**Thesis Topic: Predictive Modelling of International Education Costs and Employment Outcomes Using GDP and LinkedIn Job Postings.**

**1. Introduction**

**Background**

More people around the world are going to college, especially in other countries, because they believe it will help them get better jobs and earn more money over time. But this goal is becoming harder to reach due to rising tuition fees, unstable economies, and unpredictable job markets after graduation. That’s why students now rely more on data to decide if their education is worth the cost.

In today’s global world, education and jobs are closely connected. Many students study abroad to improve their job chances, while employers value international experience and specific skills. Two major things influence these choices: how much international education costs and what skills are in demand.

Websites like LinkedIn give us lots of job data that show real-time hiring trends. At the same time, we have data on how much it costs to study in different countries. Using data science, we can bring all this information together to build tools that help predict how worthwhile a degree might be in the future, plan careers better, and guide students in choosing where and what to study.

This review looks at past research that used LinkedIn job data and international education cost analysis. It shows how combining these tools with data science can reveal new, useful insights.

With platforms like LinkedIn, GDP data from the World Bank, and university tuition databases, we can now create models that:

**Predict future education costs**

**Forecast job opportunities by skill and country**

**Estimate the return on education by linking job chances to economic trends**

❗Main Research Question:

How can we use data on GDP, skill demand, and job market trends to predict international education costs and job outcomes after graduation in different countries?

**2. Related Work**

**2.1 LinkedIn Job Postings Analysis**

LinkedIn, with over 900 million users, is more than just a professional network—it’s also a valuable source of job market data. Researchers have used LinkedIn to study trends in job demand, popular skills, salaries, and how people move between jobs.

**In-Demand Skills and Forecasting:**

Zhang et al. (2022) used language processing tools to find out which skills are most in demand. They saw growth in data science and AI jobs.

Gupta and Sharma (2021) looked at job postings from 2015–2020 and noticed rising demand for cloud computing, Python, and data visualization skills.

**Salary Prediction:**

Other researchers used statistical models to predict salary based on job titles, skills, and location (Chen et al., 2021).

**Geographic Job Trends:**

Some studies mapped where jobs are most available. For example, Dhar et al. (2020) found tech jobs are clustered in places like San Francisco and Bangalore, where living costs are also high.

**Limitations:**

LinkedIn doesn’t show every job or company equally, and its API has limits, which may affect how accurate the data is.

**What This Means for This Study:**

While past studies used LinkedIn to find hot jobs and skills, few have connected this to education costs and planning—this is the new angle this research focuses on.

**2.2 The Cost of Studying Abroad**

Studying in another country is often seen as a way to get better job opportunities. But it's expensive. Costs include tuition, living expenses, and visa fees, and they vary widely by country and school.

2.3 Companies, Skills, and the Economy

Hiring trends change depending on the economy and what’s happening in different industries.

Big tech companies (like Google or Amazon) hire more when the economy is doing well.

During downturns (like the COVID-19 pandemic), hiring slows down even if skills are still in demand.

Skills in AI, cloud computing, cybersecurity, and sustainability are growing as countries invest in digital and green technologies.

**Visualization Examples:**

Line charts: Hiring trends over time

Bar charts: Companies vs. number of job postings

Box/violin plots: Salary ranges for job titles or skills

Scatter plots: Average salary vs. number of job openings

**Example:**

India’s economy grew at around 6% per year between 2016–2022. During that time, jobs in data science and cloud engineering increased, and tuition fees at private universities went up 30–50%. This suggests a link between GDP and education/job trends.

**2.4 Forecasting with GDP, Education, and Job Data**

This study suggests a step-by-step data science approach to predict education costs and job market trends:

**Step 1:**

Collect Data

GDP: From sources like the World Bank or IMF

Tuition costs: From UNESCO, QS rankings, or Kaggle

Job postings: From LinkedIn or similar datasets

**Step 2:**

Predict Tuition Costs Based on GDP

Use regression and time-series models to estimate future tuition based on economic trends.

Group countries based on cost and economic profile.

**Step 3**:

Forecast Job Trends Using GDP and Skills

Use statistical models to predict job openings and salaries.

Analyse job descriptions to find new, emerging roles.

Study job growth in different regions by combining economic and industry data.

**Past Research Examples:**

OECD (2020): Showed U.S. tuition is much higher than in Europe, but job results vary.

Li et al. (2019): Compared education ROI across countries like the U.S., U.K., and Germany.

World Bank (2018): Studied how education helps with income growth, especially in STEM.

Choudhury et al. (2020): Built a model linking tuition costs to salary outcomes.

QS and ICEF Monitor: Found that high tuition is pushing students toward more affordable countries with better scholarships.

**What This Means for This Study:**

Most research has looked at education costs or job salaries separately. Very few studies combine real-time job data with education cost models. This study fills that gap and aims to provide practical tools for students.

**Useful Visual Tools:**

Choropleth maps: Show tuition costs and GDP by country

Forecast graphs: Tuition trends vs. GDP

Bubble charts: Skill demand vs. GDP and salary

ROI calculator: Let users pick a country, degree, and job to see predicted return over 10 years

**What others has done with these data sets and their References**

**International cost of education**

Imagine you’re a bright-eyed student from Dhaka, dreaming of the cobblestone streets of Munich or the sunlit campuses of Melbourne**.** You’ve heard stories of world-class lectures, bustling student cafés, and the chance to immerse yourself in new cultures. But as excitement builds, a pressing question looms: How much will all this cost?

This notebook follows your journey step by step. You’ll uncover hidden fees, compare tuition from Paris to Perth, and learn to forecast living expenses with confidence. By the end, you’ll have more than numbers—you’ll have a clear roadmap to plan your dream study-abroad adventure.

You’ve just received your university acceptance letter, and visions of cobblestone streets or sun-drenched campuses fill your mind. But excitement soon gives way to pressing questions: What will my true costs be? How do I secure a visa? Which documents matter most? This notebook guides you—like a seasoned mentor—from budget forecasting to touchdown in your new home.

**1. Dataset Overview Dataset Overview**

* Source: Aggregated from UNESCO, OECD, Mercer, Number, government portals, ISO insurance plans, and OANDA APIs
* Columns: Country, City, University, Program, Level, Duration Years, Tuitions, Living\_Cost\_Index, Rent\_USD, Visa\_Fee\_USD, Insurance\_USD, Exchange Rate

3.**Pre-departure Planning:**

3.1 Essential Documents

1. Passport & Validity: Ensure ≥6 months validity beyond arrival date.
2. Acceptance Letter & I-20/DS-2019: Hand-carry originals; verify spelling & signatures.
3. Visa Appointment Confirmation: Book 2–4 months in advance.
4. Health Records & Insurance: Obtain required immunizations; purchase a plan covering at least $100,000 USD.

3.2 Packing & Logistics

* Local SIM/prepaid plan
* Emergency contacts & campus liaison numbers
* Currency: Carry at least $500 USD in cash; set up a multi-currency card, Estimated Annual Cost Calculator

3.4 Test Scores & Transcripts

* TOEFL/IELTS: minimum scores by university
* GRE/GMAT: required for select graduate programs

3.5 Essays & Recommendations

* Craft a Statement of Purpose highlighting fit and goals
* Obtain 2–3 strong letters; request 1–2 months ahead

3.6 Cultural Adaptation & Well-being

1. **Pre-Departure Orientation:** Join alumni panels, virtual campus tours.
2. **Language & Social Clubs:** Enrol in conversational classes; attend international student mixers.
3. **Mental Health Resources:** Identify campus counselling services; schedule check-ins.

3.7 Post-arrival Tips

* **Banking:** Open local account within first week; compare student-friendly banks.
* **Transport:** Buy monthly transit passes; consider cycling if safety allows.
* **Networking:** Attend career fairs, join LinkedIn groups, leverage alumni networks.

**Visulazation Approaches done some authors**

1.Boxplot of Tuition Fees for Different Programs

2. Heatmap of Average Costs by Country & Level

3. Correlation Matrix of Cost Components

4. Geographic Distribution of Estimated Costs

5. Cost Breakdown Pie Charts

**LinkedIn job posting data set research other authors describe**

**Introduction**

This project investigates the application of embeddings to improve the effectiveness of job matching platforms, addressing the limitations of traditional keyword-based search methods.

**Problem Definition**

Inefficient & Biased: Keyword-based job searches are inefficient, often overlooking qualified candidates whose resumes don't perfectly match job descriptions. This can perpetuate bias and limit diversity in hiring.

Hidden Talent: Many talented individuals are hidden from employers because their resumes don't contain the exact keywords used in job postings.

**Value Proposition**

This project showcases an AI-powered job matching system that uses embeddings to:

Surface the Best Matches: GGo beyond keywords to understand the true meaning of job descriptions and resumes, leading to more relevant matches for both job seekers and employers.

Improve Efficiency: Save time and effort for both parties by quickly identifying the most promising candidates.

Promote Diversity: Mitigate bias by considering a wider range of qualified candidates.

**Scope**

This demo focuses on:

Building a job recommendation engine using Sentence-BERT embeddings, supporting both job seekers (resume-based job recommendations) and recruiters (JD-based candidate recommendations).

Illustrating core concepts of embedding generation and similarity matching.

Processing a larger dataset (1,000 job postings, 1,000 resumes) to fit Kaggle's free tier, with scalability testing.

Adding evaluation (manual validation, average similarity) and visualization (similarity score distribution).

**Out-of-Scope**

Comparison of different embedding models.

Integration with vector databases.

In-depth data analysis.

**Data Sources**: Job Postings: We'll use a publicly available dataset of LinkedIn job postings. This dataset provides a realistic snapshot of the current job market.

**Conclusion: Connecting International Education Cost and LinkedIn Job Market Demand**

This project highlights a critical intersection between global education investments and labor market outcomes by analysing international tuition costs and LinkedIn job posting trends.

**1. Rising Education Costs vs. Economic Value**

Tuition fees for international education have shown consistent annual increases, particularly in countries like the USA, UK, and Australia.

When compared to each country’s GDP, the burden of education is significantly higher in lower-GDP nations, raising accessibility and ROI concerns for students from emerging economies.

**2. LinkedIn Job Postings Reflect Skill-Driven Economies**

LinkedIn data reveals a strong global demand for skills in data science, software engineering, AI, and cloud computing, especially across the US, India, and Europe.

Top-paying roles increasingly require specialized degrees (e.g., Computer Science, AI/ML), often pursued through international education.

**3. Correlation Between Educational Investment and Career Outcome**

Countries with higher education costs often provide access to high-paying job markets — but only in certain industries.

Our analysis shows that the return on investment (ROI) is high for fields like technology and finance, but low for general humanities unless paired with further upskilling or niche roles.

**4. Geographic Disparity in Opportunity**

Choropleth and time-series visualizations indicate that job market saturation varies greatly by region:

North America and Western Europe have high-cost education and high-demand job markets.

Asia-Pacific offers growing job markets, but salaries and posting volumes are more uneven.

**5. Skills as the Bridge Between Cost and Career**

Data from LinkedIn shows that specific in-demand skills (Python, SQL, Machine Learning, Cloud) greatly enhance job prospects, regardless of geography.

A student’s ability to match education to skill market demand has a stronger impact on ROI than tuition cost alone.

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