E-News Express: Analysis of Landing Page Effectiveness in Subscriber Acquisition

Project on E-news Express for the Course Business Statistics

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Contents / Agenda

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I. Executive Summary

Business Problem & Analysis

Business Problem:

Context: E-news Express seeks to grow its subscriber base but faces declining monthly new subscribers.

Analysis: Experiment Method: 100 users split into control group (50): old landing page & treatment group (50): new landing page.

Statistical Tests: Statistical tests included a t-test for time spent comparison, a z-test for conversion rate differences, a Chi-Square Test for language preference vs. conversion, and One-Way ANOVA for time spent by language users.

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Executive Summary Cont'd

Key Findings and Conclusions

Project Objective:

Assess the effectiveness of the new landing page in improving user engagement and conversion rates.

Key Findings:

- Users spend significantly more time on the new page.
- Conversion rate is significantly higher for the new page.
- No significant relationship between language preference and conversion.
- No significant difference in time spent across languages.

Conclusion:

The new landing page effectively boosts user engagement and conversion rates with a consistent impact across languages.

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Executive Summary Cont'd

Actionable Insights and Recommendations

Actionable Insights:

- New Landing Page Success: Increases user engagement and conversions.
- Uniform User Experience: Consistently effective across languages.
- Focus Areas: Conversion strategies can remain language-agnostic.

Recommendations:

- Implement New Landing Page: Roll out for all users.
- Optimize Content: Add engaging multimedia and monitor engagement metrics.
- Targeted Campaigns: Leverage findings for marketing campaigns.
- Future Experiments: Conduct A/B tests to refine design and content further.

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II. Business Problem Overview and Solution Approach

1. Business Problem Overview

- **Business Context**:
  - E-news Express, an online news portal, aims to expand its subscriber base.
  - The portal offers quick updates on global events using electronic transmission.
  - Advantages include faster access and the use of multimedia elements.
- **Problem Statement**:
  - Decline in new monthly subscribers compared to the past year.
  - Hypothesis: The current webpage design is not engaging enough to convert visitors into subscribers.

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2. Objective and Experiment Design

- **Objective**:
  - To test the effectiveness of a new landing page designed to improve user engagement and conversion rates.

- **Experimental Design**:
  - Randomly select 100 users and divide them into two groups:
  - Control Group: 50 users served the existing landing page.
  - Treatment Group: 50 users served the new landing page.
  - Collect data on user interactions with both versions of the landing page.

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3. Solution Approach / Methodology

- **Statistical Analysis**:

  •Performed analysis at a 5% significance level to answer the following questions:

  1. Do users spend more time on the new landing page than on the existing landing page?
  2. Is the conversion rate for the new page greater than the conversion rate for the old page?
  3. Does the converted status depend on the preferred language? (Use a contingency table)
  4. Is the time spent on the new page the same for different language users

- **Data Dictionary**:

  - User_id
  - Group,
  - Landing_page,
  - Time_spent_on_the_page
  - Converted,
  - Language_preferred

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III. EDA Results

1. Dataset Overview

i. **Initial Steps**:

Displayed first few & last few rows ensured the dataset is loaded correctly and is consistent.

Checked the shape of the dataset: 100 rows and 6 columns.

ii. **Data Types**:

Numerical: user_id, time_spent_on_the_page

Categorical: group, landing_page, converted, language_preferred

Link to Appendix slide on data background check

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EDA Cont'd

2. Summary Statistics and Missing Values

Numerical Summary:

- Mean time spent: 5.38 minutes
- Min time spent: 0.19 minutes
- Max time spent: 10.71 minutes

Categorical Summary:

- Group: 50 control, 50 treatment
- Landing_page: 50 old, 50 new
- Converted: 54 yes, 46 no
- Language_preferred: 34 Spanish, 33 French, 33 English

Missing Values:

- None found in the dataset

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EDA Cont'd

3. Duplicate Check and Insights

Duplicate Rows: No duplicate rows found in the dataset

Insights:

- Dataset is clean with no missing or duplicate values.
- Balanced distribution of control and treatment groups.
- Adequate representation of different languages preferred by users.
- Provides a solid foundation for further analysis and hypothesis testing.

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4. Univariate Analysis

i. Time Spent on the Page:

- Histogram and boxplot analysis revealed normal distribution of time spent on the page

ii. Group:

- Balanced distribution of users between control (50) and treatment groups (50)

iii. Landing Page:

- Value counts and count plot revealed equal representation of old(50) and new(50) landing pages.

iv. Converted:

- Value counts and count plot revealed conversion rate distribution among users: users converted (54) & not converted (46)

v. Language Preferred:

- preferred languages among users count plot shows (Spanish(34), French(34), and English(32))

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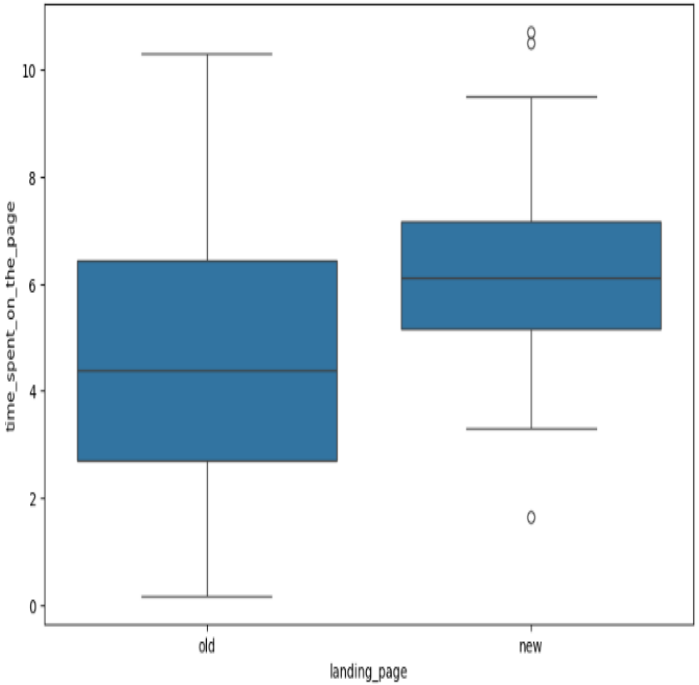
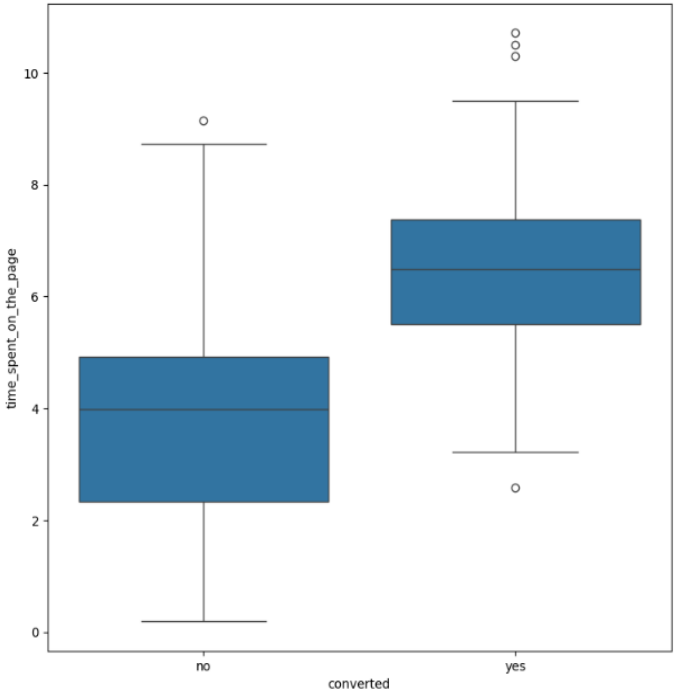
5. Bivariate Analysis Overview

- **Landing Page vs. Time Spent; and Conversion Status vs. Time Spent:**
- Visual indication if users spend more time on the new page and visual representation to see if more time spent correlates with higher conversion rates.





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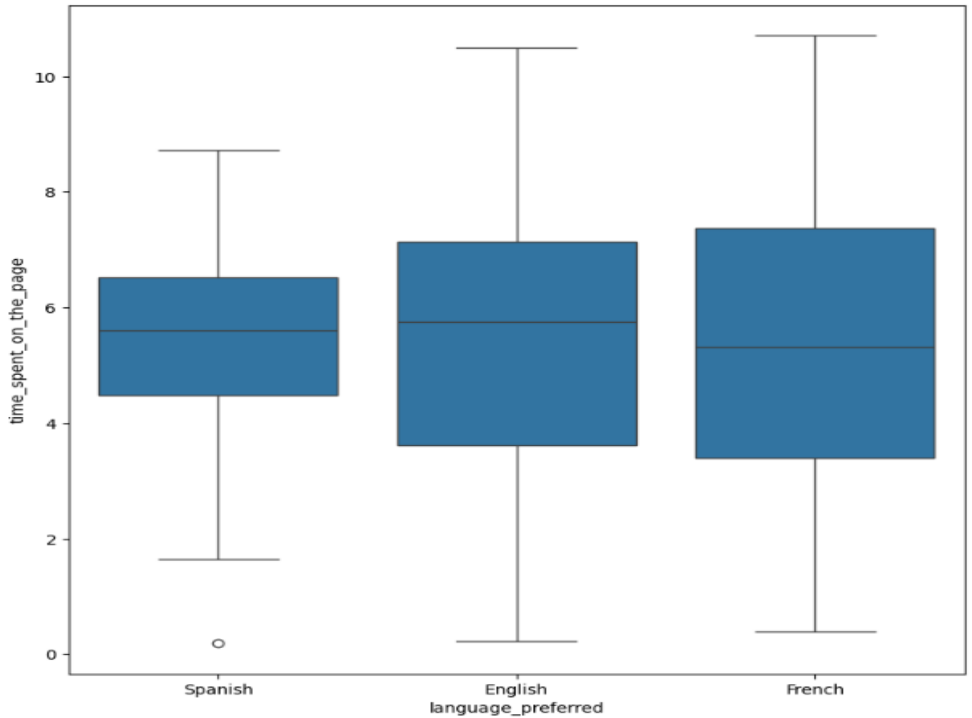
Bivariate Analysis Overview (Cont'd)

- **Language Preferred vs. Time Spent:**

  - The following boxplot shows the distribution of time spent on the page across different languages.



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IV. Hypotheses Tested and Results

1. Analysis of Time Spent on Landing Pages

Do Users Spend More Time on the New Landing Page?

This is a comparative analysis for time spent on new vs. old landing page.

i. Hypotheses:

Null Hypothesis (H_0): Mean time spent on new landing page $\leq$ mean time spent on existing landing page.

Alternate Hypothesis (H_a): Mean time spent on new landing page > mean time spent on existing landing page.

ii. Appropriate Test and Significance Level:

Two-sample t-test for independent at significance Level $\alpha = 0.05$.

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Analysis of Time Spent on Landing Pages (cont'd)

iii. Data Preparation:

Subset data for new and old landing page users.

Sample standard deviations: New page: 1.82, Old page: 2.58.

iv. P-value Calculation:

Result: p-value = 0.000139.

Comparison: p-value < α (0.05).

v. Inference:

Conclusion: Reject the null hypothesis.

Result: The mean time spent on the new landing page is greater than the mean time spent on the existing landing page.

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2. Conversion Rate Analysis

Is the Conversion Rate for the New Page Greater than the Old Page?

This is a comparative analysis for a conversion rate for new & old landing page

i. Hypotheses:

- **Null Hypothesis (H_0)**: Conversion rate for the new page is equal to the conversion rate for the old page (P1 = P2).
- **Alternate Hypothesis (H_a)**: Conversion rate for the new page is greater than the conversion rate for the old page (P1 > P2).

ii. Test Selection & **Significance Level**:

a. **z-test for proportions**: Appropriate for comparing two population proportions from independent samples.

b. Selected **$\alpha = 0.05$**.

iii. Data Preparation:

Number of Converted Users:

- Treatment group (new page): 33 users.
- Control group (old page): 21 users.

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Conversion Rate Analysis (Cont'd)

Total Users:

- Treatment group: 50 users.
- Control group: 50 users.

iv. P-value Calculation:

- Result: p-value = 0.008.

- Comparison: p-value < α (0.05).

v. Inference:

Conclusion: Reject the null hypothesis.

Result: Therefore, we can conclude that the conversion rate for the new landing page is greater than the conversion rate for the old landing page.

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3. Conversion Status and Preferred Language

Does the Conversion Status Depend on the Preferred Language?

A comparison analysis in the relationship between conversion status and preferred language; indication of any dependency if any.

i. **Hypotheses:**

- Null Hypothesis (H_0): The converted status does not differ by preferred language.
- Alternate Hypothesis (H_a): There is a difference in converted status among different preferred languages.

ii. **Test Selection & Significance Level:**

- Chi-Square Test of Independence: Suitable for testing the independence of two categorical variables.
- Selected $\alpha = 0.05$.

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3. Conversion Status and Preferred Language (cont'd)

Data Preparation:

- Contingency Table: Created for language preferred and conversion status.

P-value Calculation :

- Result: p-value = 0.213.

- Comparison: p-value > α (0.05).

converted	no	yes
language_preferred		
English	11	21
French	19	15
Spanish	16	18

Inference:

Conclusion: Fail to reject the null hypothesis.

Result: The conversion status does not depend on the preferred language.

[No dependency in between the conversion status and language preference]

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4. Time Spent on the New Page comparison by Different Language Users

Is the Time Spent on the New Page the Same for Different Language Users?

A comparative analysis on time spent on the new page by different language users.

Hypotheses:

- Null Hypothesis (H_0): The time spent on the new page is the same for different language users.

- Alternate Hypothesis (H_a): The time spent on the new page is different for different language users.

Test Selection & Significance Level

One-way ANOVA: Suitable for comparing the means of more than two groups at selected $\alpha = 0.05$.

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Time Spent on the New Page Comparison by Different Language Users (cont'd)

Data Preparation:

Subset data for time spent by English, French, and Spanish users on the new page.

P-value Calculation:

Result: p-value = 0.432.

Comparison: p-value > α (0.05).

Inference:

- Conclusion: Fail to reject the null hypothesis.
- Result: There is no statistically significant difference in the time spent on the new page among different language users.

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V. Summary (Conclusion, Key Findings & Recommendations)

1. Conclusions:

The objective of the project was to assess the effectiveness of the new landing page in improving user engagement and conversion rates.

Key Findings:

- Users spend significantly more time on the new landing page compared to the old one.
- Conversion rate for the new landing page is significantly higher than the old page.
- No significant relationship between conversion status and preferred language.
- No significant difference in time spent on the new landing page among different language users.

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Summary Cont'd

2. Actionable Insights

- ✓ The new landing page is effective in increasing user engagement and conversion rates.
- ✓ The impact of the new design is consistent across different languages, suggesting it appeals broadly to users.
- ✓ Conversion strategies can remain language-agnostic given the lack of dependency on language preference.

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Summary Cont'd

3. Recommendations

- ✓ Launch the new landing page for all users to improve engagement and conversions.
- ✓ Use multimedia (videos, images) to make the page more engaging. Keep track of how much time users spend on the page and adjust as needed.
- ✓ Use the experiment results to create targeted marketing campaigns that highlight the improvements in user experience with the new landing page.
- ✓ Run more A/B tests to further refine page layout, calls-to-action, and content in different languages.

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VI. APPENDIX

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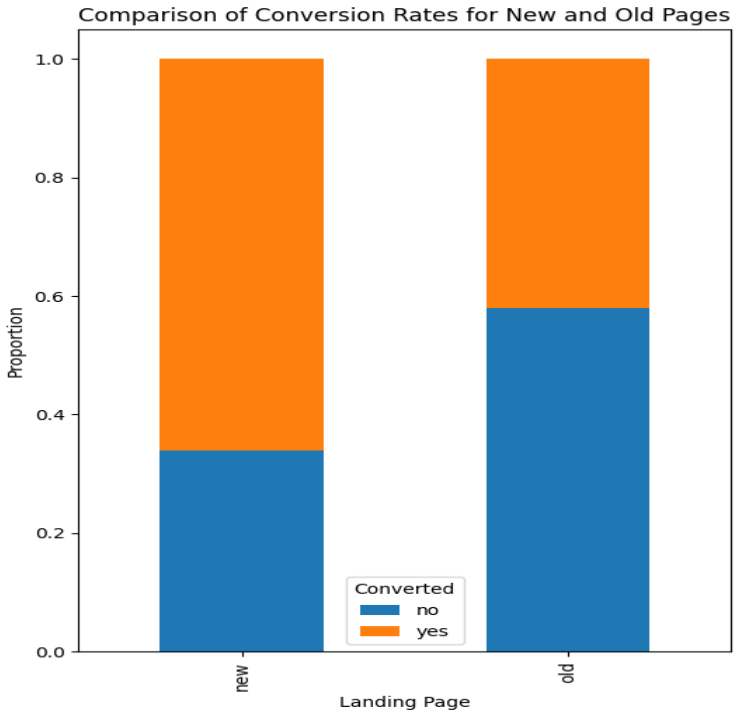
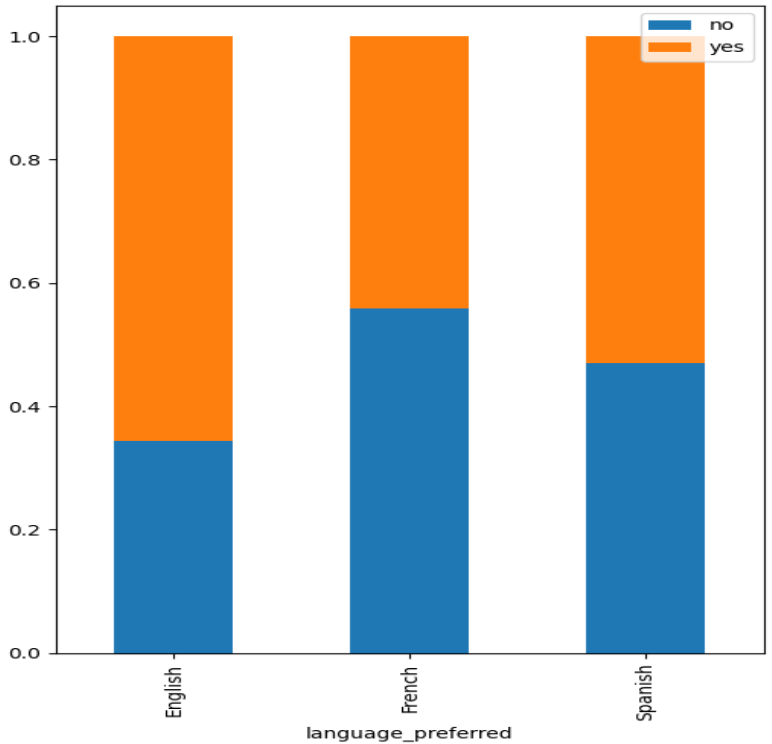
Conversion Rate by Landling Pages VS Conversion Rate by Language Preference





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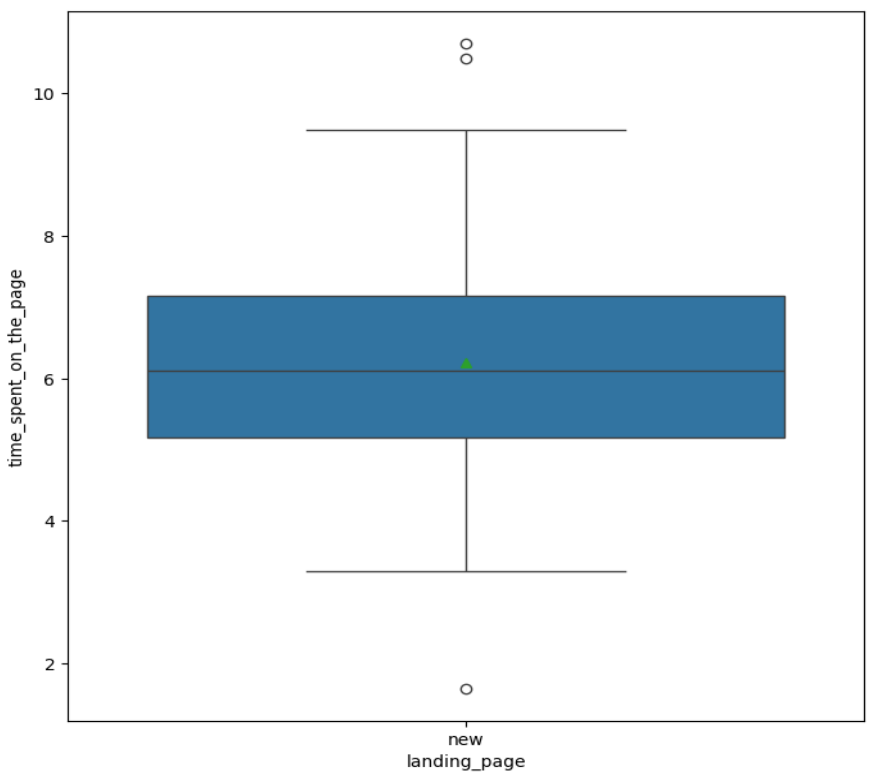
Time spent on the new page



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