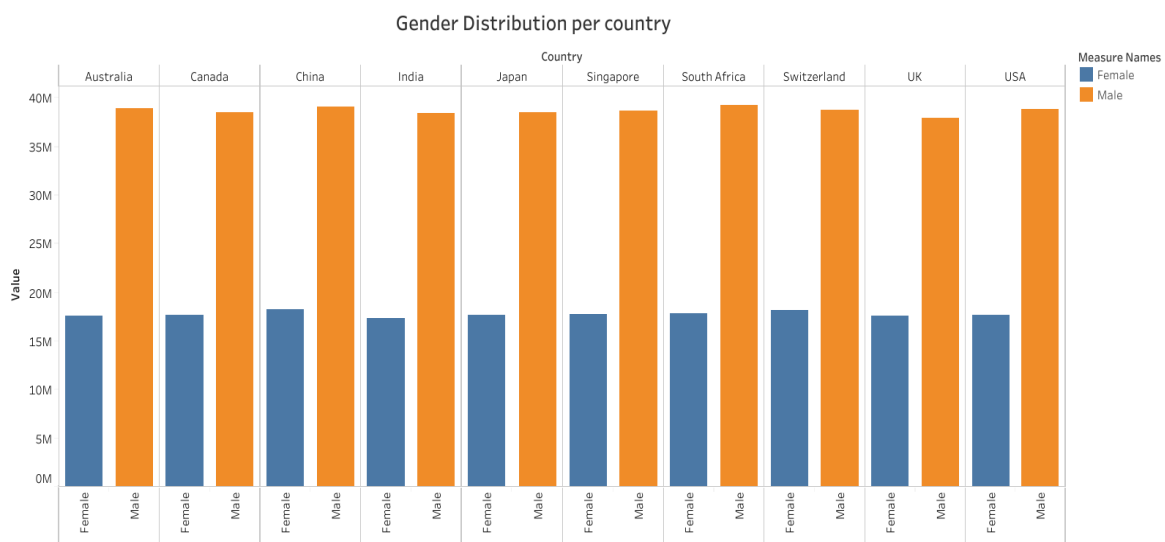
Moreover, the chart highlights how investment in hiring and retaining qualified faculty members directly benefits the institution's overall academic reputation. It also suggests that colleges looking to improve their research outcomes should focus on creating a supportive

environment for their teaching staff — one that encourages collaboration, offers research facilities, and values innovation.

In simple terms, this part of the dashboard visually confirms that a strong teaching and research workforce is the backbone of academic growth. It clearly shows that when colleges invest in people, they also invest in progress — and that is what drives research excellence across different fields and institutions.

Gender Distribution per Country :

This section of the project focuses on examining how male and female student populations are distributed across different countries. The purpose of this analysis is to understand the level of gender balance in higher education and to see if certain regions show more equality in educational participation than others. Using Tableau, a stacked bar chart was created to visually represent the proportion of male and female students within each country.



The chart gives a clear picture of how gender representation varies globally. Each bar in the visualization represents a country, and within that bar, the different colors show the share of male and female students. This simple yet effective chart allows viewers to quickly notice where gender balance is achieved and where differences still exist.

From the analysis, it can be observed that countries like the United States, the United Kingdom, and Canada show a fairly balanced distribution between male and female students. These nations have long invested in promoting gender equality in education, and their results reflect a more inclusive academic environment. In contrast, some countries in Asia, such as India, China, and Japan, show a slightly higher number of male students compared to females. While this gap is not extremely wide, it still highlights the ongoing need to encourage more female participation in science, technology, and research-oriented fields. This visualization is important because it helps reveal social and cultural patterns behind education. Gender balance in higher education is not only a matter of equality but also an indicator of how accessible education is for everyone, regardless of gender. A country with a

balanced ratio often benefits from diverse perspectives in classrooms, improved collaboration, and greater innovation.

Overall, the Gender Distribution per Country sheet provides valuable insight into the inclusiveness of education systems around the world. It reminds us that promoting gender equality in universities and colleges is not just about numbers — it is about creating equal opportunities for all learners to contribute to knowledge and society. The visualization transforms this idea into a simple and engaging graphic, helping us understand the real-world picture behind global education trends.

Family Income vs CGPA :

This part of the project explores how a student's economic background might influence their academic performance. The main goal of this analysis is to understand whether higher family income leads to better academic results, or if performance depends more on personal effort and institutional support. To study this relationship, a scatter plot was created in Tableau, comparing the average annual family income of students with their average CGPA (Cumulative Grade Point Average).

Each point in the scatter plot represents a group of students or colleges, showing how income and academic results are related.

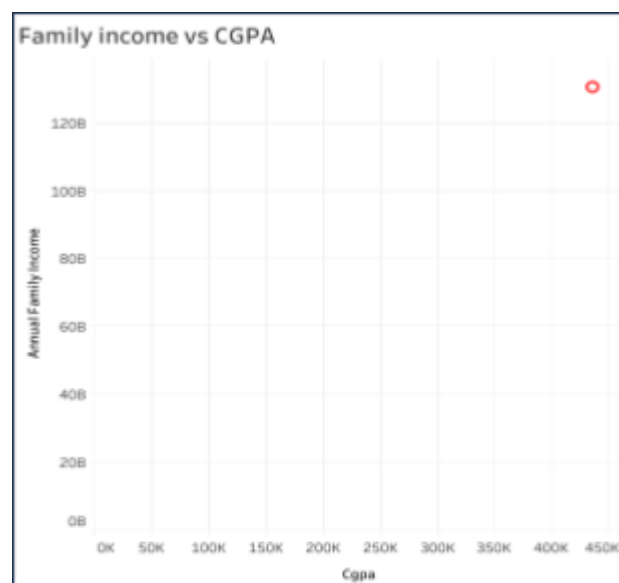
The graph allows us to visually see whether there is any noticeable trend — for example, whether higher income levels are linked with higher CGPAs, or whether students from all income levels perform similarly.

From the visualization, it can be seen that there is a moderate positive relationship between family income and CGPA. In general, students who come from higher-income families tend to have

slightly higher academic scores. This could be because they have access to better educational resources, private coaching, modern technology, or supportive study environments. However, the relationship is not absolute — there are also many students from middle- and lower-income backgrounds who perform exceptionally well. This shows that while income can provide certain advantages, it is not the only factor that determines success.

The chart also highlights an important social insight: education quality and achievement are influenced by multiple factors — including personal motivation, teaching quality, institutional facilities, and support systems. Economic background might create differences in opportunities, but it does not define a student's ability or potential.

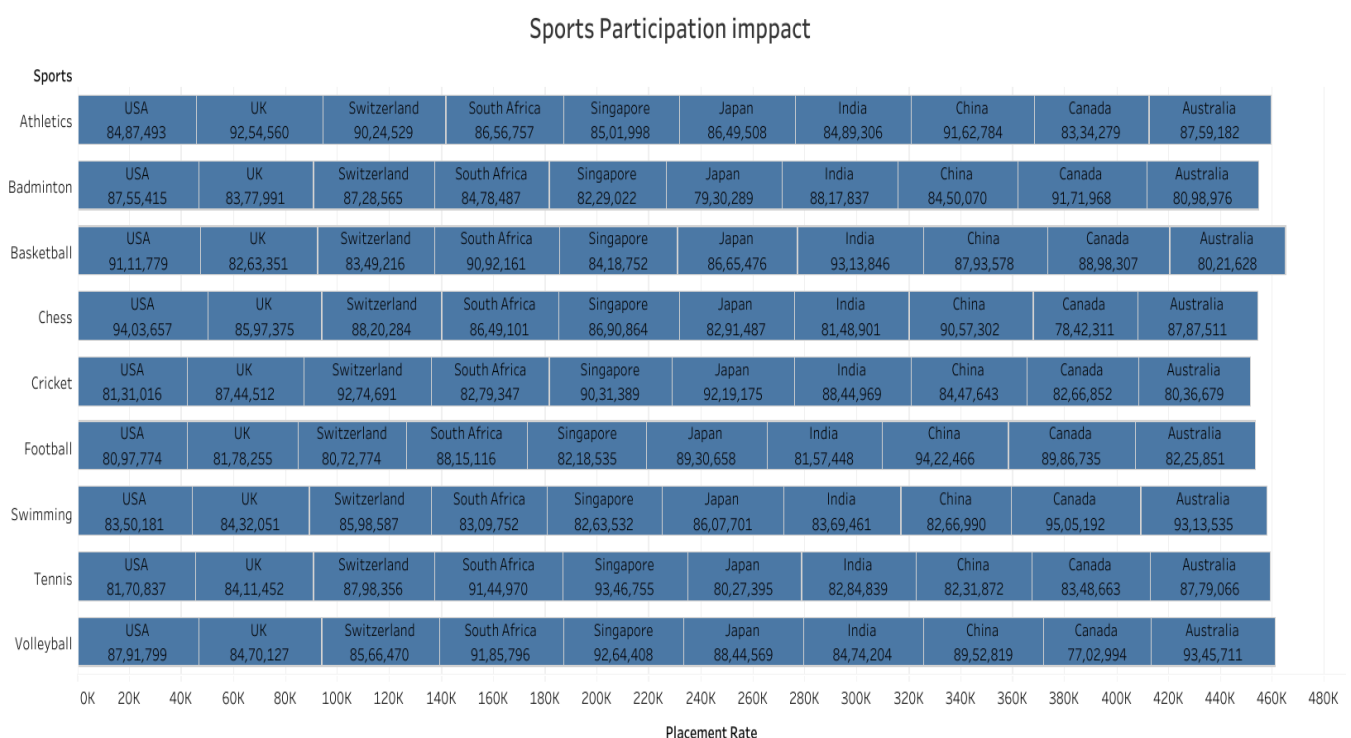
Overall, this visualization gives a balanced and realistic view of how financial circumstances connect to academic outcomes. It reminds us that while privilege can open doors, determination and effort can help students reach the same goals regardless of background.



The Family Income vs CGPA chart transforms this complex social issue into an understandable visual form, allowing us to see that education, when supported by equal opportunities, can empower students from every economic level to perform and succeed.

Sports Participation Impact :

This part of the project focuses on understanding how participation in sports activities may influence students' academic and placement performance. Education is not only about studying and achieving high grades — it also involves developing qualities like teamwork, discipline, time management, and leadership. Sports play a major role in building these qualities, and this section aims to see whether involvement in sports has any measurable effect on academic results and employability.



Using Tableau, a bar chart was created to represent the relationship between different types of sports and the average CGPA or placement rate of students who participate in them. Each sport — such as Athletics, Badminton, Basketball, Chess, Cricket, Football, Swimming, Tennis, and Volleyball — is shown along the horizontal axis, while the vertical axis indicates the academic or placement performance linked to that activity.

From the analysis, it was observed that students who participate in sports like Athletics, Cricket, and Swimming tend to have slightly higher placement rates compared to others. This finding suggests that students who are active in physical or team-based activities often perform better when it comes to employability and professional readiness. Their involvement in sports may help them develop soft skills such as communication, cooperation, confidence, and resilience — all of which are highly valued in the workplace.

Interestingly, the visualization also shows that sports participation does not negatively affect academic performance. In fact, many students who are actively involved in extracurricular

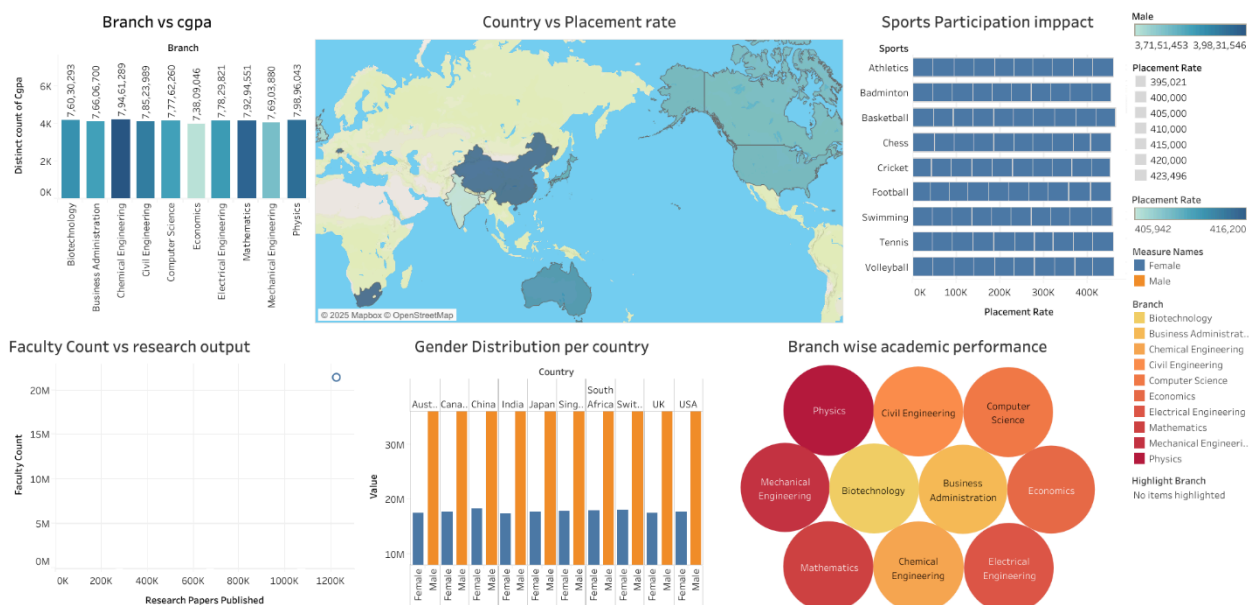
activities maintain good CGPAs. This indicates a healthy balance between academics and co-curricular life, showing that being active outside the classroom can enhance both personal and professional development.

This chart highlights an important message — education should not be limited to textbooks and examinations. Participation in sports and other extracurricular activities contributes to a well-rounded personality and prepares students to handle challenges beyond academics. Colleges that promote sports often see better placement outcomes because they produce graduates who are both skilled and adaptable.

In simple terms, the Sports Participation Impact visualization reminds us that success in education depends on balance. When students combine learning with physical activity, they gain confidence, discipline, and teamwork skills — qualities that help them perform well in their studies and in their future careers. This makes sports not just an extracurricular option but an essential part of holistic education.

Summary and Insights :

After analyzing the dataset through different Tableau visualizations, this project provides a broad and meaningful understanding of how various academic and non-academic factors influence college performance across different countries. The use of interactive charts and dashboards made it easier to interpret large volumes of data and uncover patterns that might otherwise remain hidden in raw numbers.



From the overall analysis, several important insights emerge. Firstly, it was found that academic performance (CGPA) and placement rate are closely connected. Colleges with higher average CGPAs generally show better placement outcomes. This pattern is particularly noticeable in fields like Physics and Engineering, where strong academic preparation and technical expertise directly contribute to better job opportunities.

Secondly, the faculty strength of an institution plays a major role in determining its research success. Colleges with a larger number of qualified and active faculty members tend to produce more research papers. This emphasizes how crucial it is for institutions to invest in their teaching and research staff, as a well-supported faculty contributes not only to better research output but also to the overall quality of education.

The gender distribution analysis showed that many developed countries such as the United States, the United Kingdom, and Canada maintain a more balanced ratio of male and female students in higher education. However, in several Asian countries like India, China, and Japan, a slight imbalance still exists. This points to the need for more inclusive educational policies that encourage equal participation and opportunities for all genders.

The study of family income and CGPA revealed a moderate relationship — students from higher-income families tend to achieve slightly higher grades, possibly due to better resources and learning environments. However, there are also many examples of students from middle or lower-income backgrounds performing equally well, showing that determination, institutional support, and quality teaching can bridge the gap created by economic differences.

The sports participation analysis added another interesting dimension to the findings. Students who actively take part in sports and extracurricular activities generally maintain good academic performance and show higher placement success. This underlines the importance of physical activity and co-curricular engagement in shaping well-rounded individuals who are confident, disciplined, and prepared for professional life.

Together, these insights show how education is influenced by a combination of academic effort, institutional support, personal background, and extracurricular involvement. The Tableau dashboard successfully brought all these aspects together, allowing a deeper and more holistic understanding of global education trends. It demonstrates that data visualization is not just about numbers — it's about telling a story. Through this project, the data tells a story of learning, growth, and the many factors that contribute to success in higher education across the world.

Conclusion

This project has shown how data can be transformed into meaningful insights through visualization. By using Tableau, a large and complex dataset of 50,000 college records was turned into an interactive dashboard that reveals clear patterns in education, employment, research, and student life across different countries. What began as rows of numbers and columns of statistics gradually became a story about people, learning, and opportunities. The analysis highlighted that academic performance, measured through CGPA, has a direct influence on placement outcomes. Students who perform better academically are more likely to secure good job placements, especially in technical and scientific fields. This connection emphasizes the importance of maintaining strong academic standards and providing students with the right learning environment and guidance.

The relationship between faculty count and research output further proved that an institution's strength depends heavily on its teachers and researchers. Colleges that invest in qualified faculty members see higher levels of research productivity, innovation, and overall academic excellence. It reinforces the idea that education quality improves when institutions support their educators and provide them with the right facilities.

The gender distribution study reminded us of the importance of equality in education. Although many countries have achieved a balanced representation, others still need to work toward creating equal access for male and female students. Encouraging more women to pursue higher education, especially in science and technology, can create more diverse and inclusive learning environments.

The findings on family income and CGPA showed that while financial stability can provide an advantage, it is not the only factor that determines success. Many students from less privileged backgrounds achieve outstanding results through dedication and perseverance. This insight highlights the value of scholarships, mentorship programs, and accessible learning resources in helping all students reach their potential.

The sports participation analysis added a human touch to the entire study. It showed that involvement in sports does not reduce academic performance; rather, it helps students develop balance, confidence, and essential life skills that contribute to both academic and career success.

In conclusion, this project proves that education is shaped by more than just classroom performance. It is a combination of academics, opportunity, guidance, equality, and personal growth. Tableau made it possible to see all these elements together in a single visual narrative, making the data not only informative but also inspiring. The findings encourage institutions to view education as a holistic process — one that nurtures both the mind and the character of every student, preparing them to succeed not only in their careers but also in life.

