

MINI PROJECT

A/B Testing Application in Data Science

Controlled Experiment on Landing Page Optimization

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Introduction to A/B Testing

A/B Testing, also known as Split Testing, is a research methodology where two versions of a variable (A and B) are compared simultaneously to determine which one performs better against a defined goal.

Role in Data Science

A/B testing is a foundational technique in data science that engineering and product teams use to validate decisions with real-world data. At its core, it's about understanding what changes improve user experience, conversion, or retention.

A/B Testing: Bridging UX and Data

- **Scientific Validation:** A/B Testing is a Randomized Controlled Experiment validating user experiences design changes based on objective evidence, not subjective opinion.
- **Core Function:** It measures the isolated impact of a single change (e.g., **headline**, **button placement**) on user behavior.
- **Primary Goal:** Maximize key performance indicators (KPIs) like **Conversion Rate** and **Revenue Per User**.

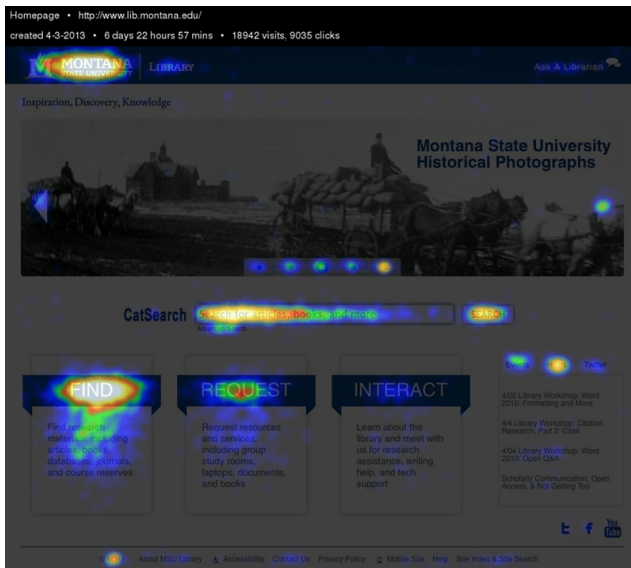


Figure: Library Homepage Click Data - April 3-April 10, 2013

Case study: Improving Library User Experience

- **Problem Identified:** The homepage category "**Interact**" had an extremely low **2% Click-Through Rate (CTR)**.
- **Research Question:** Will changing the confusing category title lead to a measurable increase in user engagement?
- **Refinement:** Used brief user interviews to select the most meaningful title variations for testing.
- **Hypothesis:** Replacing the title with "**Help**" or "**Services**" will generate significantly higher user engagement compared to all other options.

Case study: Improving Library User Experience

- **Set up and run experiment:** Users were randomly served one of the five variations (Control: Interact, Variations: Connect, Learn, Help, Services) over a set period. Tools used included Google Analytics and Crazy Egg.

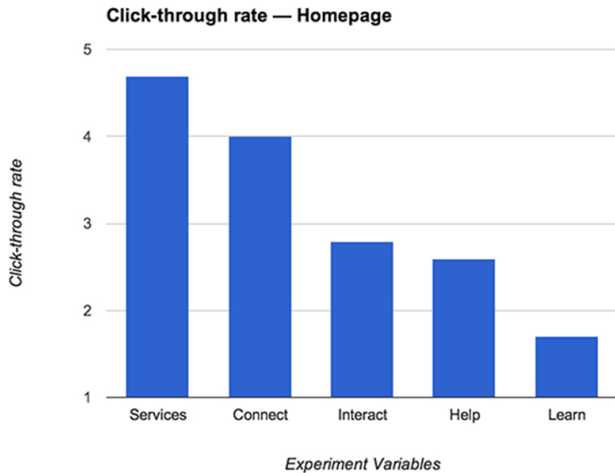


Figure: Click through rate by title variation

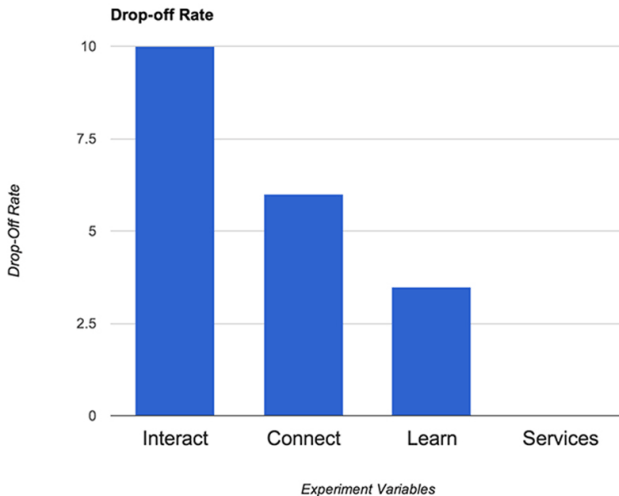


Figure: Drop off rates by title variation

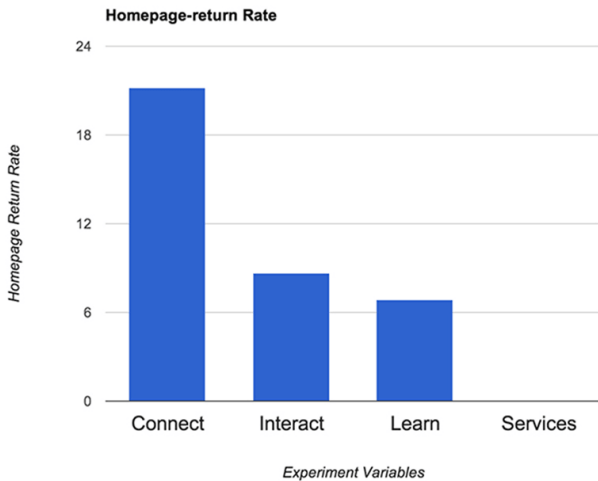


Figure: Homepages return rates by title variation

Case study: Improving Library User Experience

- **Winning Variation:** The title "**Services**" was the highest-performing option across all metrics (CTR, Drop-Off, Return Rate).
- **Unexpected Finding:** The internally favored title, "**Learn**," generated the **lowest user engagement**.
- **Validation:** This confirmed the value of A/B testing—relying on internal opinion would have resulted in a worse UX.

Data Collection Process Overview

- **Define research question:** Identify UX issues or engagement problems on library platforms.
- **Conduct qualitative interviews:** Gather user insights to refine and validate variations to test.
- **Formulate hypothesis and metrics:** Decide what to measure (click-through rate, drop-off rate, etc.).
- **Set up experiment:** Deploy A/B or A/B/n variations randomly to users with controlled sampling.
- **Collect and analyze data:** Track defined metrics and compare the performance of variations.
- **Share results and decide:** Implement the winning variation based on the analysis.

Phương Pháp Nghiên Cứu

- Thu thập dữ liệu
- Phân tích dữ liệu
- Công cụ và kỹ thuật sử dụng

Kết Thúc

Cảm ơn các bạn đã lắng nghe!