Performance Measurement Metrics

University Model

## Prepared by:

## Shreya Bidarkar

## Ameya Ranade

## Abhishek Palkar

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### Application Engineering & Development

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### Prof. Kal Bugrara

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|  |  |  | Problem Statement: Your task to study ways to create a performance measurement solution to enable universities to measure the quality of the education they deliver to their students. Quality here means keeping courses fresh and aligned with industry trends. The approach will be to look into how an educational system involving faculty, courses, and employers contribute to the professional growth of their graduates over a 5-year period. You must figure out ways to track the jobs and promotions graduates get over time and assign rankings accordingly. In addition, track the connection of courses and their relevance to graduates growth. Also, study the relationship between GPAs and industrial success (In other words, do grades matter?) Also, discuss how to apply your digital ideas and solutions to k-to-12 educational systems in the developing countries. |

Solution:

The Performance Measurement Solution of the student’s stay at the University and after the graduation can be accomplished by implementing below Six metrics:

1. Student Performance
2. Course Performance
3. Faculty Performance
4. Global Services Performance
5. Career Services & Growth Performance
6. University-Employer Connections Performance

The performance metrics mentioned above are crucial for the Performance Metric Solution as accumulatively they contribute to the students’ overall growth over the years in their stay at the university and also after graduation.

University-Employer connections is the most contributing factor in terms of course relevance and student growth which can help universities to make changes if applicable in area which is mentioned in this report.

# Performance Metrics

# Student Performance Metric

The student performance metric measures the student’s performance at the university. The SPM is based on the grades, projects, research papers, extra-curricular activities (which is taken into consideration because EC Activities’ participation showcases student’s soft skills performance which is crucial for the student’s overall development)

Grades

Research Papers

Work Experience

Extra-Curricular Activities

Built Projects

The performance of a student is based on the following factors:

Student Performance Indicator

1. Grades

2. Projects Build

3. Research Papers

4. Work Experience

5. Extra-Curricular Activities

|  |  |
| --- | --- |
| 0 - 1 Years | 2.5 EXP |
| 2 - 5 Years | 5 EXP |
| 6 - 8 Years | 7.5 EXP |
| Over 9 Years | 10 EXP |

Calculation of SPM:

SPM = (GPA) + Project Rating + Research Papers + Work Experience +ECA

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|  |  |  |
| --- | --- | --- |
| GPA | 4 | GPA = 4 \* 2.5 = 10 |
| Work Experiment | 10 Years | WE = 10 |
| Research Papers | No. of published 2:   1. 8/10 2. 9/10 | RP = (8 + 9) / 2 = 8.25 |
| Projects | Project 1 : 7/10  Project 2 : 9/10 | Projects = (7 + 9)/2 = 8 |
| Extra-Curricular Activities | No. of Events Participated: 3 | ECA = 3 |
| **Overall Student PI** | **Average of all metrics** | (10 + 10 + 8.25 + 8 + 3) / 5 = 7.85 |

# Course Performance Metric

This metric measures the performance of the Courses taken by the student which is mostly based on the relevancy of their chosen career paths and their responsibilities in the industry.

In the case we are going to look at 3 career paths and courses available for the students:

1. Software Developer
2. Application Engineering and Development
3. Program Structures and Algorithms
4. Web Design and User Experience Engineering
5. Program Design Paradigm
6. Computer Systems
7. Data Scientist
8. Data Science Engineering Methods and Tools
9. Data Science Engineering with Python
10. Machine Learning with Python
11. Data Warehousing and Business Intelligence
12. Advanced Data Science Engineering Methods and Tools
13. Natural Language Processing
14. Business Analyst
15. Introduction to Business Analytics
16. Foundations of Analysis of Business
17. Business Analytics Methods
18. Business Analytics Capstone
19. Data Mining and Machine Learning with Business

* Courses Available for All Career Paths

1. Career Management for Engineers
2. Introduction to Cooperative Education

If the student has taken relevant courses according to his/her career path, a relevance score of 10 is taken (10 is most relevant).

We are calculating for Data Science for demonstration here:

|  |  |
| --- | --- |
| **Courses Taken** | **Relevance Score(RS)** |
| Data Science Engineering Methods and Tools | 10 |
| Advanced Data Science Engineering Methods and Tools | 10 |
| Web Design and User Experience Engineering | 5 |
| Data Warehousing and Business Intelligence | 10 |
| **Total Relevancy Score (RS1+ RS2+ RS3+ RS4) / N (Total )** | (10 + 10 + 10 + 5 ) / 4 = 8.75 |

# Faculty Performance Metrics

This metric measures performance of the Professor who taught the Student which indicates the Quality of Education in terms of faculty of University Department.

The performance of the professor is measured using the following factors:

1. Student Reviews
2. Years Active (Teaching Work Experience)
3. H-index
4. Industry Work Experience
5. Research Papers and Projects

Faculty Performance Metric

Industry Work Experience

Research Papers and Projects

h-index

Years Active (Experience)

Student Reviews

Solution:

1. Reviews providing by students: Taken from students after course completion and ranges between 0 to 10.
2. Research work by the professor:

|  |  |
| --- | --- |
| 0-2 Projects | 2.5 XP |
| 3-5 Projects | 5 XP |
| 6-9 Projects | 7.5 XP |
| 10+ Projects | 10 XP |

1. Years Active as a Professor

|  |  |
| --- | --- |
| 0-2 Years | 2.5 XP |
| 3-5 Years | 5 XP |
| 6-9 Years | 7.5 XP |
| 10+ Years | 1. XP |

1. h-index

|  |  |
| --- | --- |
| 2-5 | 2.5 XP |
| 6-10 | 5 XP |
| 12-24 | 7.5 XP |
| 35+ | 1. XP |

1. Years Active (Industry & Relevant)

|  |  |
| --- | --- |
| 0-2 Years | 2.5 XP |
| 3-5 Years | 5 XP |
| 6-9 Years | 7.5 XP |
| 10+ Years | 10XP |

|  |  |  |
| --- | --- | --- |
| Student Reviews | 4.5 Stars | 9 |
| Research Work | 9 | 7.5 |
| h-index | 15 | 7.5 |
| Work Exp. (Teaching) | 5 | 5 |
| Work Exp.(Industry) | 9 | 7.5 |
| **Faculty Performance** |  | (9+7.5+7.5+5+7.5)/5 = 7.3 |

# 5 Aggregate Performance Result:

Course Performance

Professor Performance

# 6 Career Services and Growth Metrics

Aggregate Performance Result

Student Performance

This metric measures performance of the Career services Portal who guided the Student which indicates the Quality of Suppport and Guidance in terms of Assistance of University Department.

The performance of the Career Growth is measured using the following factors:

1. Annual Package
2. Promotion
3. Achievements
4. Industry Experience (in Years)

Industry Experience

Promotion

Annual Package

Achievements

Career Services and Growth Metrics

Solution:

1. Annual Package

|  |  |
| --- | --- |
| 60k-70k | 2.5 XP |
| 71k-90k | 5 XP |
| 91k-120k | 7.5 XP |
| 130k+ | 1. P |

1. Promotion

|  |  |
| --- | --- |
| 0-1 | 2.5 XP |
| 2-3 | 5 XP |
| 4-5 | * 1. XP |
| 5+ | 10XP |

1. Achievements

|  |  |
| --- | --- |
| 0-1 | 2.5 XP |
| 2-3 | 5 XP |
| 4-5 | * 1. XP |
| 5+ | 10XP |

1. Industry Experience

|  |  |
| --- | --- |
| 0-2 Years | 2.5 XP |
| 3-5 Years | 5 XP |
| 6-9 Years | 7.5 XP |
| 10+ Years | 10XP |

|  |  |  |
| --- | --- | --- |
| Annual Package | 100k | 7.5XP |
| Promotion | 2 | 5XP |
| Achievements | 3 | 5XP |
| Industry Experience | 5 | 5XP |
| **Career Services and Growth Performance** |  | (7.5+5+5+5)/4 = 5.625 |

# Career Achievements

The career achievements performance metric provides details about student’s academic and career path metrics, which is student’s performance over a certain period of time.

Career Services and Growth Performance Metric

GPA

Career Achievement

Career Achievements = (GPA+ Career Services and Growth)/2 Performance Metric= ((4 \* 2.5) + 5.625 ) / 2= 7.81 out of 10.

# University-Employer Connections Performance

The University-Employer Connections Performance metric is useful for determining the significance of career growth which mostly relies upon the fact that, in how much the amount of times university and employers connect and discuss about the student. Also, the course relevancy and their expectations with the student.

Employer and GSGD Relations

Career Services and Growth Department (CSGD)

University-Employer Connections Performance

1. CSGD (Interaction)

|  |  |
| --- | --- |
| 1-2 Meetings | 2.5 XP |
| 3-5 Meetings | 5 XP |
| 6-8 Meetings | 7.5 XP |
| 9+ Meetings | 10XP |

1. Employer and CSGD Interaction

|  |  |
| --- | --- |
| 1-2 Meetings | 2.5 XP |
| 3-5 Meetings | 5 XP |
| 6-8 Meetings | * 1. XP |
| 9+ Meetings | 10XP |

|  |  |  |
| --- | --- | --- |
| CSGD(Interaction) | 6 | 7.5XP |
| Employer and CSGD | 5 | 5XP |
| **University-Employer Connections Performance** |  | (7.5+5)/2 = 6.25XP |

**Conclusion:**

There are multiple factors which decide the student’s growth over the years and career growth. And adding them up all gives the proper outcome of what should be the approach of education and employment.

Extra-Curricular activities are as important as grades, Employer-University Connections are as important as Student-Employer/University Connections, Faculty performance is as important as Course Performance. But, to answer the question, grades to matter but they are not sole factor to determine student’s ability to achieve success.

For Example,

Even with the GPA being (4 \* 2.5) = 10, having a career metric of 5.625 affects the overall success metric to 7.81 out of 10. Hence it shows that just having a good GPA doesn’t guarantee Career Achievements.

For developing countries should provide quality education which considers all the metrics we have mentioned above. Also providing relevant job opportunities.

**For k to 12 educational systems:**

These systems in developing countries may also use our digital ideas and solution with some tweaks for k -12 level of grading and activities. Some of the fields like research and work experience will not apply to them and some changes should be made.

But, in short, this model will definitely help k to 12 systems also.

**Ranking System:**

University rankings will be determined after adding all the metrics of all involved factors and after taking their average and normalizing the result.

Result will fall into ranges:

Scores are Normalized :

|  |  |
| --- | --- |
| 0 – 30XP | Tier 4 |
| 31 – 60XP | Tier 3 |
| 61-80XP | Tier 2 |
| 80+XP | Tier 1 |

**Deliverable 6 Solution:**

If we assume university as an intermediary (broker) between student and employer and their brand is about credibility which means more credible the employer better graduated students will go to that employer based on SPM.

In terms of code implementation, code should be modified such as we should be able to fetch the students based on SPM and also be able to classify them as bright student or average student or below average student.

We can add a method

public int studentSPM(int Grades, int projects\_Build, int Research\_Papers,int workExp, int extra\_Curricular\_Activities)

which gives the result of Student SPM score and same should be done for Employer Performance Score.