Applying Iterative Design Principles to a Live Product

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Date: 7th June 2021

Step 1

Select KPIs

&

Evaluate Previous Multivariate Experiment Results

Select KPIs for Flyber Analyses

- For the data available, which KPI(s) best match Flyber's business model?
    - Flyber's Business Model looks like the model of an eCommerce business: significant amount of top-of-funnel users opening up the app, a typical sales funnel from opening to be beginning a ride, Flyber is a company that must bring users to the app and convert these visits into actual rides.
    - KPIs
        - % Overall Conversion Rate (Open -> Begin Ride)
        - % Conversion Rate Step by Step
        - % Product Stickiness (DAU/WAU)
        - # Weekly Average of Rides per User
        - R$ Daily Profit Margin
        - # Overall Number of Rides
        - # Repeat Customers
- How would you calculate these KPI(s) using the available event data logs?
    - Calculating KPIs
        - % Overall Conversion Rate (Open -> Begin Ride)
            - [#unique_sessions_rides] x 100% / [#unique_sessions_open]
        - % Conversion Rate Step by Step
            - [#unique_sessions_step] x 100% / [#unique_sessions_step_before]
        - % Product Stickiness (DAU/WAU)
            - [#daily_active_users] x 100% / [#weekly_active_users]
        - # Weekly Average of Rides per User
            - [#rides_week]/[#unique_users_week]

Select KPIs for Flyber Analyses

- # Overall Number of Rides
  - [count_number_begin_rides_event]
- # Repeat Customers
  - Cohort analysis showing number of users riding Flyber's Taxis again on the following days after usage when compared any day of the week
- List other KPIs that might be important to Flyber but are not calculable based on available data
  - R$ Daily Profit Margin
  - Stickiness (WAU/MAU)
  - Stickiness (DAU/MAU)
  - CSAT (Customer Satisfaction Score) measured after every ride
  - NPS (Net Promoter Score) measuring promoters of Flyber
  - CRR (Customer Retention Rate) measured month by month in cohort analysis segmented by month of first ride

Describe the First Multivariate Experiment

- Describe the elements tested during the multivariate experiment. You can use the image below when referencing the tests
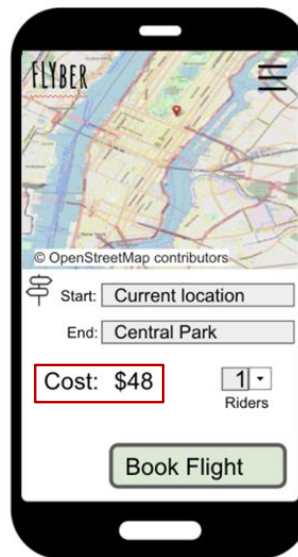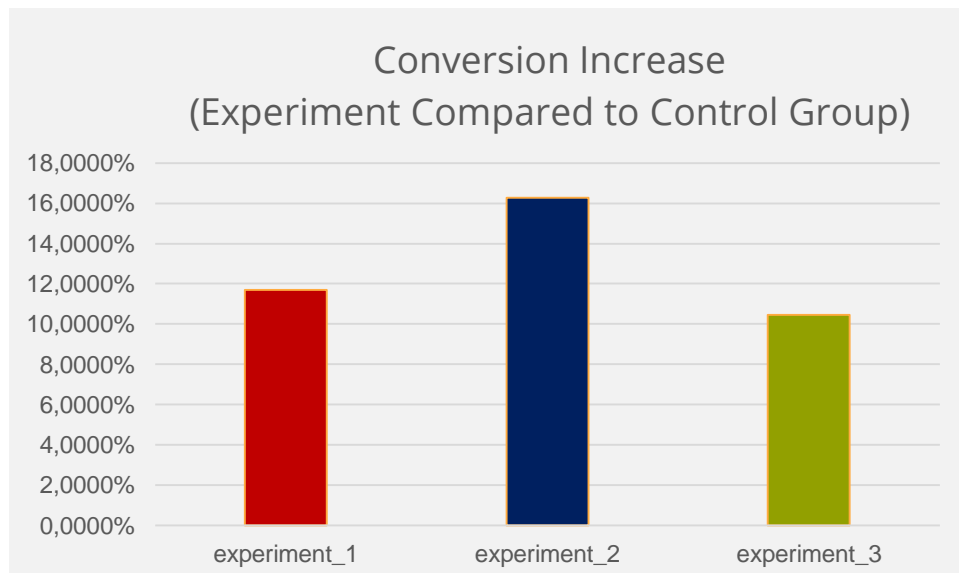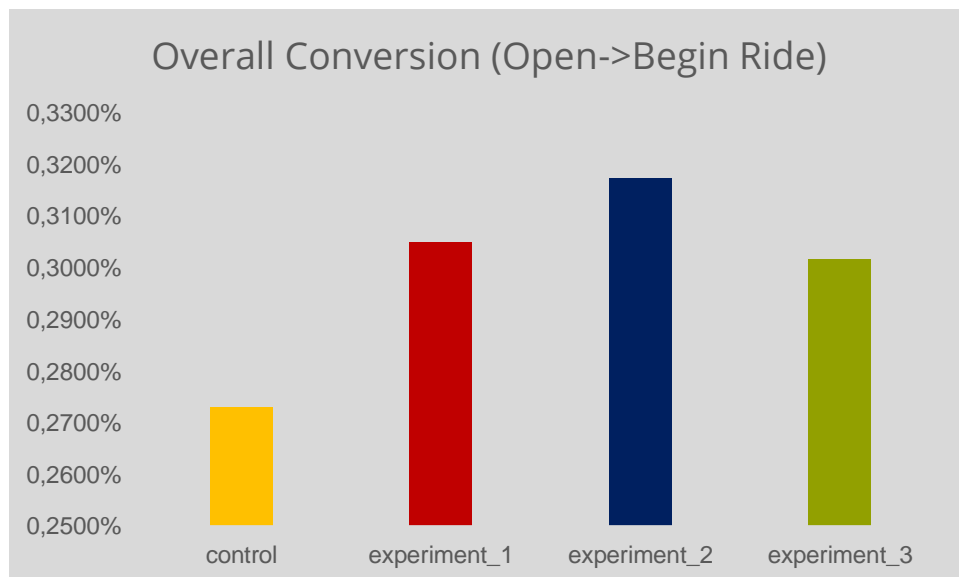

In Experiment 1, the "Book Flight" button label was changed to "Fly Now".

*In Experiment 2, the small text "*Tip included" was removed.*

*In Experiment 3, the "Book Flight" button label was changed to "Fly Now" and the small text "*Tip included" was removed.*

Review Multivariate Test Results: Visualization

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

Overall Conversion (Open->Begin Ride)

0,3300%	
0,3200%	
0,3100%	
0,3000%	
0,2900%	
0,2800%	
0,2700%	
0,2600%	
0,2500%	

control   experiment_1   experiment_2   experiment_3

Conversion Increase
(Experiment Compared to Control Group)

18,0000%	
16,0000%	
14,0000%	
12,0000%	
10,0000%	
8,0000%	
6,0000%	
4,0000%	
2,0000%	
0,0000%	

experiment_1   experiment_2   experiment_3

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Explain how you would perform a t-test to determine if the experimental results had a greater impact on the booking conversion rate than the control state

  We are going to compare all 3 experiments, one by one, with the control group using the [SurveyMonkey AB Testing Calculator](), considering as "Visitors" the number of unique sessions triggering the "open" event and "Conversions" as the number of unique sessions triggering the "begin_ride" event.

  We are hypothesizing a Two-sided Test, as overall conversion could increase or decrease during these 3 experiments.

  We are also defining a minimum confidence of 95%, we should definitely ensure that scaling any experiment is assertive.

  Thus, when comparing each experiment to the control group, we should target experiments presenting an increase in conversion rate and a p-value < 0.05, which will ensure the experiment was statistically significant.

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- List the test results (p value) for each experiment compared to the control

	P-value	% of Confidence
A: Control **B: Experiment 1**	0.1591	31.55%
A: Control **B: Experiment 2**	0.0843	52.29%
A: Control **B: Experiment 3**	0.1848	26.43%

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Using the statistical significance calculator of your choice, determine which experiments, if any, had a significant result at the 95% level. Include your calculations as part of your explanation

    No experiment showed statistical significance, even though an increase in conversion was verified.

	% of Confidence
A: Control **B: Experiment 1**	**31.55%**
A: Control **B: Experiment 2**	**52.29%**
A: Control **B: Experiment 3**	**26.43%**

Highest percentage of confidence was reached from Experiment 2, but we are still not able to verify a significant result at 95% of confidence level.

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Based on your statistical significance calculations, recommend if any of the experiments should be expanded.

  None of these experiments should be expanded as none of them reached a considerable significance level.

  Even though an increase in conversion was verified in all of them, no experiment showed statistical significance, hence no significant difference was seen between control group and experimental groups.

  For now, those increases in conversion could be simply random factors, we should keep experiments running for a little longer in order to reassess statistical significance and decide if any of them could be expanded.
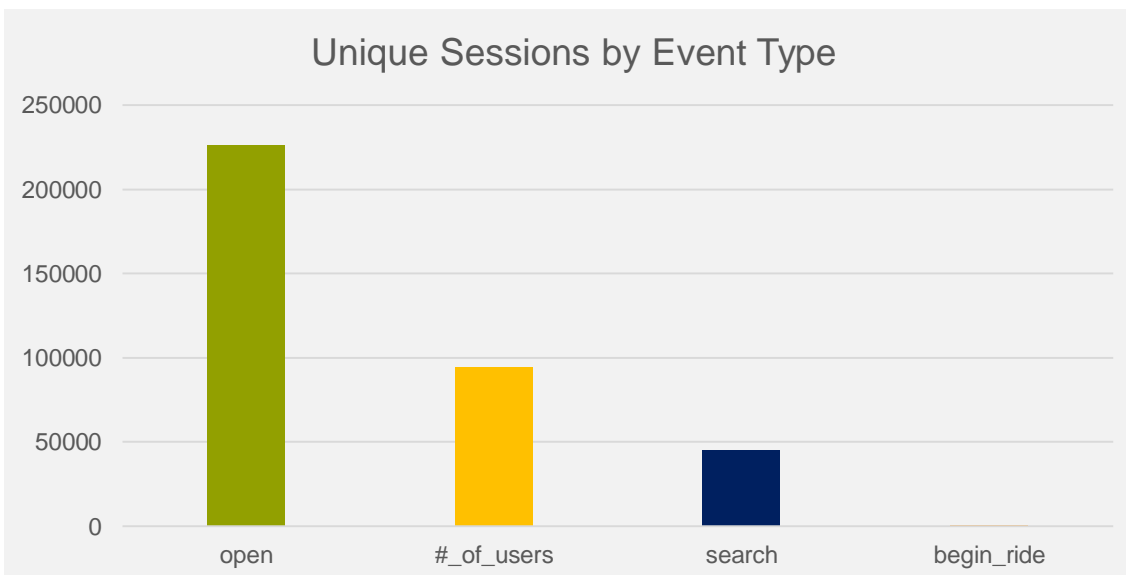
Step 2

Funnel & Cohort

Analyses

User Funnel

Identifying the different stages the user funnel

- Based on the event types in the data provided, list the 3 or more steps a user can take from opening the app to final booking of a ride

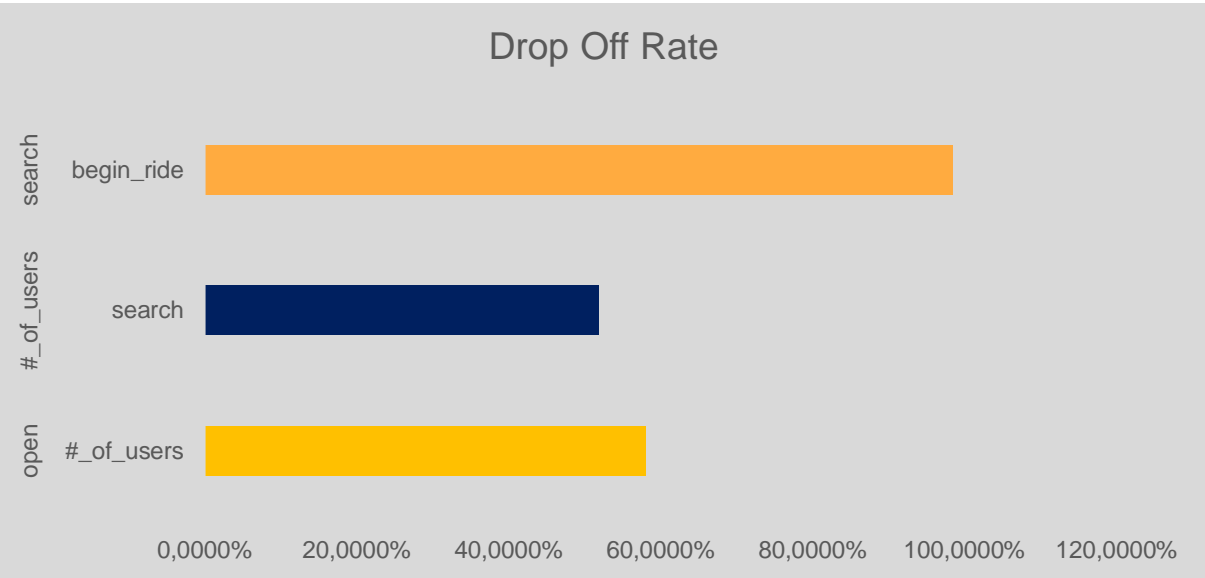| Event Type	Unique session_uuid
open	226155
#_of_users	94748
search	45503
begin_ride	677

Unique Sessions by Event Type

User Funnel

Identifying the different stages the user funnel

- Provide a graph showing the funnel from step to step, including drop off rates.

from	to	Drop Off Rate
open	#_of_users	58,1048%
#_of_users	search	51,9747%
search	begin_ride	98,5122%

Clearly the highest drop off rate is from the search touch point to beginning a ride.
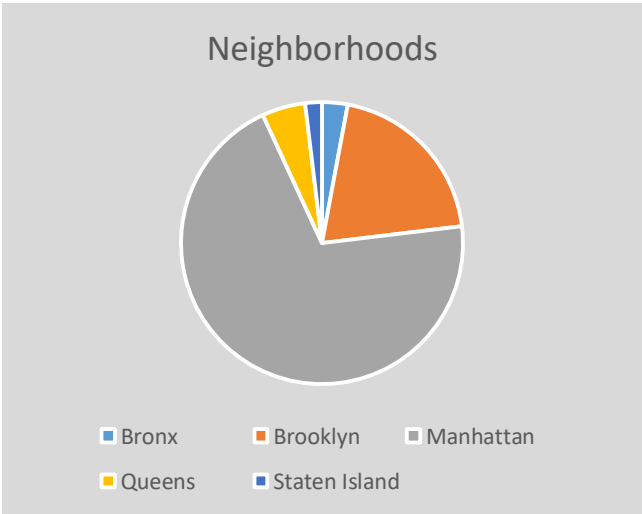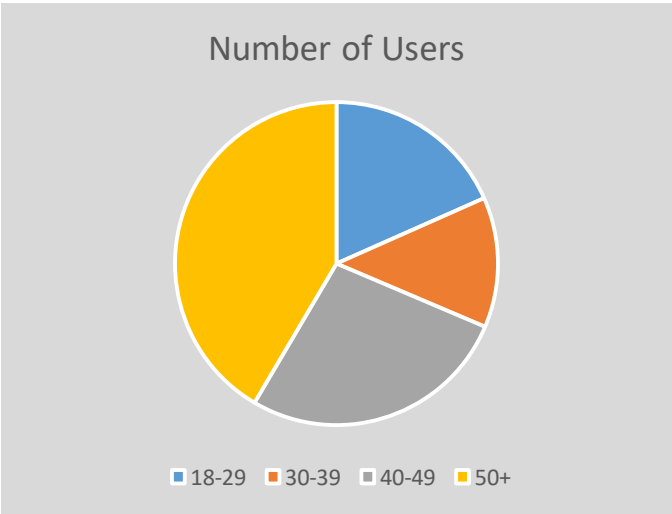
User Segments

- Identify 2 demographic attributes present in the data that allow for segment analysis
  - We could use Age and Neighborhood as user segments.
- For each demographic attribute, provide the number of users in each segment group

Age	Number of Users
18-29	28321
30-39	20124
40-49	41774
50+	64059

Neighborhood	Number of Users
Bronx	2396
Brooklyn	16435
Manhattan	57110
Queens	4050
Staten Island	1566

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

Number of Users

■ 18-29 ■ 30-39 ■ 40-49 ■ 50+

Neighborhoods

■ Bronx ■ Brooklyn ■ Manhattan
■ Queens ■ Staten Island

User Segments

Cross Analysis

Neighborhood/Age	18-29	30-39	40-49	50+
Bronx	841	623	1213	1878
Brooklyn	5767	4044	8460	12905
Manhattan	19813	14060	29184	44888
Queens	1374	1024	2089	3158
Staten Island	526	373	828	1230

Performing a Cross Analysis, we can see in greener cells the major cross segments.

Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

Event Type / Age	Percentage of 1st Step			
	18-29	30-39	40-49	50+
open	100,0000%	100,0000%	100,0000%	100,0000%
#_of_users	41,9800%	41,6388%	41,8906%	41,9235%
search	26,9733%	26,4455%	26,8238%	13,4698%
begin_ride	0,3719%	0,4394%	0,4551%	0,1722%

Event Type / Neighborhood	Percentage of 1st Step				
	Bronx	Brooklyn	Manhattan	Queens	Staten Island
open	100,0000%	100,0000%	100,0000%	100,0000%	100,0000%
#_of_users	41,2072%	41,8116%	41,9730%	41,4250%	42,2023%
search	19,8416%	19,9702%	20,1735%	20,2023%	19,9724%
begin_ride	0,3436%	0,2962%	0,2993%	0,2775%	0,3225%

Age Segments 30-39 and 40-49 are clearly over performing, regarding the percentage of conversion in rides from app openings. The segment 50+ is under performing.

Neighborhood Segments Bronx and Staten Island are clearly over performing, regarding the percentage of conversion in rides from app openings. The segment Queens is under performing.
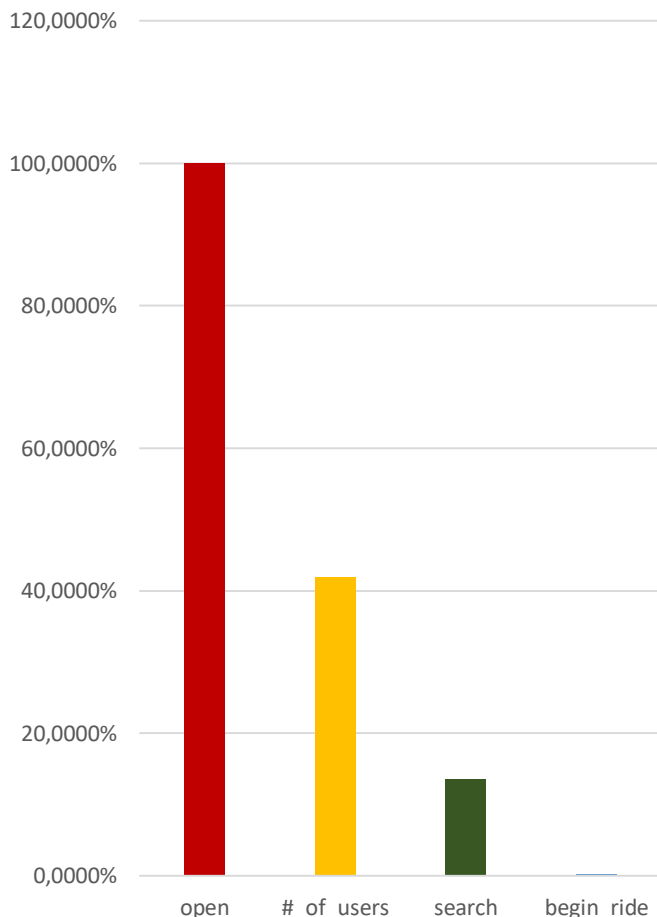
Segment Analysis of Funnel

Identify Opportunities for Improvement

- If underperformance for a segment in an attribute is identified, add a visual showing the average funnel conversion by segment group for that demographic.
  - A deep dive in the Age Segment of 50+ clients and in the Queens Segment was performed:

Deep Dive 50+ Age Segment
(% Conversion from 1st Step)

Deep Dive Queens Segment
(% Conversion from 1st Step)
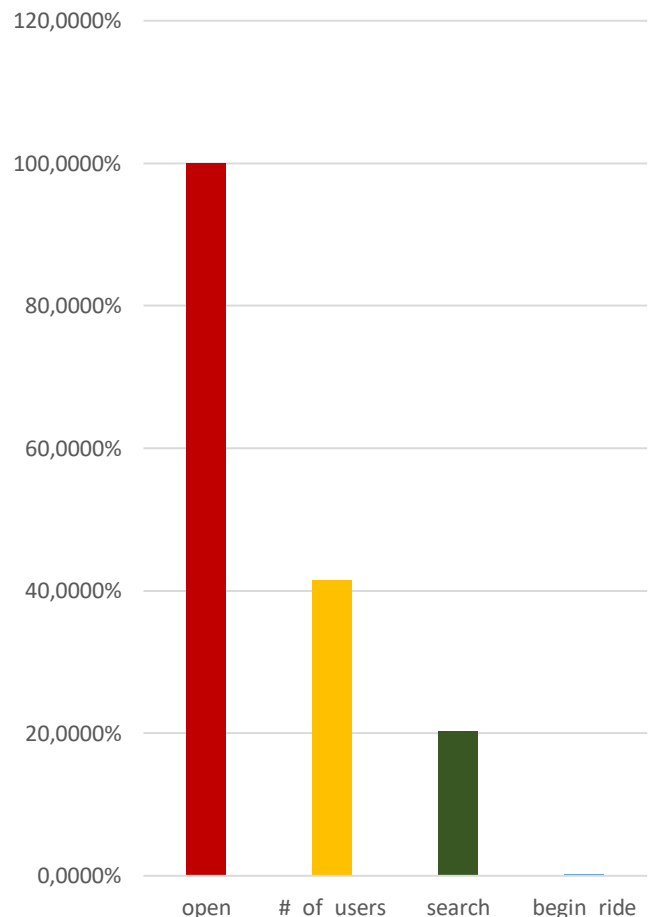
Step 3

Hypothesis & Next Steps

Review Qualitative Data

- Read user interviews to understand "why" any funnel under-performance seen in Step 2 might occur
  - It can be verified in multiple clients, almost 30% of users interviewed, that buttons and instructions seem to be a tiny, hard to use. It might be one of the causes for small overall conversion.
- List your hypothesis for what customer need is being under-served
  - The 50+ Age Segment is an outstanging segment in our client base and in 3 out of 7 "50+ clients " the app was difficult to use due to tiny buttons and small instructions.
- Provide 3 or more quotes as evidence for this hypothesis
  - ""(…) the instructions were too small."
  - ""(… Luckily my daughter was around to help me book the ride.(…)"
  - ""(…) with an app and hitting tiny buttons(…)"

Suggested Features & Experimentation Plan

- **Main Hypothesis**

  - We believe an overall conversion in the 50+ Age Segment roughly 42.5% lower than average was caused by poor UX and accessibility issues (tiny buttons and intructions). By improving UX for the 50+ Age Segment we will see conversion rate on the segment increasing by at least 100%.

- **Features**

  - **Accessibility App Version** (automatic setup for 50+ users)

  - **Voice Commands with an Alexa Skill** (automatic setup for 50+ users)

  - **Experiment:**

Group	Accessibility	Alexa Skill
Control	NO	NO
Experiment 1	**YES**	NO
Experiment 2	NO	**YES**
Experiment 3	**YES**	**YES**

Suggested Features & Experimentation Plan

- Determine who should be exposed to the experimental changes

    - **50+ users** will be randomly distributed between Control, Experiment 1, 2 and 3 groups.

- List any additional metrics that would be helpful to collect from your suggested features

    - We could use a simple AARR for Features:

        - Acquisition

            - % Users who opened app during test

        - Activation

            - % Users who updated the app with test features

        - Retention

            - % Users using app again during experiment duration

        - Revenue

            - R$ Revenue generated for each group (control and experiments)

Appendix

Raw Data

Additional Info

Click image on the left to check out the Colab Notebook with some Data Exploration.

Product Stickiness (DAU/WAU)

Day of Week	DAU	WAU	Stickiness (DAU/WAU)
1	28099	81558	34,45%
2	52556	81558	64,44%
3	52004	81558	63,76%
4	52835	81558	64,78%
5	52303	81558	64,13%
6	52543	81558	64,42%
7	52663	81558	64,57%
8	24080	81558	29,53%