**WHO’S WINNING THE GLOBAL EDUCATION RACE?**

**📊 Overview**

This project presents a comprehensive analysis of global education systems by integrating datasets on GDP, inequality, outbound student mobility, and tertiary education investment. Our aim is to uncover which countries effectively retain talent, which ones lose students abroad despite investment, and who leads the global education race.

**🎯 Objectives**

* Evaluate **investment efficiency**: How well countries retain students relative to spending.
* Explore if **education inequality** leads to higher outbound student mobility.
* Identify **education winners** based on a composite score using multiple indicators.
* Recommend data-driven strategies for education reform and international competitiveness.

**📁 Data Sources**

1. **World GDP Dataset** (Kaggle, 2020)
2. **OECD Student Mobility Dataset**
3. **Outbound Students (% Abroad)** – Our World in Data (2020)
4. **Education Inequality Dataset** – HDI (UNDP, 2020)
5. **World Education Indicators** – Gov. expenditure, enrollment, literacy
6. **Web-scraped CWUR University Rankings** – Reputation, rank, and student decision indicators

**🧹 Data Wrangling Summary**

* **Question 1 (Investment vs Retention):**
  + Merged: Govt. Education Expenditure + Outbound %
  + Created **Investment Efficiency Score** = (Education Spend % GDP) ÷ (Outbound %)
  + Cleaned NAs, filtered 2020 only
* **Question 2 (Inequality vs Outbound):**
  + Merged: Education Inequality + Outbound %
  + Visualized correlation (Pearson r = –0.067), created scatter plots with HDI tiers
  + Included tertiary enrollment to show access disparity
* **Question 3 (Global Education Scorecard):**
  + Normalized indicators: GDP per capita, inequality, outbound %, tertiary access
  + Created **Composite Score** using min-max scaling
  + Ranked 32 countries to identify top performers (e.g., Australia, Switzerland, New Zealand)
* **Bonus (Web Scraping):**
  + Used BeautifulSoup to extract university rankings from CWUR
  + Compared # of top-ranked universities to domestic student retention
  + Added human perspective with Reddit, Twitter, and Quora sentiment using snscrape

**🔍 Key Insights**

* **Investment ≠ Retention:**  
  Countries like **Andorra**, **Luxembourg**, and **Cyprus** spend significantly but lose students abroad.  
  In contrast, **Argentina** and **Australia** retain students efficiently despite moderate spending.
* **Inequality Drives Outflow:**  
  Countries with high inequality (e.g., Bhutan, Chad, Nepal) tend to have higher outbound rates — suggesting unequal access to domestic education is a push factor.
* **Education Winners:**
  + 🇦🇺 Australia (Score: 0.72): High inbound, strong retention, low inequality
  + 🇨🇭 Switzerland (Score: 0.68): Excellent GDP, low outbound, top equity
  + 🇳🇿 New Zealand (Score: 0.63): Balanced performer with global appeal

**💡 Recommendations**

1. **Retain Talent**: Link funding to student outcomes, improve university infrastructure, and provide employability pathways.
2. **Address Inequity**: Expand access and affordability in underserved regions to prevent outbound migration.
3. **Boost Global Appeal**: Improve curriculum, research, and international partnerships to attract inbound students.
4. **Leverage Rankings**: Promote top-performing universities and offer incentives like post-study work rights to compete globally.

**❗ Limitations**

* Most datasets are from **2020**, influenced by COVID-19 disruptions.
* Lack of **student voice** and decision motivations (e.g., safety, cost, prestige).
* Unequal country coverage (bias toward OECD and high-income nations).
* Global rankings often ignore access or affordability factors.

**🏁 Conclusion**

This project helps governments, universities, and policymakers **benchmark national education systems**, identify **inefficiencies**, and unlock strategies to improve both **domestic retention** and **global appeal**. By blending traditional indicators with real-world sentiment and web data, we offer a modern, actionable education performance scorecard.