Applying Iterative Design Principles to a Live Product

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Step 1

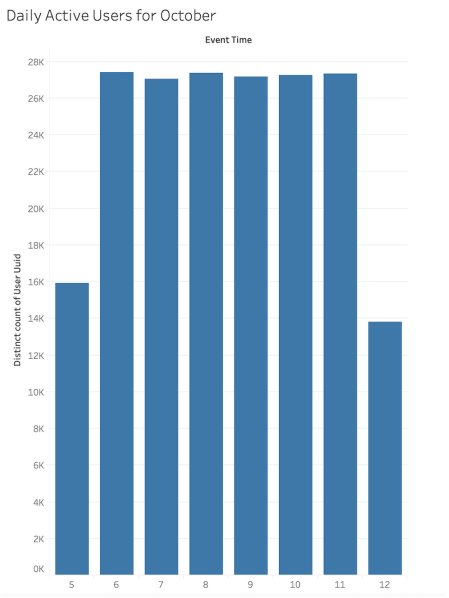
Select KPIs

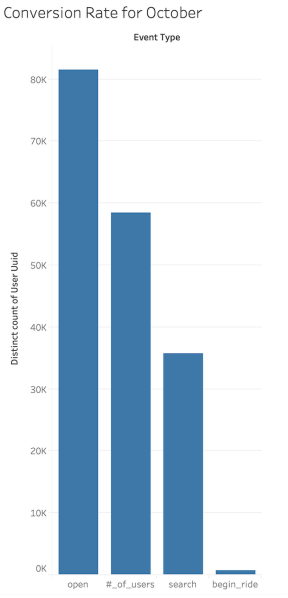
&

Evaluate Previous Multivariate Experiment Results

KPIs for Flyber Analyses

- KPI(s) for Flyber's business model (Product as a Service)– Daily Active Users (DAU), Daily Conversion Rate, NPS score, Daily Trips, Daily Passengers Count
- Calculation of KPI(s) using the available event data logs - Daily Active Users can be found using unique user session count for each day and conversion rate can be found by plotting event type against unique user ID and arranging the steps in proper order. Here are some graphs:





Conversion Rate for October

Event Type	
open	
#_of_users	-28.32%
search	-38.82%
begin_ride	-98.11%

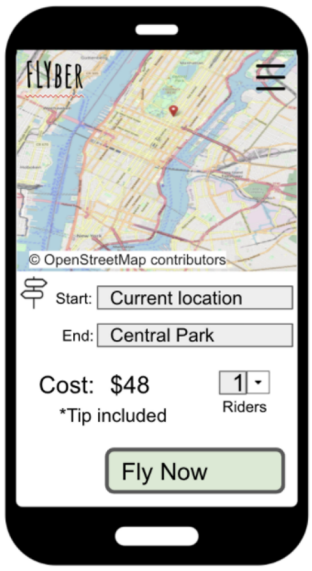
- Other KPIs that are important to Flyber but can't be calculated based on available data – **NPS score** is important to determine how happy are the customers so that they'll use the service again? We'll have to use user feedback in each stage of flow to gauze the experience. **Daily Passengers Count and No. of Trips** are other important KPIs which will help in determining how many individual v/s shared trips were made. It will help us calculate cost incurred v/s revenue earned.

First Multivariate Experiment

- First multivariate experiment was executed with different variants of **Book Flight** v/s **Fly Now** button and Cost showing with v/s without ***Tip included** text. Since there are two changes that needs to be validated so total 2*2 versions were be used and users were divided in 4 groups (1 control and 3 experiments).

Control

Experiment 1



Experiment 2

Experiment 3

- Almost equal number of users (32K+) used for each variant and logs were recorded for step by step activities.

Multivariate Test Results: Visualization

- Visual representation of the impact of the experiment on the conversion rate of users booking a flight (out of all users opening the app)

Conversion funnel for Multivariate Test1

	Experiment Group			
Event Type	control	experiment_1	experiment_2	experiment_3
open				
#_of_users	-42.37%	-42.25%	-42.11%	-42.70%
search	-45.91%	-45.81%	-44.61%	-45.59%
begin_ride	-98.46%	-98.28%	-98.27%	-98.29%

Funnel analysis for each of the experiment groups is done and % drop in each step in the flow is calculated. The test results in the graph listed above shows that there is drop out rate is different for each experiment group and we need to see if the variance in drop rate is cause by the change and is not just caused by randomization.

Multivariate Test Results: Significance Test

- To test multiple variant against control group, I would compare group assigned to first variant (experiment_1) with control group, then second group (experiment_2) with control group and finally third group (experiment_3) with control group. The comparison will help us know the statistical significance which means if the change in conversion is actually due to the experiment and not cause by randomization.

- Test results (p value) for each experiment compared to the control –

Comparison	p value	explanation
Control v/s Experiment_1	0.1507	Variant B's conversion rate (0.54%) was 12.11% higher than variant A's conversion rate (0.48%), but you cannot say, with 95% confidence, that variant B will perform better than variant A.
Control v/s Experiment_2	0.0889	Variant B's conversion rate (0.56%) was 15.91% higher than variant A's conversion rate (0.48%), but you cannot say, with 95% confidence, that variant B will perform better than variant A.
Control v/s Experiment_3	0.1708	Variant B's conversion rate (0.53%) was 11.11% higher than variant A's conversion rate (0.48%), but you cannot say, with 95% confidence, that variant B will perform better than variant A.

- Using statistical significance for the experiments, none of the experiments had statistical significant results at the 95% level.

- Since, none of the three variants shows statistical significant results so the experiments should not be expanded and a different set of experiment should be designed..

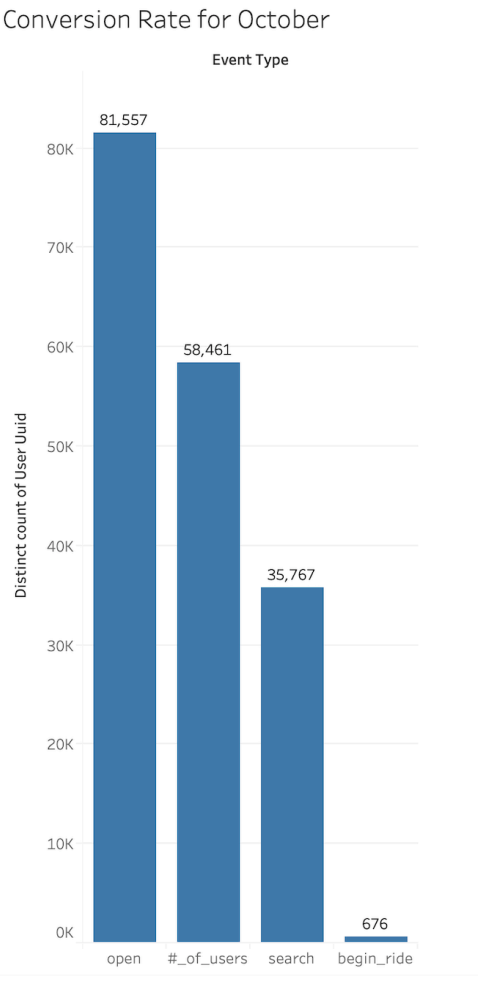
Step 2

Funnel & Cohort Analyses

User Funnel

Identifying the different stages the user funnel

- Based on the event types in the data provided, 3 steps a user can take from opening the app to final booking of a ride – open, #_of_users, search, begin_ride
- Graph showing the funnel from step to step, including drop off rates.



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User Segments

- 2 demographic attributes present in the data that allow for segment analysis – Age and Neighborhood
- For each demographic attribute, the number of users in each segment group –

Segment group based on Age

Age	
18-29	28,321
30-39	20,124
40-49	41,774
50+	64,059

Segment groups based on neighbourhood

User Neighborhood	
Bronx	2,396
Brooklyn	16,435
Manhattan	57,110
Queens	4,050
Staten Island	1,566

- For each demographic attribute, segment group with the largest number of users

  - For age based segments – above 50+ is largest segment with 64059 users.

  - For neighborhood based segments – Manhattan is largest segment with 57110 users.

Segment Analysis of Funnel

Opportunities for Improvement

- Funnel analysis by segment for all identified demographic attributes and describe the results

Conversion funnel for age segment

	Age			
Event Type	18-29	30-39	40-49	50+
open				
#_of_users	-53.59%	-55.27%	-50.40%	-42.15%
search	-33.88%	-35.18%	-32.69%	-62.13%
begin_ride	-98.55%	-98.29%	-98.16%	-98.61%

Conversion funnel for neighborhood segment

	User Neighborhood				
Event Type	Bronx	Brooklyn	Manhat..	Queens	Staten Island
open					
#_of_users	-28.71%	-28.63%	-28.22%	-28.89%	-26.37%
search	-38.35%	-38.61%	-38.89%	-38.30%	-40.50%
begin_ride	-97.82%	-98.14%	-98.11%	-98.26%	-97.96%

The conversion rate is similar across segments for demographic neighborhood however there is a significant variance in conversion rate across segments when it comes to age demographic.

- Visual for showing the funnel conversion by segment group for age:

The conversion rate for segment 50+ age is slightly lower despite the # of users who opened the app is way high for this segment so we need to focus on this segment.

Conversion analysis for segments based on age

	Age			
Event Type	18-29	30-39	40-49	50+
open				
begin_ride	-99.6281%	-99.5606%	-99.5449%	-99.8278%

Step 3

Hypothesis & Next Steps

Review Qualitative Data

- Based on interviews, reason for funnel under-performance seen in Step 2 – Qualitative data provided is mostly from the users belonging to age segment 50+. The higher funnel drop off after first step clearly indicates that they are struggling to use app and need someone to assist them to book Flyber.
- Hypothesis for what customer need is being under-served – Customers from age segment 50+ are struggling with using app and would require better ways of using Flyber. A voice assistance would certainly help here. Also, there should be a way to store addresses they visit and allow them to tag as home, office, hospital, art gallery etc.
- 3 quotes as evidence for the hypothesis -

” I call up our local pilot, Bob. He's not always available but I don't need to fiddle around with an app and hitting tiny buttons. He knows where I tend to be and where I want to go.”

“I have a personal car service on call. My assistant books Flyber whenever I'd be travelling during peak NYC traffic hours. Time is money and Flyber saves me time! But I let my assistant actually book the Flyber because the first few times I tried booking, the instructions were too small.”

“Honestly, I thought about using Flyber to surprise my grandson or granddaughter with a visit to one of their sporting games. Luckily my daughter was around to help me book the ride. I usually just use Uber because it remembers my addresses and has all my favourite place[illegible] so I guess I always just open that up since it is so convenient and sa[illegible] time. Though now that I say that, I really should use Flyber again si[illegible] would save more time when it comes to fighting traffic!

Suggested Features & Experimentation Plan

- Hypothesis using standard format:

We believe that funnel drop in user segment of 50+ age is Because they are struggling to use the app And that by providing voice assistance and geo-tagging for user segment aged 50+ we will see a 30% relative increase in bookings.

- 2 features that would match the hypothesis and determine a plan for multivariate testing, including describing the control and experimental conditions – Voice assistance, Geo tagging for Address. Since, there are two changes that we want to test, we should have 2*2 = 4 variant for testing (1 control group - no new features and 3 test groups – combination of the two new feature for each variant). Users should be randomly assigned to one out of the four groups to rule out any unintentional bias.

- Who should be exposed to the experimental changes – Population aged 50+ should be targeted for experimental changes.

- Additional metrics that would be helpful to collect from suggested features – user actions in new feature (invoking voice command, different commands used, use of geo-tagging etc.), # of times the feature is used and booking made, time spent in every stage of new functionality. User experience (like/dislike), device

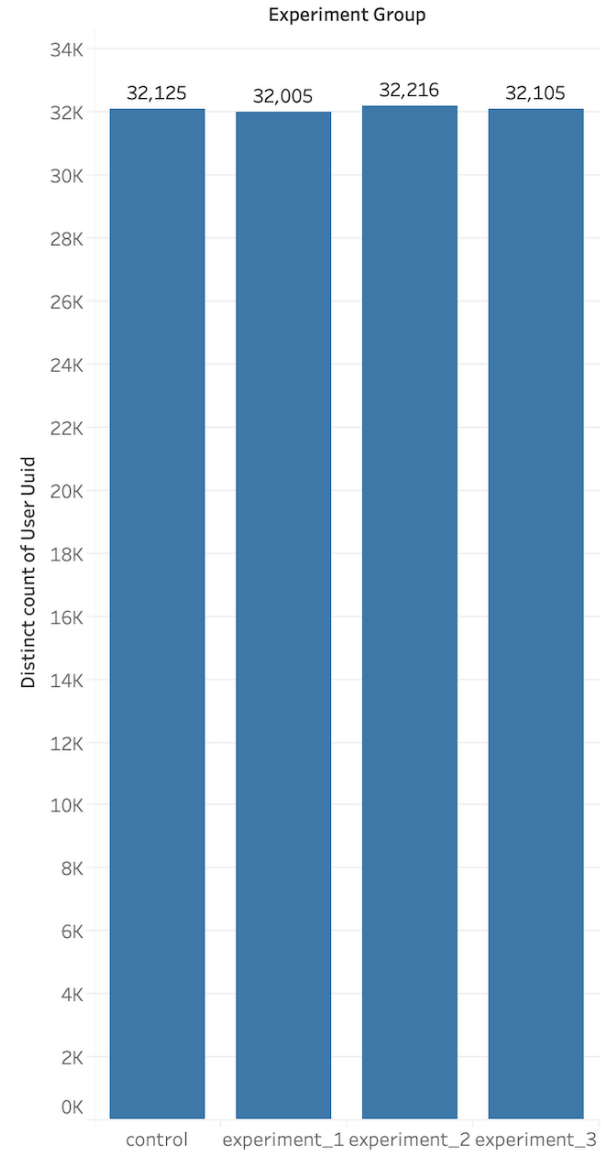
Appendix

Raw Data

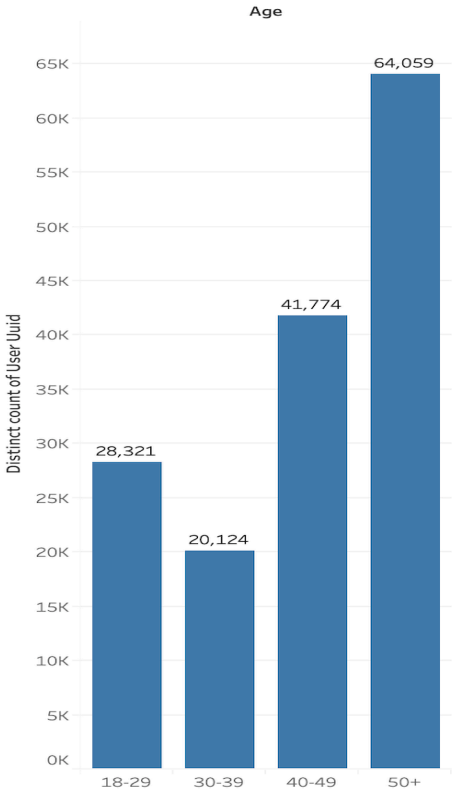
Additional Info

More visuals for reference -

Unique Users in Experiment Groups



Unique Users in User Segments



Conversion funnel for age segment

	Age			
Event Type	18-29	30-39	40-49	50+
open	28,321	20,124	41,774	64,059
#_of_users	13,145	9,001	20,718	37,057
search	8,692	5,834	13,945	14,035
begin_ride	126	100	256	195