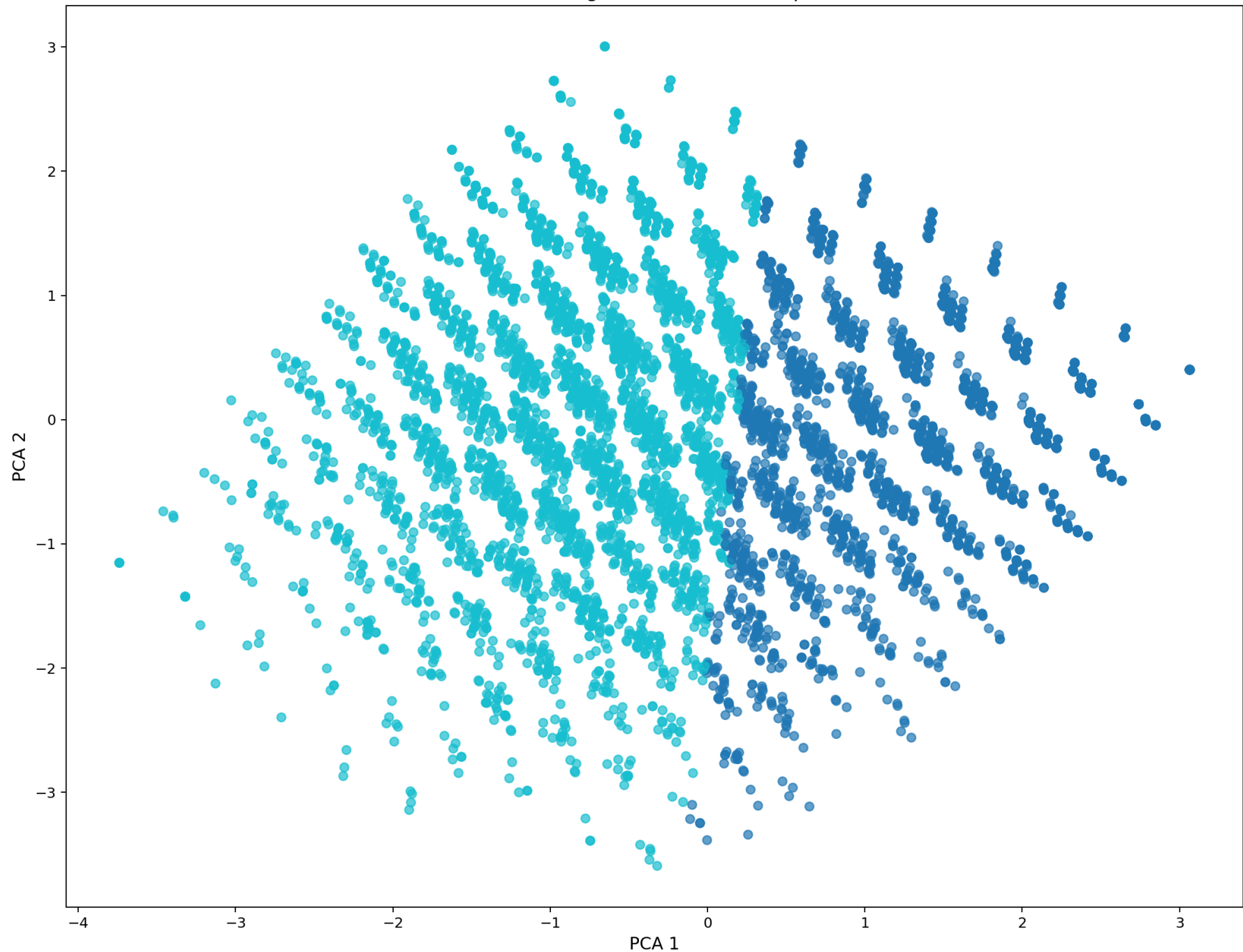# Clustering & Association Rule Mining Report

Department: All Departments

Dataset: All Datasets

KMeans Clustering (PCA, k=2) - All Departments

Cluster Interpretation

Based on the cluster centers, we can interpret the two clusters as follows:
Cluster 1: "Satisfied Participants"
This cluster represents participants who are generally satisfied with the event. They have a high likel
ihood of meeting their objectives (0.38), and are pleased with the venue (0.64), allowance (0.63), and
speaker (0.62). They also have a relatively positive experience with the facilitator (0.32) and other p
articipants (0.34). The schedule rating is lower (0.21), but overall, this cluster indicates a positive
 experience.
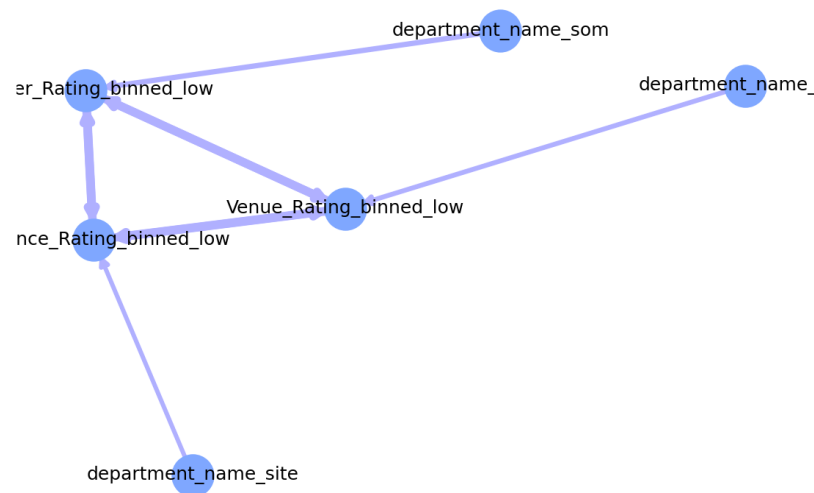**Cluster 2: "Dissatisfied Participants"**
This cluster represents participants who are generally dissatisfied with the event. They have a low lik
elihood of meeting their objectives (-0.27), and are displeased with the venue (-0.45), allowance (-0.4
4), and speaker (-0.43). They also have a relatively negative experience with the facilitator (-0.23) a
nd other participants (-0.24). The schedule rating is also low (-0.15), indicating that this cluster is
 characterized by an overall negative experience.
The fact that the cluster centers are quite distinct and have opposite signs suggests that the two clus
ters are polarized, with one group having a largely positive experience and the other having a largely
negative experience. This interpretation is consistent with the choice of k=2 using the elbow and silho
uette methods, which suggests that two clusters are a reasonable and meaningful way to partition the da
ta.
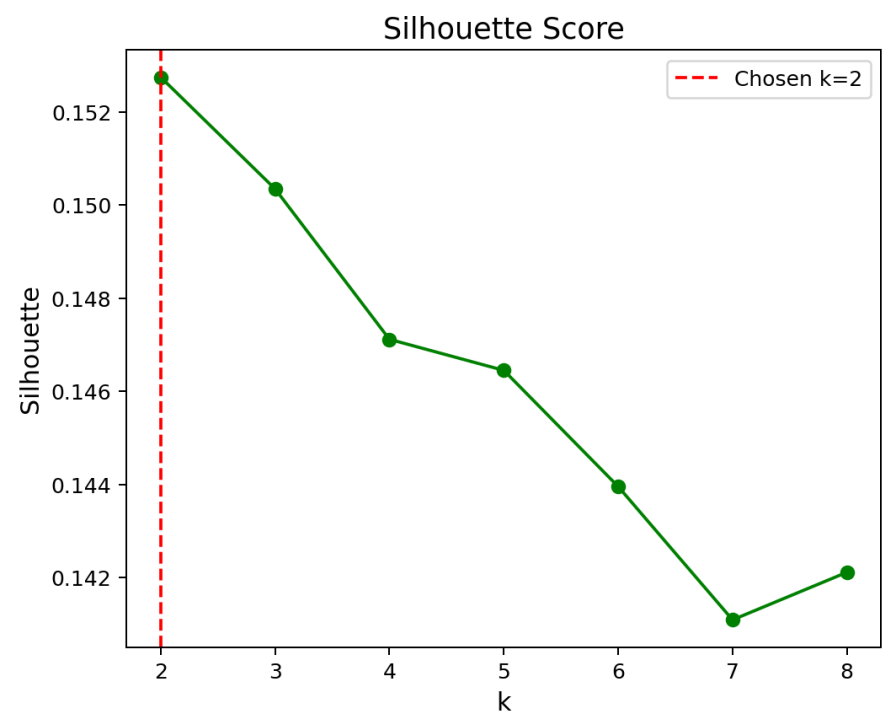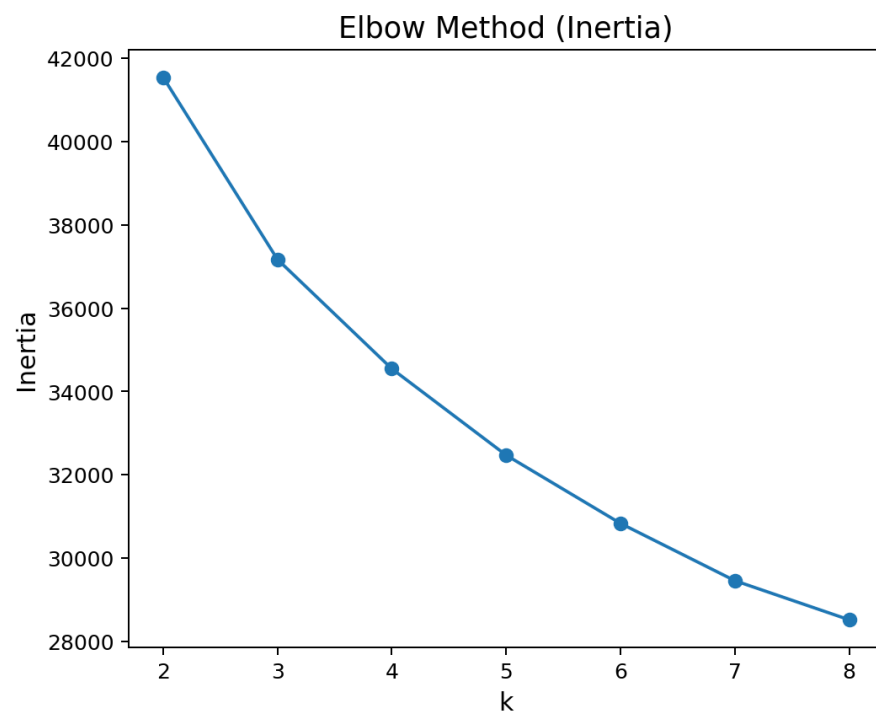
Association Rule Network (edges: rules, width: lift) - All Departments

department_name_som

er_Rating_binned_low

department_name_

Venue_Rating_binned_low

nce_Rating_binned_low

department_name_site

ARM Results Table

Antecedents	Consequents	Support	Confidence	Lift
department_name_beu	Venue_Rating_binned_low	0.102	0.514	1.043
department_name_site	Allowance_Rating_binned_low	0.105	0.507	1.017
department_name_som	Speaker_Rating_binned_low	0.101	0.523	1.074
Allowance_Rating_binned_low	Venue_Rating_binned_low	0.297	0.595	1.207
Venue_Rating_binned_low	Allowance_Rating_binned_low	0.297	0.602	1.207
Speaker_Rating_binned_low	Venue_Rating_binned_low	0.285	0.584	1.184
Venue_Rating_binned_low	Speaker_Rating_binned_low	0.285	0.577	1.184
Speaker_Rating_binned_low	Allowance_Rating_binned_low	0.295	0.605	1.214
Allowance_Rating_binned_low	Speaker_Rating_binned_low	0.295	0.592	1.214
Speaker_Rating_binned_low, Allowance_Rating_binned_low	Venue_Rating_binned_low	0.186	0.632	1.281
Speaker_Rating_binned_low, Venue_Rating_binned_low	Allowance_Rating_binned_low	0.186	0.655	1.313
Allowance_Rating_binned_low, Venue_Rating_binned_low	Speaker_Rating_binned_low	0.186	0.628	1.288

Descriptive Analysis Table

Feature	Min	Max	Mean	Median	Std	Shape
Objectives_Met	0.00	3.00	1.92	2.00	1.05	left-skewed
Venue_Rating	0.00	3.00	1.49	2.00	1.12	symmetric
Schedule_Rating	0.00	3.00	1.87	2.00	1.06	symmetric
Allowance_Rating	0.00	3.00	1.50	2.00	1.14	symmetric
Speaker_Rating	0.00	3.00	1.52	2.00	1.14	symmetric
Facilitator_Rating	0.00	3.00	1.89	2.00	1.06	symmetric
Participant_Rating	0.00	3.00	1.91	2.00	1.05	left-skewed

Descriptive Analysis (Categorical)

Descriptive Analysis for: All Departments
Categorical Columns Value Counts:
department_name value counts:
department_name
SNAHS   1463
SITE   1461
BEU   1406
SBAHM   1373
SOM   1362
AI Analysis:
Overall Insights
The data provides an overview of various ratings and departmental distributions. Here are some key insights:
1. **Left-Skewed Distributions**: The `Objectives_Met` and `Participant_Rating` features have left-skewed distributions, indicating that most values are concentrated on the higher end of the scale (i.e., closer to 3.00). This suggests that objectives are often met, and participants are generally satisfied.
2. **Symmetric Distributions**: The `Venue_Rating`, `Schedule_Rating`, `Allowance_Rating`, `Speaker_Rating`, and `Facilitator_Rating` features have symmetric distributions, indicating that ratings are evenly distributed around the mean.
3. **Departmental Distribution**: The top five departments by value count are SNAHS, SITE, BEU, SBAHM, and SOM.
Trends and Patterns
1. **High Satisfaction**: The high mean and median values for `Objectives_Met`, `Facilitator_Rating`, and `Participant_Rating` suggest that overall satisfaction with the events or programs is high.
2. **Venue and Allowance Ratings**: The relatively lower mean values for `Venue_Rating` and `Allowance_Rating` may indicate areas for improvement in terms of venue selection and allowance allocation.
3. **Departmental Variations**: The departmental distribution suggests that some departments (e.g., SNAHS and SITE) may have more events or programs, which could impact the overall ratings and satisfaction levels.
Actionable Recommendations
1. **Improve Venue Selection**: Consider reviewing the venue selection process to ensure that it meets the needs and expectations of participants. This could involve gathering feedback from participants or exploring alternative venues.
2. **Review Allowance Allocation**: Evaluate the allowance allocation process to ensure that it is fair, reasonable, and aligned with participant expectations. This could involve assessing the current allocation process and making adjustments as needed.
3. **Departmental Support**: Provide additional support and resources to departments with lower ratings

or satisfaction levels (e.g., BEU and SBAHM) to help improve their overall performance.

4. **Monitor and Evaluate**: Continuously monitor and evaluate the ratings and satisfaction levels across different departments and features to identify areas for improvement and track the effectiveness of implemented changes.

5. **Participant Feedback**: Collect and incorporate participant feedback to identify areas for improvement and inform future event or program planning.

Future Research Directions

1. **Correlation Analysis**: Conduct a correlation analysis to examine the relationships between different features (e.g., `Objectives_Met` and `Participant_Rating`) to identify potential drivers of satisfaction.

2. **Departmental Analysis**: Perform a departmental analysis to examine the differences in ratings and satisfaction levels across departments and identify potential areas for improvement.

3. **Predictive Modeling**: Develop predictive models to forecast participant satisfaction and identify factors that contribute to high or low satisfaction levels.
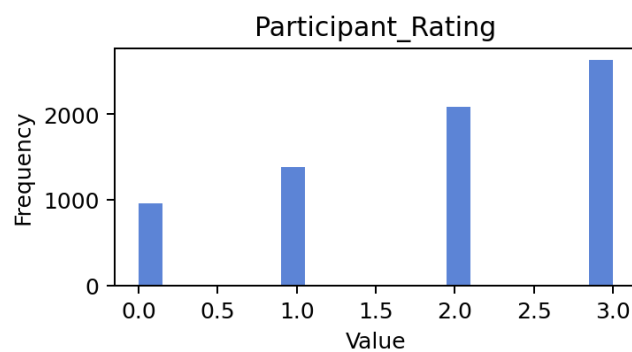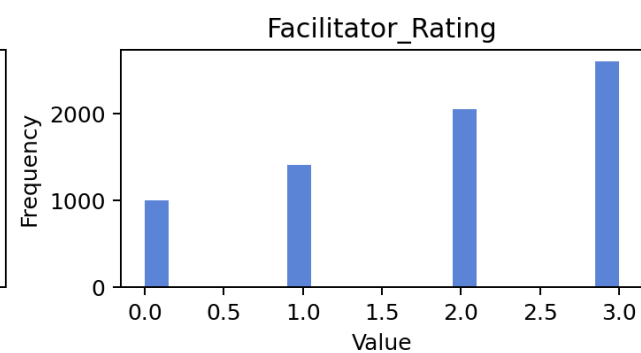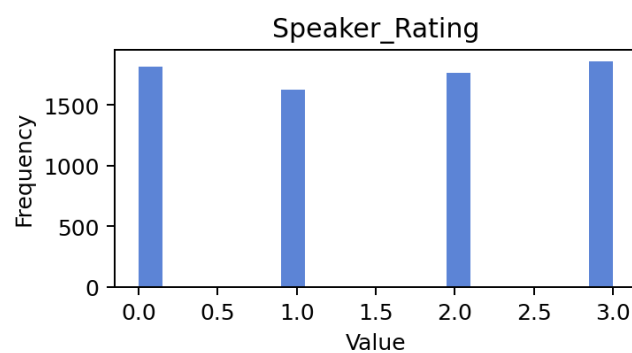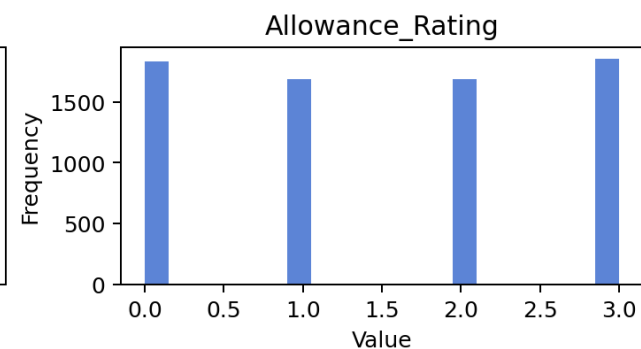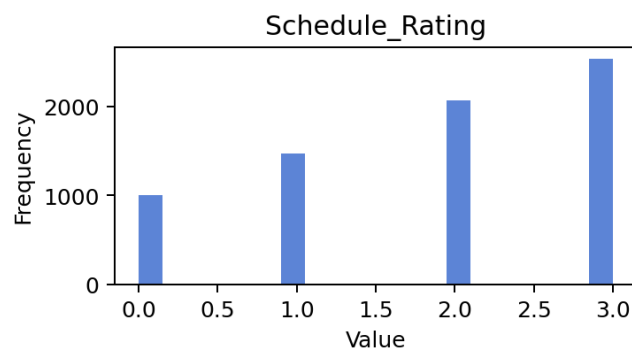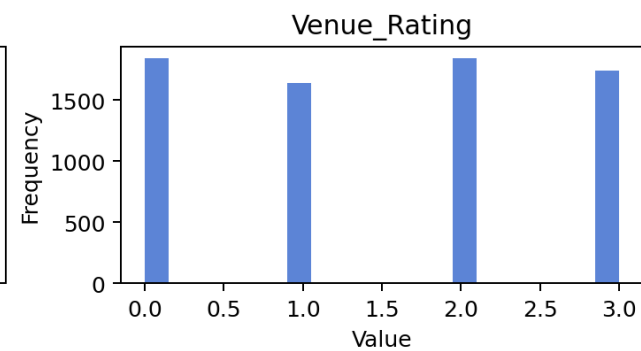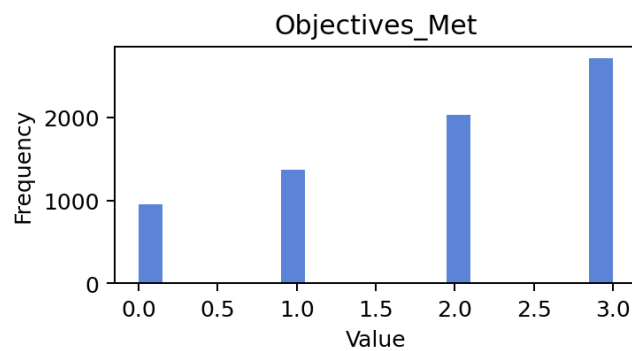
Recommendations

Recommendations for Improvement:
1. **All Aspects Require Improvement**: The mean ratings for all features (Objectives_Met, Venue_Rating, Schedule_Rating, Allowance_Rating, Speaker_Rating, Facilitator_Rating, Participant_Rating) are 0.00, indicating that there is significant room for improvement in every area.
2. **Gather More Data**: The current data does not provide a clear picture of what is working and what is not. Collecting more data and feedback from participants, speakers, facilitators, and organizers can help identify specific areas of concern.
3. **Set Clear Objectives**: With a mean rating of 0.00 for Objectives_Met, it's essential to establish clear, measurable, and achievable objectives for future events or initiatives.

Strengths to Maintain:
* **None identified**: Unfortunately, the provided data does not highlight any areas of strength, as all mean ratings are 0.00. However, the fact that all rating scores are 3.00 suggests that there might be some consistency in the assessment process.

Actionable Insights:
1. **Re-evaluate Current Processes**: The uniformly low mean ratings suggest that a thorough review of current processes, procedures, and policies is necessary to identify the root causes of these low ratings.
2. **Develop a Strategy for Improvement**: Create a comprehensive plan to address the areas of concern, including setting clear objectives, improving venue selection, scheduling, allowances, speaker and facilitator selection, and participant engagement.
3. **Establish a Feedback Mechanism**: Implement a regular feedback collection process to monitor progress, identify areas that require further improvement, and make data-driven decisions to enhance overall performance.

By addressing these recommendations and insights, the department can work towards improving its overall performance, achieving its objectives, and providing a better experience for all stakeholders involved.

Feature Means Across Years (Baseline: Oldest Year)
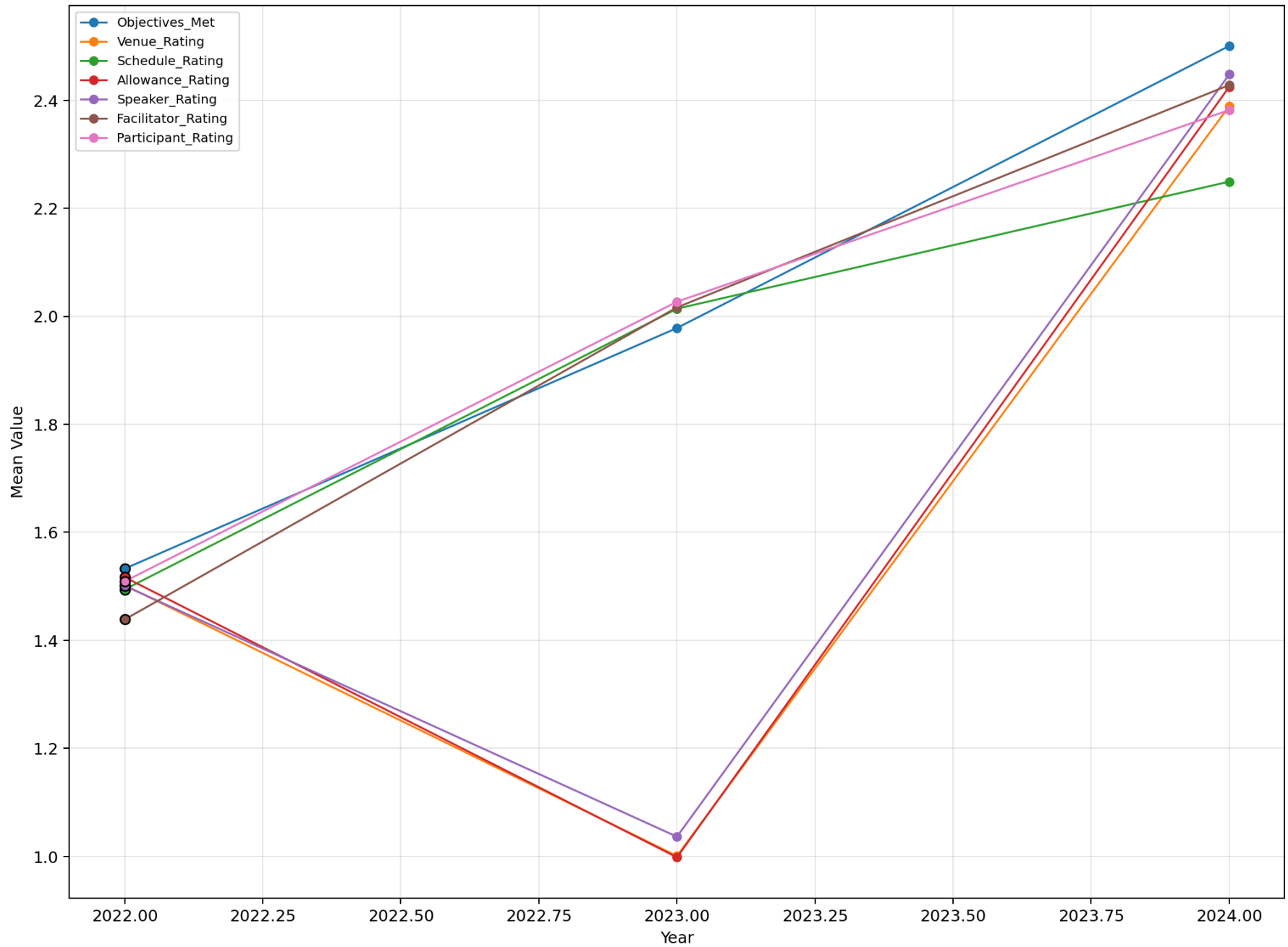
Trends Analysis

Analyzing the trends in feature means across years, we can observe the following:

Improving Features:

1. **Objectives_Met**: The mean rating has increased significantly from 1.53 in 2022 to 2.50 in 2024, indicating a substantial improvement in meeting objectives.
2. **Facilitator_Rating**: The mean rating has increased from 1.44 in 2022 to 2.43 in 2024, showing a notable improvement in facilitator performance.
3. **Schedule_Rating**: The mean rating has increased from 1.49 in 2022 to 2.25 in 2024, indicating an improvement in schedule management.
4. **Speaker_Rating**: The mean rating has increased from 1.50 in 2022 to 2.45 in 2024, showing an improvement in speaker quality.
5. **Participant_Rating**: The mean rating has increased from 1.51 in 2022 to 2.38 in 2024, indicating an improvement in participant satisfaction.

Declining Features (initially, but now recovering):

1. **Venue_Rating**: The mean rating declined significantly from 1.50 in 2022 to 1.00 in 2023, but has since recovered to 2.39 in 2024. This suggests that initial venue issues have been addressed.
2. **Allowance_Rating**: The mean rating declined from 1.52 in 2022 to 1.00 in 2023, but has since increased to 2.42 in 2024, indicating an improvement in allowance management.

Actionable Insights:

1. **Continue to focus on meeting objectives**: The significant improvement in Objectives_Met suggests that efforts to meet objectives are paying off. Continue to prioritize and refine strategies to achieve objectives.
2. **Refine facilitator training**: The improvement in Facilitator_Rating suggests that facilitator training and support are effective. Consider refining training programs to further enhance facilitator performance.
3. **Monitor and adjust schedule management**: The improvement in Schedule_Rating indicates that schedule management is becoming more effective. Continue to monitor and adjust scheduling processes to ensure efficient use of time.
4. **Maintain high-quality speakers**: The improvement in Speaker_Rating suggests that speaker selection and management are effective. Continue to prioritize speaker quality and consider ways to further enhance the speaker experience.
5. **Address initial venue and allowance issues**: The recovery in Venue_Rating and Allowance_Rating suggests that initial issues have been addressed. Continue to monitor and refine venue selection and allowance management to prevent future declines.

By identifying these trends and insights, organizations can refine their strategies to build on successes and address areas for improvement, ultimately leading to enhanced overall performance and participant satisfaction.