



Executive Summary

Customer Engagement Analysis in Excel

Company: 365 Data Science

Project Duration: Q4 2021 – Q4 2022

Tool Used: Microsoft Excel

Skills Applied: Descriptive Statistics, Hypothesis Testing, Data Visualization, Business Insight Generation

Objective

The primary goal of this analysis was to determine whether new engagement features introduced by **365 Company** in 2022 — such as **XP systems, in-app coins, leaderboards, streaks**, and an **expanded course library** — led to a measurable increase in **student engagement** on the learning platform.

The analysis compared engagement metrics between **Q4 2021 and Q4 2022** for both **paid and free users**, focusing on usage time (minutes watched) as the core indicator of customer engagement.

Methodology

A structured, data-driven approach was employed using Microsoft Excel:

1. **Descriptive Analysis:** Compared mean, median, and standard deviation of minutes watched between Q4 2021 and Q4 2022.
2. **Distribution Analysis:** Evaluated **skewness** and **kurtosis** to detect asymmetry and the presence of outliers.
3. **Confidence Intervals:** Estimated 95% intervals to determine the reliability of engagement metrics.
4. **Hypothesis Testing:** Conducted **two-sample t-tests (unequal variances)** to verify if engagement significantly improved post-feature launch.
5. **Regional Comparison:** Compared user engagement between **U.S. and India** for free users to identify regional behavioral differences.

Key Findings

1. Paid-Plan Users

- **Mean minutes watched:** Increased from **33.8 → 273.0 minutes** (Q4 2021 → Q4 2022)
- **Median minutes watched:** Increased from **26.3 → 40.3 minutes**
- **Standard deviation:** Rose sharply (**28.2 → 854.6**), indicating wide engagement variability
- **Interpretation:** Paid users showed a *significant and widespread increase* in engagement, supported by a clear upward shift in both mean and median.

2. Free-Plan Users

- **Mean minutes watched:** Increased from **25.4 → 117.6 minutes**
- **Median minutes watched:** *Decreased* from **14.2 → 11.8 minutes**
- **Standard deviation:** Jumped (**26.2 → 468.9**), indicating extreme outliers
- **Interpretation:** Engagement growth among free users was *inconsistent* — a few users became highly active, while the majority remained less engaged.

3. Distribution Shape

- **Skewness:** Paid users → 0.63 → **7.07**, Free users → 1.17 → **15.06**
- **Kurtosis:** Paid → -0.85 → **58.48**, Free → 0.36 → **315.76**
- **Interpretation:** Both distributions became **highly right-skewed** and **leptokurtic**, showing that engagement increases were driven by a small subset of heavy users. The mean is no longer representative of typical behavior — median and percentiles provide a more reliable picture.

4. Confidence Intervals

Group	2021 CI	2022 CI	Interpretation
Paid Users	316.25 – 348.76	351.91 – 384.72	Significant Increase
Free Users	129.92 – 137.95	67.71 – 70.59	Decrease in Engagement

5. Hypothesis Testing

- **Paid Users:** Rejected null hypothesis ($p < 0.05$) → statistically significant increase in engagement.

- **Free Users:** Failed to reject null hypothesis → no statistically significant increase.
- **Interpretation:** The 2022 platform features effectively boosted engagement among paying customers but did not generate a similar effect for free users.

6. Regional Comparison (U.S. vs India)

- **Finding:** Indian students exhibited higher engagement levels than U.S. students in Q4 2022.
- **Interpretation:** Platform content and features appear to resonate better with the Indian audience, suggesting **localization opportunities** for U.S. learners.



Statistical Insights

- The **mean-to-median gap** and the **sharp rise in skewness and kurtosis** confirm that engagement is heavily influenced by a few highly active users.
- The **confidence interval shift** and **t-test results** validate that engagement growth among paid users is statistically significant.
- **Free users' variability** widened considerably — highlighting the need for personalized engagement strategies.



Business Interpretation

Insight	Business Implication
Paid users' engagement increased significantly	New premium features add tangible value for paying customers.
Free users show inconsistent engagement	The platform's gamification appeals more to motivated or paying users; mass engagement among free users remains low.
Rising skewness and kurtosis	A small cohort of hyper-engaged users drives overall growth — need to broaden engagement base.
Regional disparity (India > U.S.)	Content localization and feature adaptation can boost U.S. student engagement.



Recommendations

1. **Targeted Free-User Re-Engagement:** Introduce limited-time trials of paid features (XP, coins, streaks) to drive habit formation among free users.
 2. **Personalized Gamification:** Use data segmentation to recommend relevant challenges and streaks for different user segments.
 3. **Feature Effectiveness Tracking:** Instrument engagement metrics by feature to identify which gamification elements deliver the most impact.
 4. **Localized Engagement Strategy:** Develop content and user experiences customized for U.S. students, similar to what drives success in India.
 5. **Refined KPIs:** Replace mean-based metrics with **median watch time, 90th percentile engagement**, and **% of users exceeding engagement thresholds** for more reliable measurement.
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Conclusion

The analysis reveals a clear **increase in engagement among paid users**, validating the positive impact of the 2022 feature rollouts. However, **free users did not exhibit the same improvement**, signaling the need for more targeted re-engagement strategies.

The data indicates that the platform's growth is currently **driven by a small cohort of power users**, not the average user. To ensure sustainable growth, 365 Company should focus on **broadening engagement** through **personalization, incentives, and localization**.

Executive Takeaway

The 2022 feature enhancements successfully deepened engagement for paying subscribers, but not for the broader free-user base.

To achieve balanced growth, the company must shift from generalized gamification to **data-driven personalization** — turning sporadic engagement into sustained learning behavior.