

**Data Science & Analytics - Internship**

| **Intern’s Name** | **Email ID** |
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****Project Title:** Student Event Feedback Analysis & Dashboard**

**Introduction:**

Student feedback plays a crucial role in understanding how effectively campus events meet participants’ expectations. Colleges conduct several events — from workshops and tech fests to cultural programs — and often collect feedback through Google Forms. However, these valuable insights remain underutilized.This project applies data science and sentiment analysis techniques to uncover meaningful patterns from student feedback. By analyzing both numeric ratings and textual comments, it aims to evaluate satisfaction levels, identify strengths and weaknesses, and suggest actionable improvements for future events.

**Objectives:**

The main objectives of the project are:

* To clean and preprocess raw feedback data collected through Google Forms.
* To analyze student ratings (1–5 or 1–10 scale) and compute overall satisfaction levels.
* To perform sentiment analysis on open-text feedback using VADER and TextBlob.
* To visualize satisfaction and sentiment trends using various charts and dashboards.
* To generate data-driven insights and recommendations that can improve event planning and delivery.

**Assigned Dataset: *(Chosen)***

| **Raw Dataset** | **Cleaned Dataset Exported as** |
| --- | --- |
| “student\_feedback.csv” | **“**Student\_Event\_Feedback\_Analysis.csv” |

**Tools Used:**

| **Tool** | **Purpose** |
| --- | --- |
| Jupyter Notebook (Python) | Code execution and data analysis |
| Python (pandas, numpy) | Data cleaning and manipulation |
| Matplotlib / Seaborn | Data visualization |
| TextBlob & VADER (NLP) | Sentiment analysis (textual feedback) |
| Power BI | Interactive dashboard creation |
| Excel | Data review and export validation |

**Expected Outcome:**

* A clean and well-structured dataset ready for analysis.
* Identification of key satisfaction trends across different course aspects.
* Clear visualization of sentiment distribution and satisfaction levels.
* Insights into the most and least appreciated event elements.
* A Power BI dashboard summarizing student sentiment and satisfaction metrics.
* Actionable recommendations for improving student engagement and event quality.

**My Github Link:** <https://github.com/sumaiya-tasnim-18>

***(All my projects are available on my Github Account)***

**Data Cleaning & Transformation Summary:**

| **Task** | **Description / What Was Checked** | **Action / Correction** | **Result** |
| --- | --- | --- | --- |
| Load Dataset | Imported student\_feedback.csv into pandas | Verified successful load using df.head() and df.info() | Dataset loaded correctly with all columns present |
| Column Verification | Checked all column names and structure | Ensured 8 rating questions + feedback + sentiment columns exist | Columns correctly structured and renamed consistently |
| Data Type Check | Verified data types of each column | Converted all rating columns to int64, satisfaction to float64 where needed | All numeric and text columns have correct data types |
| Missing Values | Checked for nulls or blanks in all columns | No missing values found; dataset was complete | Dataset confirmed clean with 0 null entries |
| Duplicate Records | Checked for duplicate Student ID or entire row entries | No duplicates found; dataset unique per student | Ensured one feedback per student |
| Standardization of Ratings | Reviewed each rating column for consistency (scale 1–10) | Confirmed all ratings fall within valid range | Ratings standardized and valid |
| Derived Column – Overall\_Satisfaction | Created average of 8 rating columns per student | Applied mean across aspect columns | Added column Overall\_Satisfaction |
| Derived Column – Satisfaction\_Level | Classified satisfaction as Low / Medium / High | Applied conditional bins based on average | Added column Satisfaction\_Level |
| Text Feedback Cleaning | Checked for blank or invalid comments | Retained meaningful feedback; dropped empty strings | Clean Feedback\_Comment column ready for sentiment analysis |
| Sentiment Analysis (VADER) | Applied VADER analyzer on feedback comments | Added Sentiment\_Score and Sentiment\_Label columns | Captured polarity-based sentiment for each comment |
| Sentiment Analysis (TextBlob) | Applied TextBlob for polarity & subjectivity | Added TB\_Polarity, TB\_Subjectivity, and TB\_Sentiment\_Label | Dual sentiment model comparison prepared |
| Export for Power BI | Prepared final structured dataset | Saved as Student\_Event\_Feedback\_Analysis.csv | Clean, analysis-ready dataset exported successfully |

**Columns & Correct Data Type:**

| **Column Name** | **Data Type** | **Column Name** | **Data Type** | **Column Name** | **Data Type** |
| --- | --- | --- | --- | --- | --- |
| Student ID | int64 | Well versed with the subject | int64 | Explains concepts in an understandable way | int64 |
| Use of presentations | int64 | Degree of difficulty of assignments | int64 | Solves doubts willingly | int64 |
| Structuring of the course | int64 | Provides support for students going above and beyond | int64 | Course recommendation based on relevance | int64 |
| Overall\_Satisfaction | float64 | Satisfaction\_Level | object | Feedback\_Comment | object |
| Sentiment\_Score | float64 | Sentiment\_Label | object | TB\_Polarity | float64 |
| TB\_Subjectivity | float64 | TB\_Sentiment\_Label | object | — | — |

**Data & Sentiment Analysis Part**

**Rating Analysis:**

| **Aspect** | **Average Rating** | **Insight** |
| --- | --- | --- |
| **Well versed with the subject** | **7.50** | Students rated this highest → teachers show strong subject mastery. |
| **Explains concepts in an understandable way** | **6.08** | Fairly positive, but some students struggle with clarity. |
| **Use of presentations** | **5.94** | Mid-level satisfaction → visual aids are moderately effective. |
| **Degree of difficulty of assignments** | **5.43** | Lowest rating → assignments might feel too hard or unclear. |
| **Solves doubts willingly** | **5.47** | Indicates mixed experiences with doubt resolution. |
| **Course recommendation based on relevance** | **5.60** | Suggests the perceived relevance of courses could improve. |

**Correlation Insights:**

| **Feedback Aspect** | **Correlation with Overall Satisfaction** | **Interpretation** |
| --- | --- | --- |
| **Degree of difficulty of assignments** | 0.39 | Strongest relationship — students’ perception of assignment fairness has a big effect on satisfaction. |
| **Solves doubts willingly** | 0.39 | Equally important — accessible and supportive teachers drive satisfaction. |
| **Course recommendation based on relevance** | 0.39 | Courses that feel relevant strongly increase overall approval. |
| **Provides support for students going above and beyond** | 0.38 | Students value extra effort from instructors. |
| **Structuring of the course** | 0.38 | Well-organized courses link closely with satisfaction. |
| **Explains concepts understandably** | 0.37 | Clear teaching matters a lot, even if not the very top factor. |
| **Well versed with the subject** | 0.20 | Subject knowledge alone doesn’t ensure satisfaction — delivery and support matter more. |
| **Use of presentations** | 0.18 | Visual aids help slightly but aren’t a major driver. |

**Sentiment Analysis (Vader) Summary:**

| **Sentiment** | **Approx. Count** | **Insight** |
| --- | --- | --- |
| Negative | 350–400 | A large portion of students expressed dissatisfaction in comments — aligns with “Low” or “Medium” ratings. |
| Neutral | 300–350 | Many comments are mixed or moderate — students see both positive and negative aspects. |
| Positive | 250–300 | Fewer highly positive comments — only a minority of students strongly praised the course. |

**Sentiment Analysis (TextBlob) summary:**

| **Column** | **Description** |
| --- | --- |
| TB\_Polarity | Sentiment score (-1 negative → +1 positive) |
| TB\_Subjectivity | Measures how opinionated a comment is (0 = factual, 1 = highly subjective) |
| TB\_Sentiment\_Label | Categorized sentiment: Positive, Neutral, Negative |

***Note: For more detailed analysis, check the “sentiment\_analysis\_student\_feedback.ipynb” file which is in my github.***

**Data Dictionary for student\_feedback.csv dataset after processing:**

| **Column Name** | **Data Type** | **Description** |
| --- | --- | --- |
| Student ID | int64 | Unique identifier for each student providing feedback |
| Well versed with the subject | int64 | Rating (1–10) of how knowledgeable the instructor is about the subject |
| Explains concepts in an understandable way | int64 | Rating (1–10) of clarity in teaching |
| Use of presentations | int64 | Rating (1–10) of the effectiveness of visual aids or presentations |
| Degree of difficulty of assignments | int64 | Rating (1–10) of how difficult students found assignments |
| Solves doubts willingly | int64 | Rating (1–10) of instructor’s responsiveness to questions |
| Structuring of the course | int64 | Rating (1–10) of how well the course is organized |
| Provides support for students going above and beyond | int64 | Rating (1–10) of additional support for motivated students |
| Course recommendation based on relevance | int64 | Rating (1–10) of course applicability and relevance |
| Overall\_Satisfaction | float64 | Average rating across all 8 numeric feedback aspects per student |
| Satisfaction\_Level | object | Categorized overall satisfaction (Low / Medium / High) |
| Feedback\_Comment | object | Free-text comment provided by student |
| Sentiment\_Score | float64 | VADER compound sentiment score (-1 to 1) |
| Sentiment\_Label | object | VADER sentiment category: Positive / Neutral / Negative |
| TB\_Polarity | float64 | TextBlob polarity score (-1 to 1) |
| TB\_Subjectivity | float64 | TextBlob subjectivity score (0 to 1) |
| TB\_Sentiment\_Label | object | TextBlob sentiment category: Positive / Neutral / Negative |

**Insights & Recommendations:**

| **Insight / Finding** | **Details** | **Recommendation** |
| --- | --- | --- |
| Top-Rated Aspects | Well versed with the subject, Explains concepts clearly, Use of presentations | Continue current teaching methods; maintain clarity and presentation use |
| Lowest-Rated Aspects | Degree of difficulty of assignments, Solves doubts willingly, Course recommendation based on relevance | Simplify assignments, provide more student support, clarify course relevance |
| Overall Satisfaction | Most students in Medium satisfaction, fewer High and some Low | Focus on improving course delivery and support to increase satisfaction |
| Sentiment Analysis Insights | Low satisfaction → Negative; Medium → Neutral; High → Positive; TextBlob may classify subtle negatives as Neutral | Pay attention to neutral comments for actionable improvements |
| Common Feedback Themes (Word Cloud) | Positive: good, clear, presentation; Negative: assignment, difficult, confusing, hard | Address recurring pain points: assignments and clarity of instructions |
| Correlation Insights | Positive correlation between ratings and sentiment; highest drivers: Well versed with subject & Explains clearly; assignment difficulty weak/negative correlation | Target low-correlation aspects for improvement (assignments, support) |
| Actionable Recommendations | - Assignments: simplify with examples - Student Support: spend more time solving doubts - Course Relevance: clarify outcomes - Instructional Clarity: maintain presentations - Follow-up Feedback: mid-course/post-assignment collection | Implement these steps to boost student satisfaction and learning outcomes |

**Student Event Feedback Analysis Dashboard Visualization Summary:**

| **Visualization Title** | **Chart Type** | **DAX / Measure Used** | **Business Questions Addressed** | **Why It’s Important / Insight** |
| --- | --- | --- | --- | --- |
| Ranking of Course Aspects by Average Rating | Funnel Chart | Average('Student\_Event\_Feedback\_Analysis'[Well versed with the subject])  Average('Student\_Event\_Feedback\_Analysis'[Explains concepts in an understandable way])  Average('Student\_Event\_Feedback\_Analysis'[Use of presentations])  … (repeated for all 8 aspects) | Which course aspects are rated highest by students? | Identifies strengths and key drivers of overall satisfaction. |
| Sentiment vs. Satisfaction Matrix | Matrix | Count of Student ID per combination of Satisfaction\_Level & Sentiment\_Label: CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level] = <Level>, 'Student\_Event\_Feedback\_Analysis'[Sentiment\_Label] = <Sentiment>) | How do textual sentiments (VADER) align with numeric satisfaction levels? | Quickly shows if students’ ratings match their comments; identifies mismatches or neutral feedback in medium satisfaction. |
| Breakdown of Student Satisfaction Levels | Stacked Bar Chart | Low = CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level] = "Low")  Medium = CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level] = "Medium")  High = CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level] = "High") | How many students fall into each satisfaction category? | Quick overview of overall satisfaction distribution. |
| Average Polarity Across Satisfaction Levels | Waterfall Chart | Average TB\_Polarity = AVERAGE('Student\_Event\_Feedback\_Analysis'[TB\_Polarity]) | How does average polarity vary across Low / Medium / High satisfaction? | Highlights sentiment differences among satisfaction levels. |
| VADER vs TextBlob Sentiment Comparison | Stacked Bar Chart | Count Positive / Neutral / Negative for VADER and TB:CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Sentiment\_Label] = "Positive") (same for Neutral & Negative)CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[TB\_Sentiment\_Label] = "Positive") | Are VADER and TextBlob sentiment classifications consistent? | Ensures NLP models align and validates feedback analysis. |
| Cumulative Sentiment Across Feedbacks | Area Chart | Cumulative\_Sentiment\_Score = CALCULATE(SUM('Student\_Event\_Feedback\_Analysis'[Sentiment\_Score]), FILTER(ALL('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Student ID] <= MAX('Student\_Event\_Feedback\_Analysis'[Student ID]))) | How does overall sentiment trend across feedbacks? | Shows sentiment progression and identifies dips or peaks over feedback sequence. |
| Recommendations of Feedback | Matrix | Recommendations of Feedback =  SWITCH(  TRUE(),  SELECTEDVALUE('Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level]) = "Low",  "🔴 Simplify lessons, add interactive sessions, increase personal support, and enhance clarity.",  SELECTEDVALUE('Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level]) = "Medium",  "🟡 Add practical examples, boost engagement, collect focused feedback, and improve content flow.",  SELECTEDVALUE('Student\_Event\_Feedback\_Analysis'[Satisfaction\_Level]) = "High",  "🟢 Keep teaching methods consistent, reward top sessions, and maintain student motivation.",  "No feedback level selected."  )  Satisfaction\_Level | What specific improvement actions can be taken for each satisfaction level (Low, Medium, High)? | Translates data insights into targeted recommendations, helping instructors and organizers take focused actions to improve satisfaction, engagement, and overall learning experience |

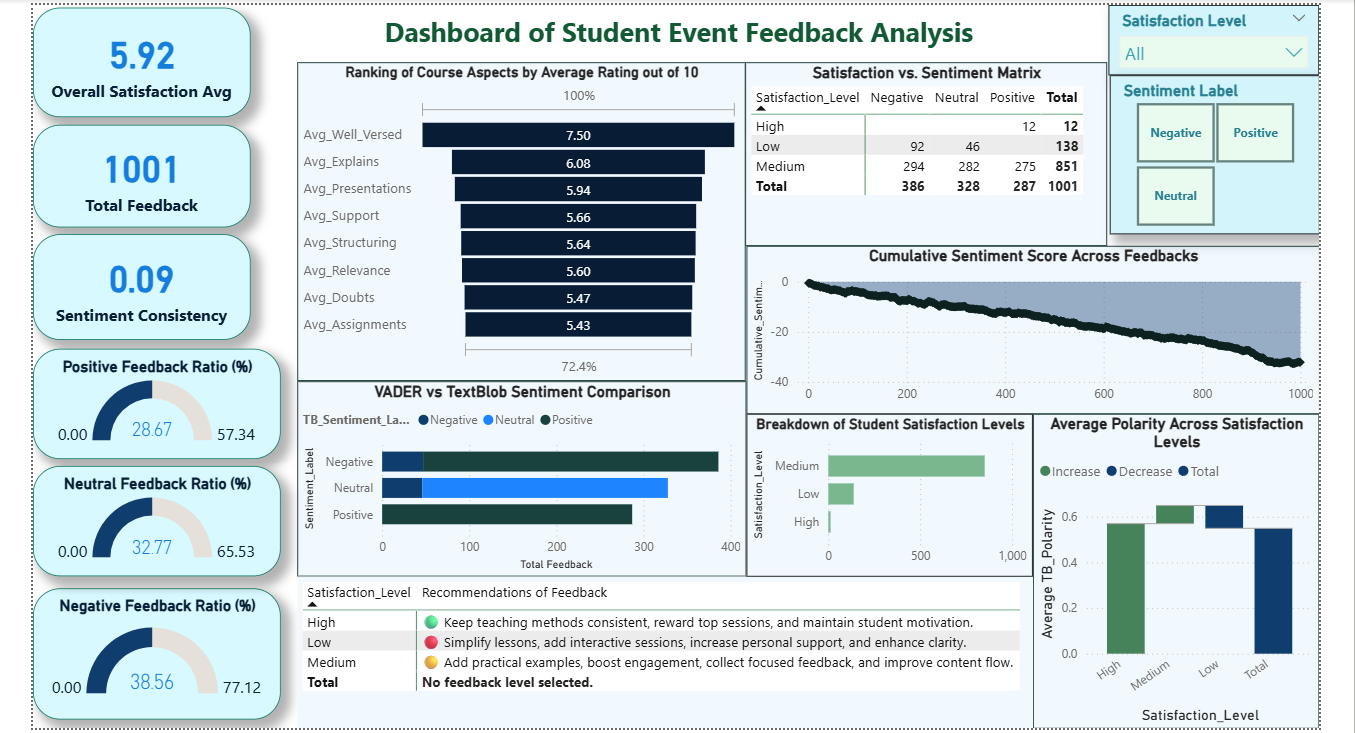
**Student Event Feedback Analysis Dashboard KPI Summary:**

| **Column Name** | **DAX Formula** | **Business Question Addressed** | **Why It’s Important / Insight** |
| --- | --- | --- | --- |
| Overall Satisfaction Avg | Overall\_Satisfaction\_Avg = AVERAGE('Student\_Event\_Feedback\_Analysis'[Overall\_Satisfaction]) | What is the average satisfaction across all students? | Provides a quick summary of overall course satisfaction. |
| Total Feedbacks | Total Feedbacks = COUNTROWS('Student\_Event\_Feedback\_Analysis') | How many feedback responses were collected? | Measures engagement and dataset completeness. |
| Sentiment Consistency | Sentiment Consistency = ABS(AVERAGE('Student\_Event\_Feedback\_Analysis'[Sentiment\_Score]) - AVERAGE('Student\_Event\_Feedback\_Analysis'[TB\_Polarity])) | How closely do VADER and TextBlob sentiments match? | Validates NLP analysis and ensures consistency of sentiment scoring. |
| Positive Feedback Ratio | Positive\_Feedback\_Ratio = DIVIDE(CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Sentiment\_Label] = "Positive"), COUNTROWS('Student\_Event\_Feedback\_Analysis')) \* 100 | What proportion of feedback is positive? | Measures positivity of student feedback at a glance. |
| Negative Feedback Ratio | Negative\_Feedback\_Ratio = DIVIDE(CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Sentiment\_Label] = "Negative"), COUNTROWS('Student\_Event\_Feedback\_Analysis')) \* 100 | What proportion of feedback is negative? | Quickly highlights areas of concern or dissatisfaction. |
| Neutral Feedback Ratio | Neutral\_Feedback\_Ratio = DIVIDE(CALCULATE(COUNTROWS('Student\_Event\_Feedback\_Analysis'), 'Student\_Event\_Feedback\_Analysis'[Sentiment\_Label] = "Neutral"), COUNTROWS('Student\_Event\_Feedback\_Analysis')) \* 100 | What proportion of feedback is neutral? | Measures Neutral of student feedback at a glance. |

**Student Event Feedback Analysis Dashboard Filters Summary:**

| **Filter Name** | **Field Type** | **Purpose / What It Controls** | **Why It’s Important / Insight** |
| --- | --- | --- | --- |
| Satisfaction Level | Categorical (Text) | Allows users to filter and view data by satisfaction category — Low, Medium, or High | Helps understand how satisfaction impacts feedback ratings and sentiment trends, revealing which satisfaction groups need improvement. |
| Sentiment Label (VADER) | Categorical (Text) | Enables filtering feedback based on sentiment classification — Positive, Neutral, or Negative | Helps identify emotional tone of feedback and analyze the correlation between sentiment and overall satisfaction. |

**Final Interactive Dashboard of Student Event Feedback Analysis:**



**Conclusion:**

The Student Event Feedback Analysis project successfully transformed raw student feedback into actionable insights. By combining quantitative ratings and qualitative comments, the analysis revealed key satisfaction drivers, pain points, and sentiment trends. Using both VADER and TextBlob sentiment models ensured reliable interpretation of feedback tone. The resulting Power BI dashboard provides a clear view of how students perceive course aspects, enabling data-driven improvements in academic experience and event quality.

**Learning Outcomes:**

* Understood how to clean and preprocess survey data effectively.
* Learned to calculate and interpret overall satisfaction scores.
* Applied TextBlob and VADER for text sentiment analysis.
* Visualized results using Power BI charts and KPIs.
* Compared sentiment results from multiple NLP models.
* Derived meaningful insights to support decision-making.
* Created a complete end-to-end data analytics workflow.

**Skills Gained:**

* Data Cleaning & Preprocessing
* Exploratory Data Analysis (EDA)
* Sentiment Analysis (VADER & TextBlob)
* Data Visualization in Power BI
* DAX Measure Creation
* Insight Generation & Interpretation
* Report Documentation & Presentation
* Analytical Thinking & Problem Solving