Mobile Game Analysis

By Liad Traube

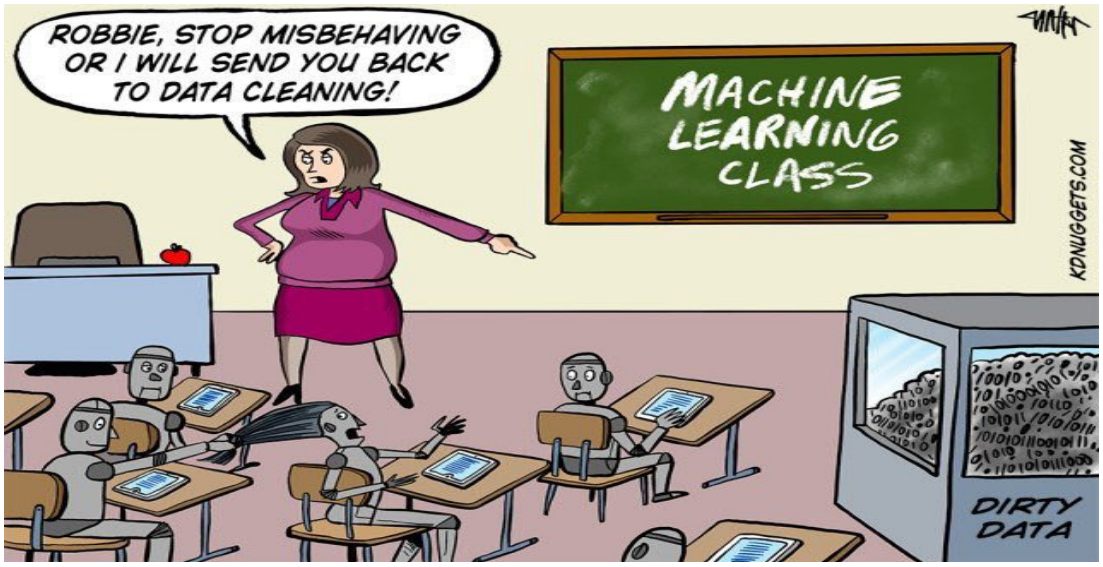
TL; DR

This project goal is to simulate a **mobile game database** and make an analysis based on data from that database, including **KPI's and game economy.**

1. Introduction

For many days I wandered around web-sites like "Kaggle" and "Maven Analytics" searching for interesting datasets that I could use to create a big and impressive project, downloading files, loading the datasets in MSSQL and Tableau, preparing queries in SQL but It was all for vain.

none of the datasets were good enough for my needs from my point of view and it seemed to me a lot the datasets in Kaggle were tailored for data-science and machine learning projects and some of the datasets were simply not "rich" enough in data or did not have what I needed for the kind of project that I had in mind.



As a result of my frustration in finding a proper dataset I decided that I have to address this challenge and build a database myself.

As a consequence of having the creative freedom with the mission of building a database by myself I decided to choose a subject that I find interesting and I want to study more from the "developers" side.

1.1 Mobile Game Introduction

As you will see in this project, **I tried to simulate a real mobile game database** as best as I could, using randomly generated data thanks to websites like "generate data" and various functions in Microsoft Excel.

The database contains data about a mobile game called "Empire Of Crabs" (I tasked chat-GPT to generate me 10 names for mobile games and this was my favorite name).

*This image was randomly found in google and was added to illustrate the idea, this image doesn't belong to me

Game description:

Embark on a crustacean adventure like no other in "Empire of Crabs"! Dive into a captivating underwater world where you take command of a vibrant and resourceful crab colony. Your mission? Build, strategize, and conquer to create the ultimate crab empire!

As the wise and ambitious leader of your crab civilization, you'll navigate the challenges of the ocean depths, from treacherous currents to rival crab factions. Harness the unique abilities of your crab subjects, each with their own strengths, to gather resources, construct intricate habitats, and defend your territory against predators.

Explore a visually stunning and immersive aquatic realm, where vibrant coral reefs, mysterious shipwrecks, and ancient ruins await your discovery. Collect rare treasures, unlock hidden secrets, and uncover the history of your crab civilization as you expand your dominion.

But it's not all peaceful tides and clear waters. Engage in epic battles against rival crab colonies for dominance over coveted underwater territories. Strategize your tactics, deploy your crab forces, and outmaneuver opponents in real-time battles that will test your leadership skills and wit.

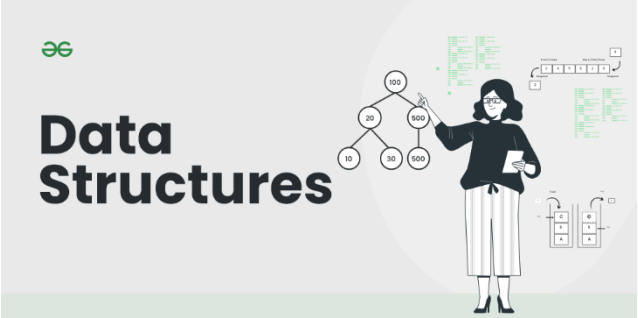
game_id	game_name	published_date	age_ratings	languages	price	genre 1	genre 2	genre 3	size_mb
1	Empire Of Crabs	2019-08-10 00:00:00.000	4+	English, Hebrew	0	strategy	simulation	NULL	8493

1.2 Monetization Strategy

Our product, the mobile app is free-to-play with **in-app microtransactions.** These transactions allow players to access premium content, customizations or enhancements within the game.
in our mobile-app the users have the ability to purchase:

cosmetic Items like skins
power-ups and boosts
time-saving mechanisms
premium content (DLC)

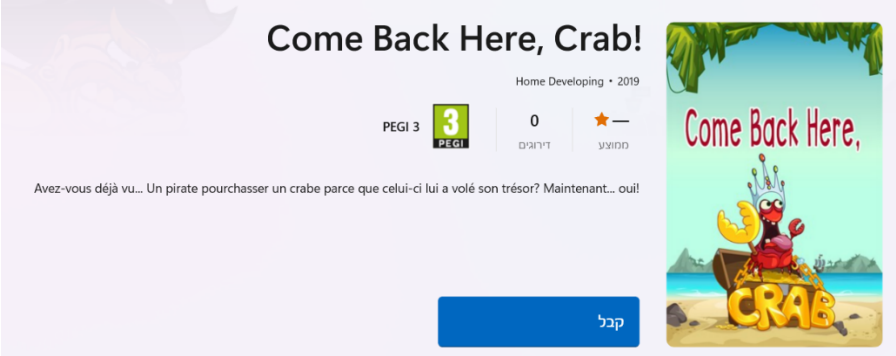
2. Data Base Structure



2.1 Database Tables

The data is stored in 9 different tables

1. GameInstall



Holds data about all the users that **installed** the game at least once

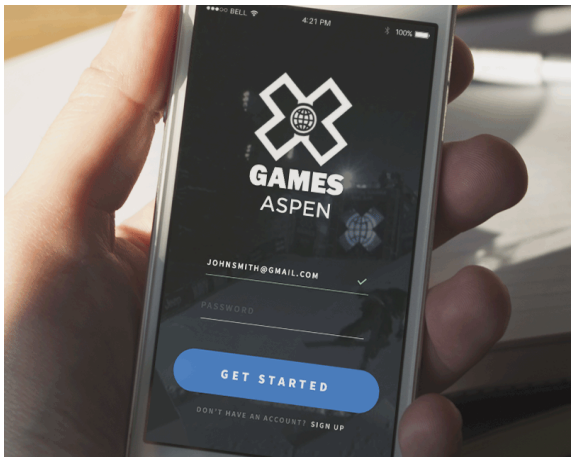
InstallID	user_id	install_date
1	6530	2020-11-07 00:00:00.000
2	11285	2020-01-28 00:00:00.000
3	848	2020-12-21 00:00:00.000
5	7396	2019-11-04 00:00:00.000
6	10694	2020-02-07 00:00:00.000

2. Users

Holds data about all the users that also **opened an account** (the other option is to sign in as "Guest")

user_id	date_registered	country	birth_date
10001	2021-12-29 00:00:00.000	Russian Federation	1992-09-01 00:00:00.000
10002	2020-08-10 00:00:00.000	Chile	2003-01-11 00:00:00.000
10003	2020-03-23 00:00:00.000	France	1967-09-12 00:00:00.000
10004	2020-01-30 00:00:00.000	Chile	1970-10-05 00:00:00.000
10005	2022-06-26 00:00:00.000	India	1967-04-04 00:00:00.000
10006	2021-09-02 00:00:00.000	Mexico	1966-09-18 00:00:00.000

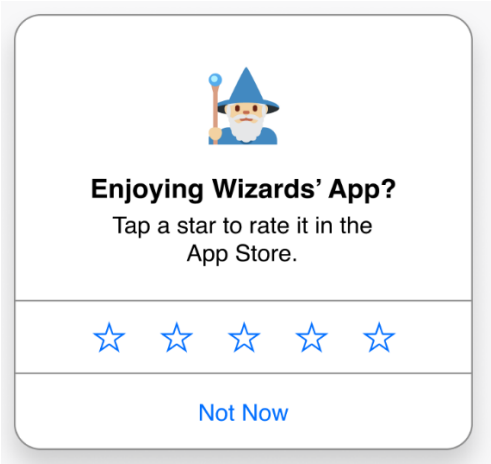
3. Log_In



Holds data about when different users **logged in** and used the app and for **how long** (in minutes)

log_id	log_in_date	log_off_date	minutes played	user_id
1	2022-04-05 00:00:00.000	2022-04-05 01:40:00.000	100	17969
3	2021-02-10 00:00:00.000	2021-02-10 01:20:00.000	80	10384
4	2021-10-22 00:00:00.000	2021-10-22 00:40:00.000	40	14386
5	2020-05-03 00:00:00.000	2020-05-03 01:37:00.000	97	8862

4. GameRatings



Holds data about what **rating** each user gave to the app (if the user chose to do so)

rating_id	user_id	rating_date	rate
33	7260	2020-09-23 00:00:00.000	3
37	1997	2020-03-19 00:00:00.000	4
42	6747	2020-06-15 00:00:00.000	2
43	5500	2020-04-30 00:00:00.000	1

5. Marketing

Holds data about all the money that the company use to **advertise** the game and platform fees.

marketing_id	campign	start_date	end_date	cost_per_month
1	facebook_ads	2020-01-07 00:00:00.000	2020-03-06 00:00:00.000	10
2	creative	2020-01-07 00:00:00.000	2021-01-05 00:00:00.000	5
3	app_store_fees	2020-01-07 00:00:00.000	2021-01-05 00:00:00.000	3

6. PremiumItems

Holds data about the special items or features that the user can **purchase with real life money.**

premuim_item_id	premuim_item_name	item genre	cost
1	Green Crab	skin	2.3
2	Crown	power-up	3
3	Aurora Shell Shimmer	skin	4
4	Oceanic Elegance	skin	6.5
5	Enigmatic Moonstone Claw	power-up	2.3
6	Cursed Relic	power-up	4.99
7	Crystal Cavern Chateau	house	5.3

7. Purchases

Holds data about the **purchases users made** (using real life money).

purchase_id	purchased_item_id	user_purchased	purchase_date
1	15	12164	2020-06-05 00:00:00.000
25	15	5274	2020-08-20 00:00:00.000
50	15	5071	2020-05-28 00:00:00.000
52	15	4485	2020-03-01 00:00:00.000
55	15	6931	2020-07-09 00:00:00.000
57	15	4812	2020-01-09 00:00:00.000

7. game economy

Holds data about the digital in app **currency inflows and outflows**.
the digital currency we can call "CrabCoins", so the "CrabCoins" that were generated by various actions made and milestone achieved by the users actions in game and the "CrabCoins" that were used by the users and disappeared into the void (or sink, whatever term you like).

action_id	user_id	action_date	action_desc	effect
1	10001	2020-01-01 00:00:00.000	first_log_in reward	25000
2	10001	2020-01-01 00:00:00.000	battle	5000
3	10001	2020-01-01 00:00:00.000	purchased blue crab	-10000
4	10001	2020-01-01 00:00:00.000	purchased iron sword	-2500
5	10001	2020-01-01 00:00:00.000	battle	7500
6	10001	2020-01-01 00:00:00.000	purchased blue crab	-10000
7	10001	2020-01-01 00:00:00.000	battle	1250
8	10001	2020-01-01 00:00:00.000	battle	5000
9	10001	2020-01-01 00:00:00.000	milestone - tier 2 clan	50000
10	10001	2020-01-01 00:00:00.000	battle	7500
11	10002	2020-02-01 00:00:00.000	purchased blue crab	-10000
12	10002	2020-02-01 00:00:00.000	milestone - tier 3 clan	75000
13	10002	2020-02-01 00:00:00.000	found magic sea-shell	10000

2.2 Data Cleaning and Validation

As consequence of the data being randomly generated, I had to build queries in SQL to make sure that data make sense,
for example:

a user cannot have data in the log-in table on a date that is **earlier than the date he installed the app** for the first time.

Installs table -

InstallID	user_id	install_date
1	6530	2020-11-07 00:00:00.000
2	11285	2020-01-28 00:00:00.000
3	848	2020-12-21 00:00:00.000

Log_in table -

	user_id	log_in_date	log_off_date	minutes played
1	6530	2021-11-29 00:00:00.000	2021-11-29 00:28:00.000	28
2	6530	2019-12-20 00:00:00.000	2019-12-20 00:12:00.000	12
3	6530	2019-12-21 00:00:00.000	2019-12-21 00:32:00.000	32
4	11285	2021-02-23 00:00:00.000	2021-02-23 00:10:00.000	10
5	11285	2022-04-12 00:00:00.000	2022-04-12 00:43:00.000	43
6	11285	2020-12-22 00:00:00.000	2020-12-22 00:10:00.000	10

Query to validate the data

```
WITH cte_first_install
AS
        (
        SELECT user_id, min(install_date) AS "FirstInstall"
        FROM GameInstalls
        GROUP BY user_id
        )
DELETE FROM Log_In WHERE log_id IN
    (
    SELECT L.log_id
    FROM cte_first_install FI JOIN Log_In L ON FI.user_id = L.user_id
    WHERE FI.FirstInstall > L.log_in_date
    )
```

*There were 8 other queries to validate the data but I did not include them in this file

3. Analysis

The analysis will be based on data from the year **2020 only,** a yearly analysis you could say.

3.1 Descriptive Statics

I will start the analysis section with some simple analysis to give a little snapshot about the mobile app performance in 2020.
just to clarify I will add and say that the app was made by 1 person and the only expenses were spent on marketing.

Users Statics

Number Of Distinct Users That Installed The App:
32,424
Number Of Users That Opened An Account:
3,420
Number Of Diffrent Countries (Registered Users Only):
35
Average Age (Registered Users Only):
18

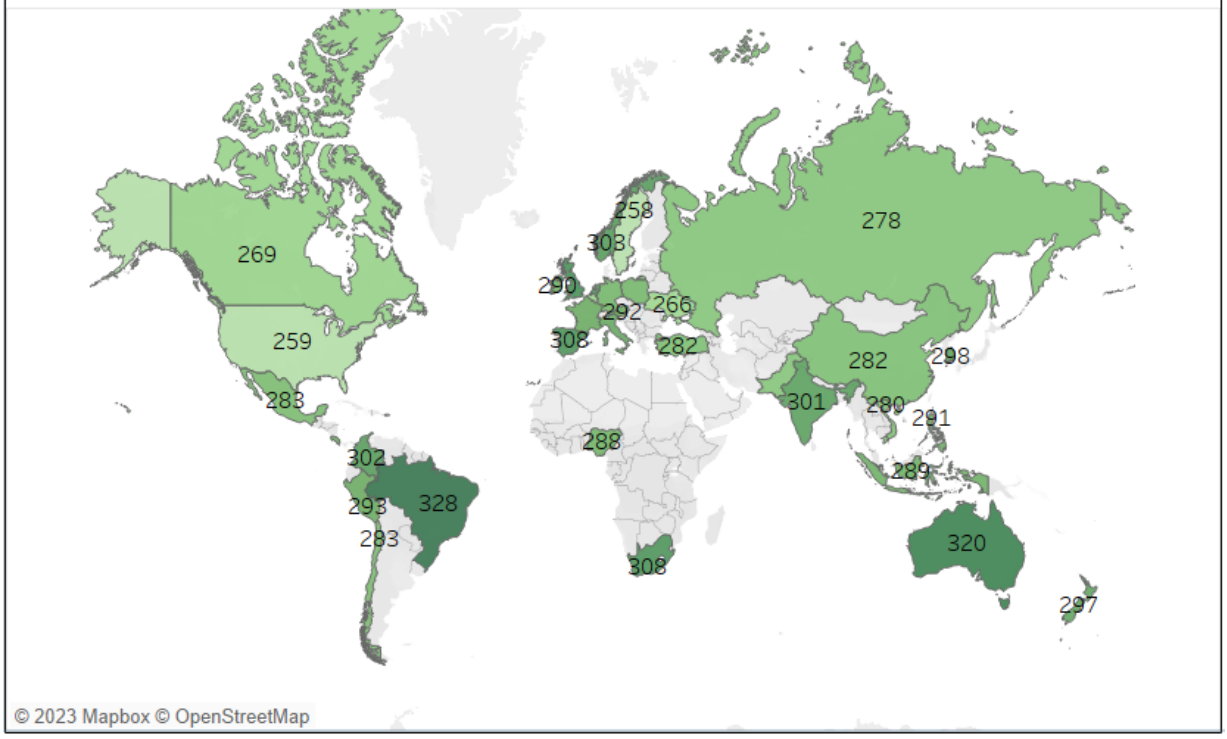
Ratings Statics

Average Rating:
2.9 ★
Number Of Ratings:
368

Revenue Statics

Total Revenue:
$1,332
Total Expenses:
$116
Number Of Purchases:
166
Avg Purchase Amount:
$8.03

Users By Country



3.2 User Engagement

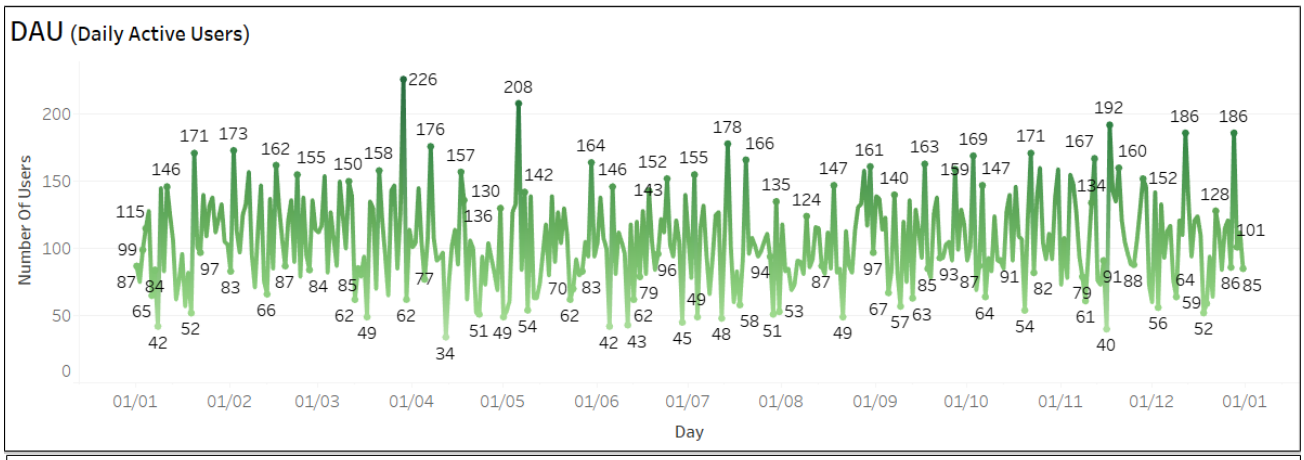
log_id	log_in_date	log_off_date	minutes played	user_id
1	2022-04-05 00:00:00.000	2022-04-05 01:40:00.000	100	17969
3	2021-02-10 00:00:00.000	2021-02-10 01:20:00.000	80	10384
4	2021-10-22 00:00:00.000	2021-10-22 00:40:00.000	40	14386
5	2020-05-03 00:00:00.000	2020-05-03 01:37:00.000	97	8862

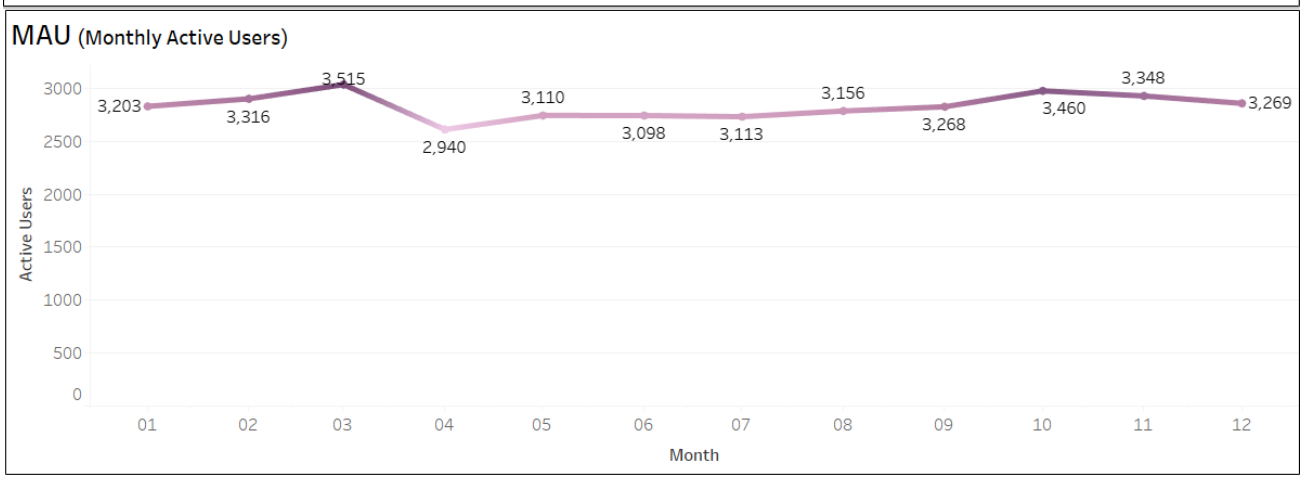
DAU

daily active users graph shows the number of **distinct** users that logged in for each **day** in 2020.

MAU

monthly active users graph shows the number of **distinct** users that logged in at least once for each **month.**





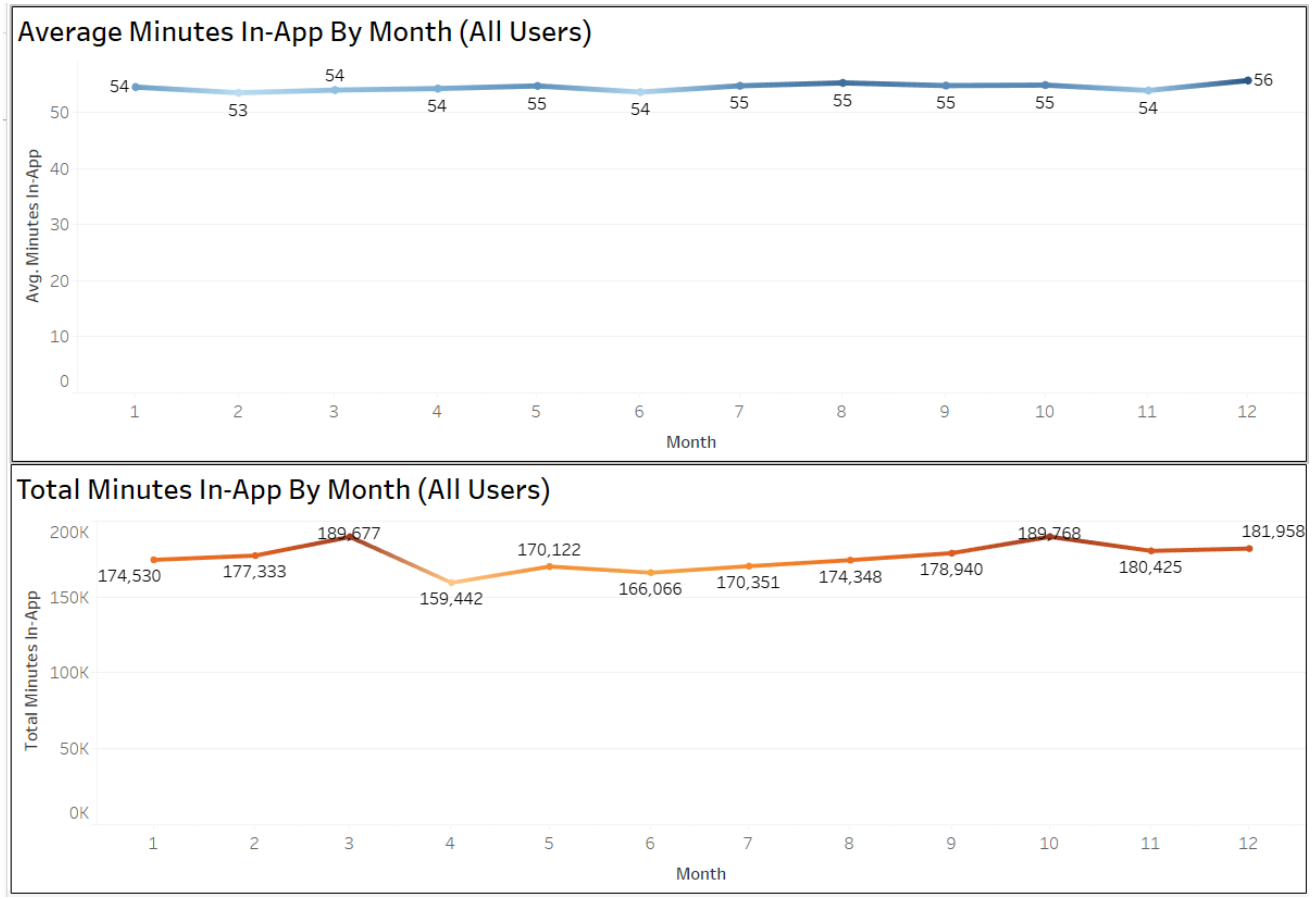
From the DAU graph we can notice that there is **high scattering in term of daily active** users across different days.

Unlike the DAU graph in the MAU graph the number of total distinct

users each month is steadier and mostly balanced, with around 3,100 – 3300 distinct users per month.

Session Duration

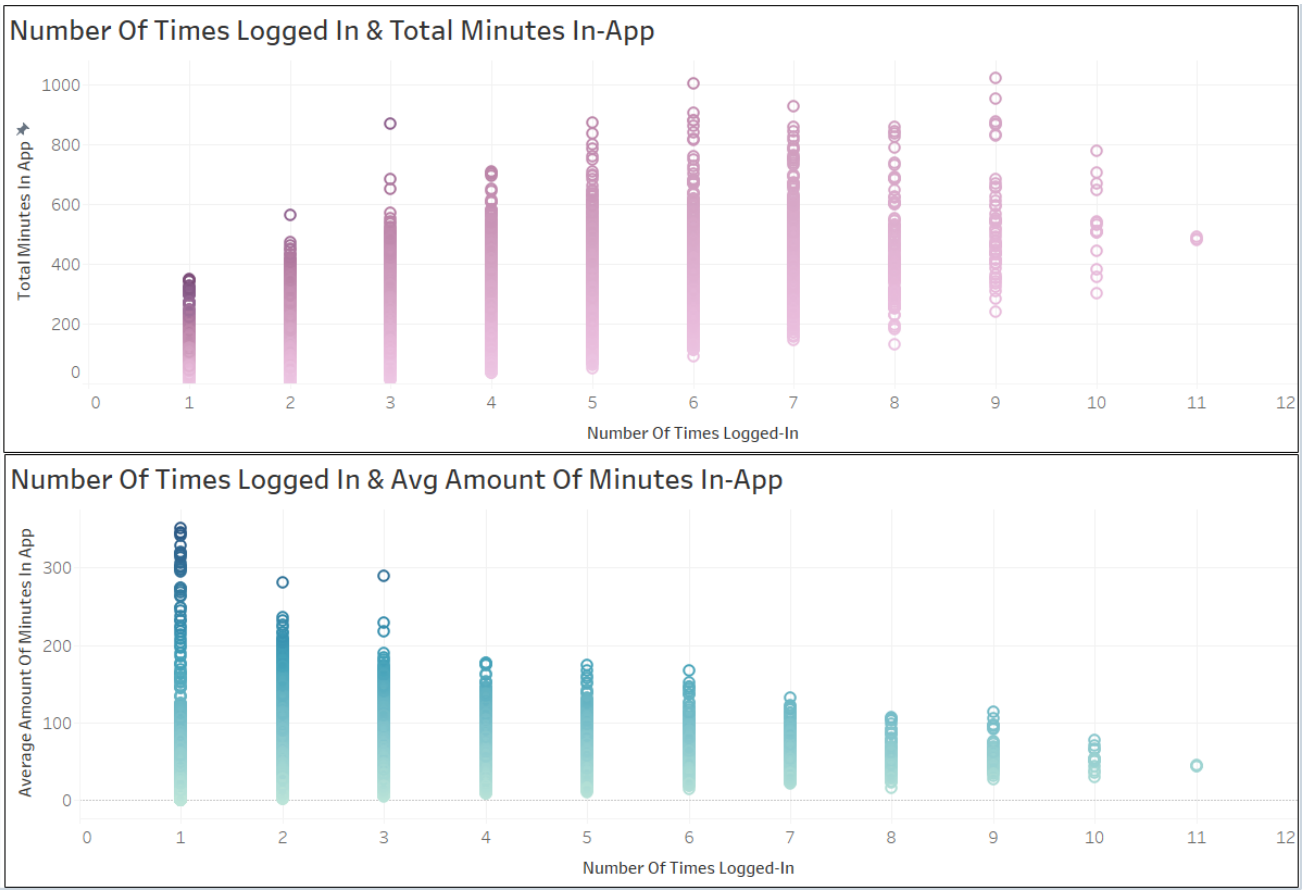
The amount of **time a user spends** actively using the app during a **single session**.



From these graphs we can note that are no significant changes in the average amount of time users spent in-app in different months, although there is one noticeable decline in total minutes between March and April, while the average minutes in-app did not change at all between these months we can assume from that a **decrease in the total number of distinct users between March and April** (which is also noticeable in the MAU graph).

Frequency

How often users return to the app over a given period of time (in my project the period is one year).



From the first graph we can observe a slight trend – higher number of log in's (right side of the graph) result in more total minutes spent in-app which make sense but perhaps the difference is not significant enough.

Contrary to the first graph, looking at the second graph we can observe a clear pattern – **users with higher number of log-in's has lower average amount of minutes in-app**.

I wanted to check further if there is correlation between the number of times a user logged in to the app and his average minutes in-app so I ran code in python to calculate correlation and got the following results:

```
Pearson Correlation Coefficient: 0.014711180260143975
```

The results suggests a very weak positive linear correlation but since the correlation coefficient (0.014) is extremely close to zero, **there is almost**

no linear relationship between the number of times user logged-in and his avreage minuts in-app.

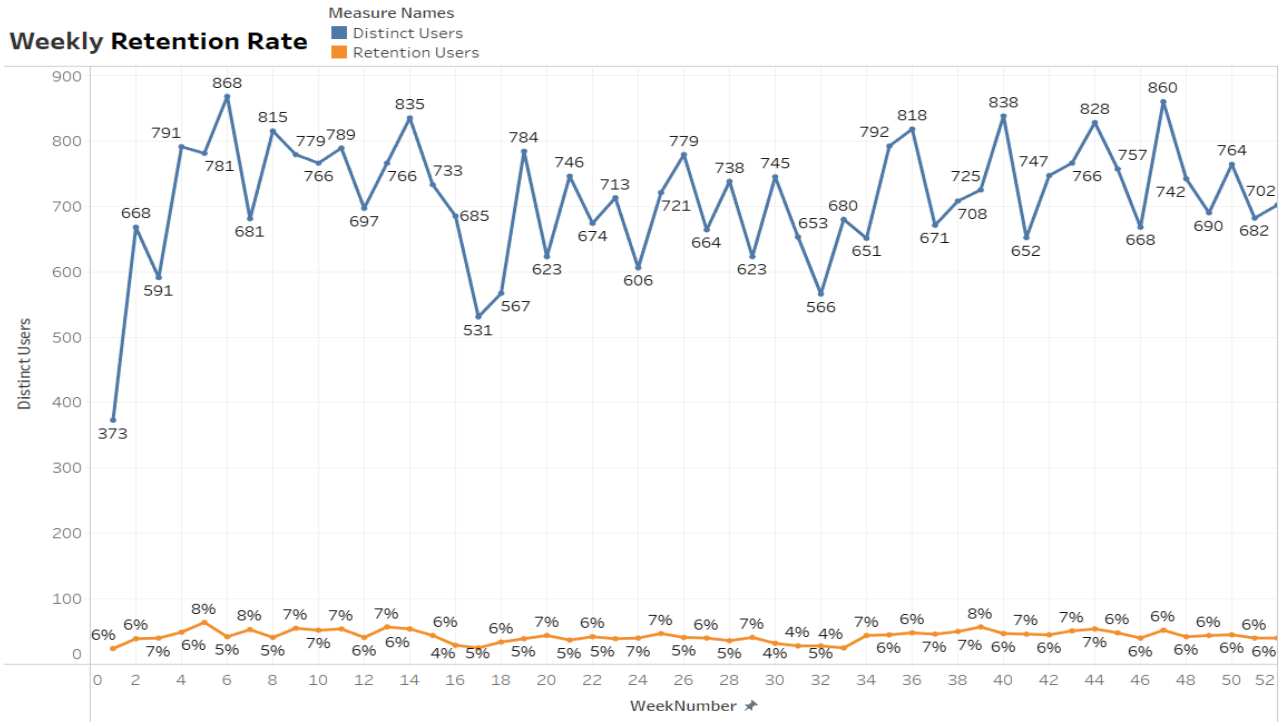
Retention

Retention rate refers to the **percentage of customers or users who continue to engage with a product**, service, or platform over a specific period of time. It is commonly used as a key performance indicator (KPI) to measure the effectiveness of an organization's efforts in retaining its existing customer base.

Retention rate can be calcuated based on user segments in terms of user activity patterns, for example:
a segment for daily log-in user, a segment for weekly log-in user and so on..
the higher number of days a "daily log-in" user does not log in to the app the higher chance he will become " churned customer " (Churn is the opposite of retention). For a weekly log in user it's the same idea but with weeks.

I decided to calculate without dividing the users for segments.

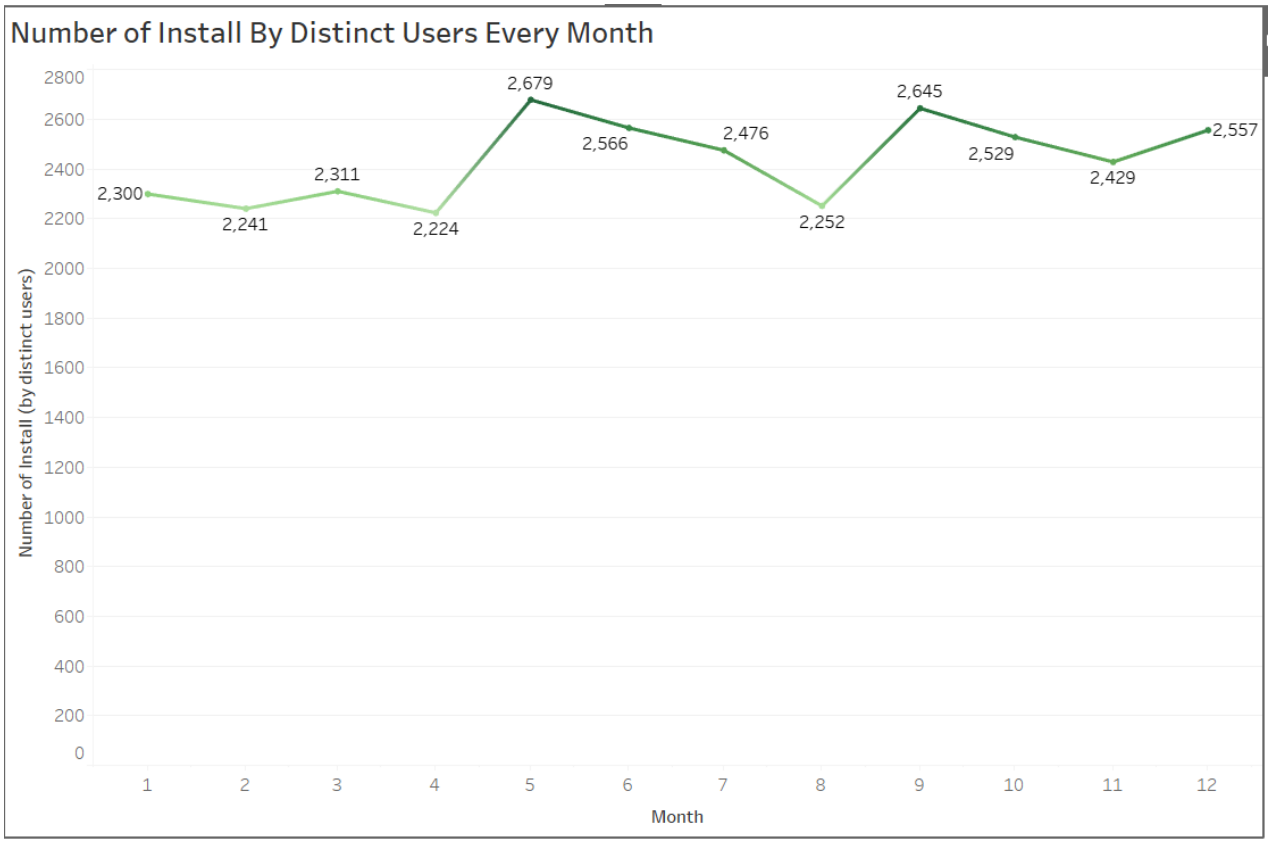
I calcuated the retnetion percentage on **weekly basis for all users -** how many users logged in and logged in again the following week.



Observing the graph we can notice **high scattering in the number of distinct users every week**, but a balanced percentage in the weekly retention rate which may indicate a **percentage of loyal customers between 5% and 7%.**

Game Installs

The following graph shows the number of distinct users that installed our app every month.

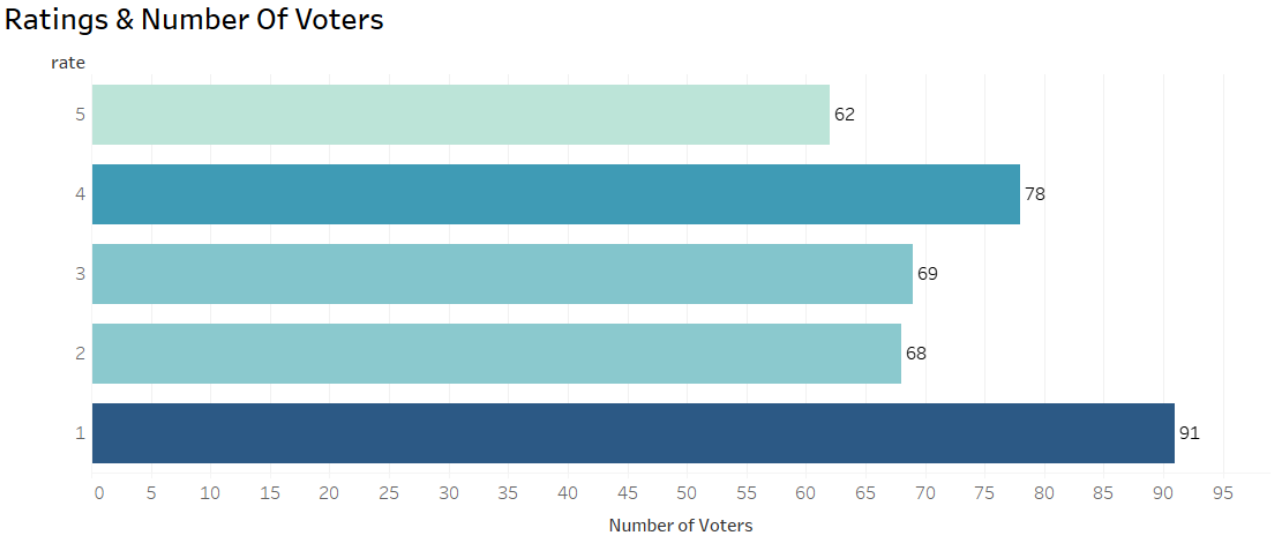


The number of installs over the year is inconsistent, the goal should be positive trend over time.

Rating

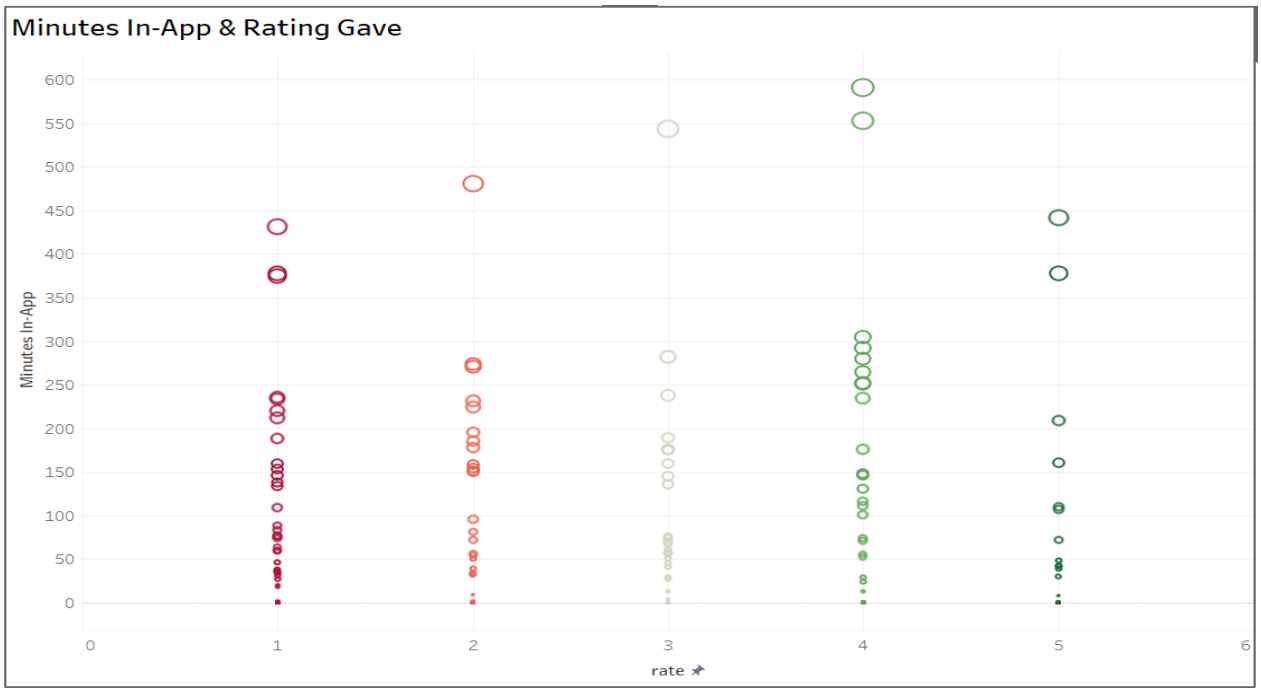
Mobile apps and online platforms often allow users to rate and review apps, products, or services. **These user ratings help others decide whether to use the app or service**.

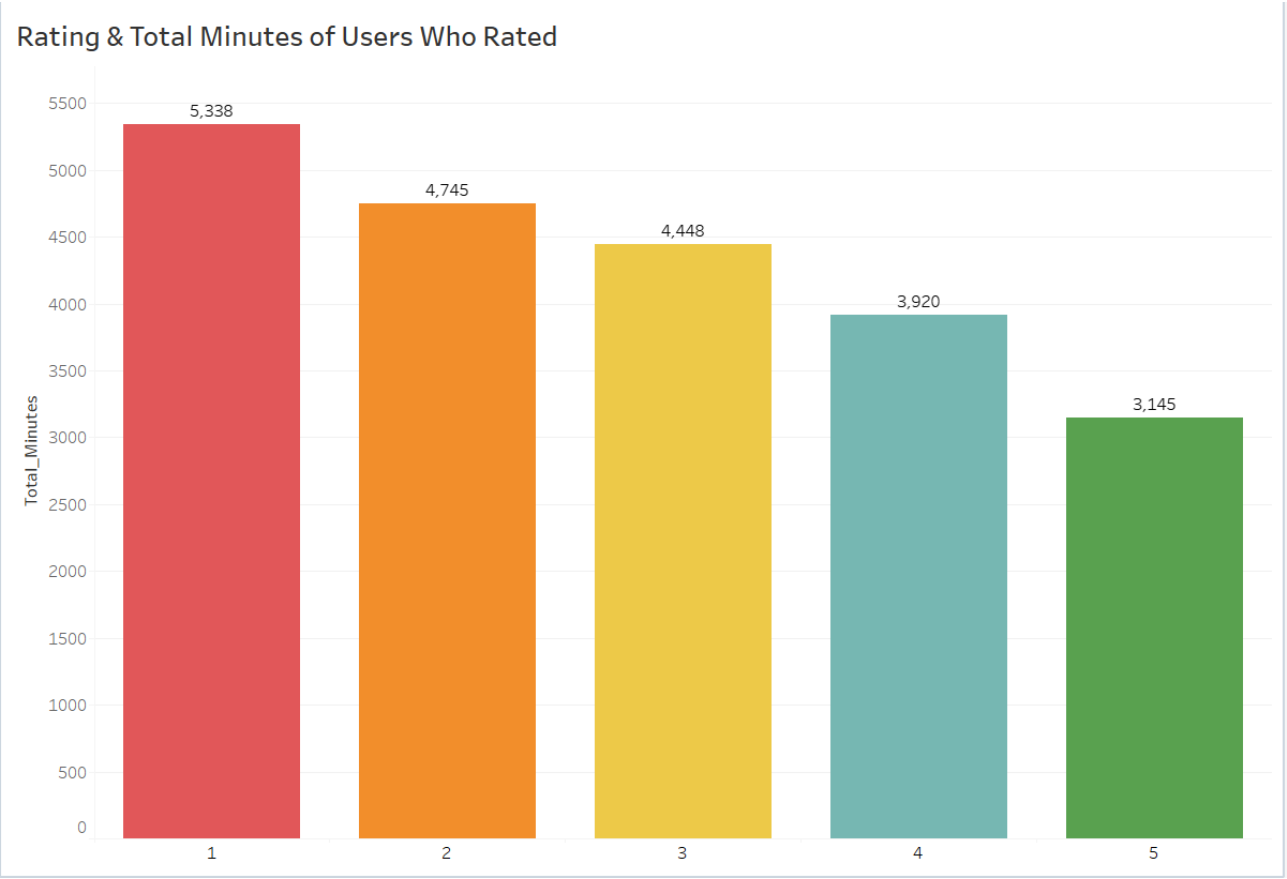
The following graph shows the how users rated the app.



The graph is mostly balanced with one expectation which is the number of users that rated the app "1", clearly some users have a serious problem with the app and that should be looked into.

The following graph shows the rating each user gave compared to the total duration he spent in-app. **bigger circles indicate more based opinions**.





The rational of these graphs is that more minutes in-app equals more based opinions.

I decided to analyze if there is correlation between user total minutes in-game and the rating that user gave.

The correlation result was -0.02744

the correlation coefficient is very close to 0, indicating an **extremely weak correlation.** This means that there is almost no linear relationship between the two variables.

Having said that, if usage is high but ratings are consistently low, **there might be an issue affecting overall user satisfaction.**

3.3 Game Economy

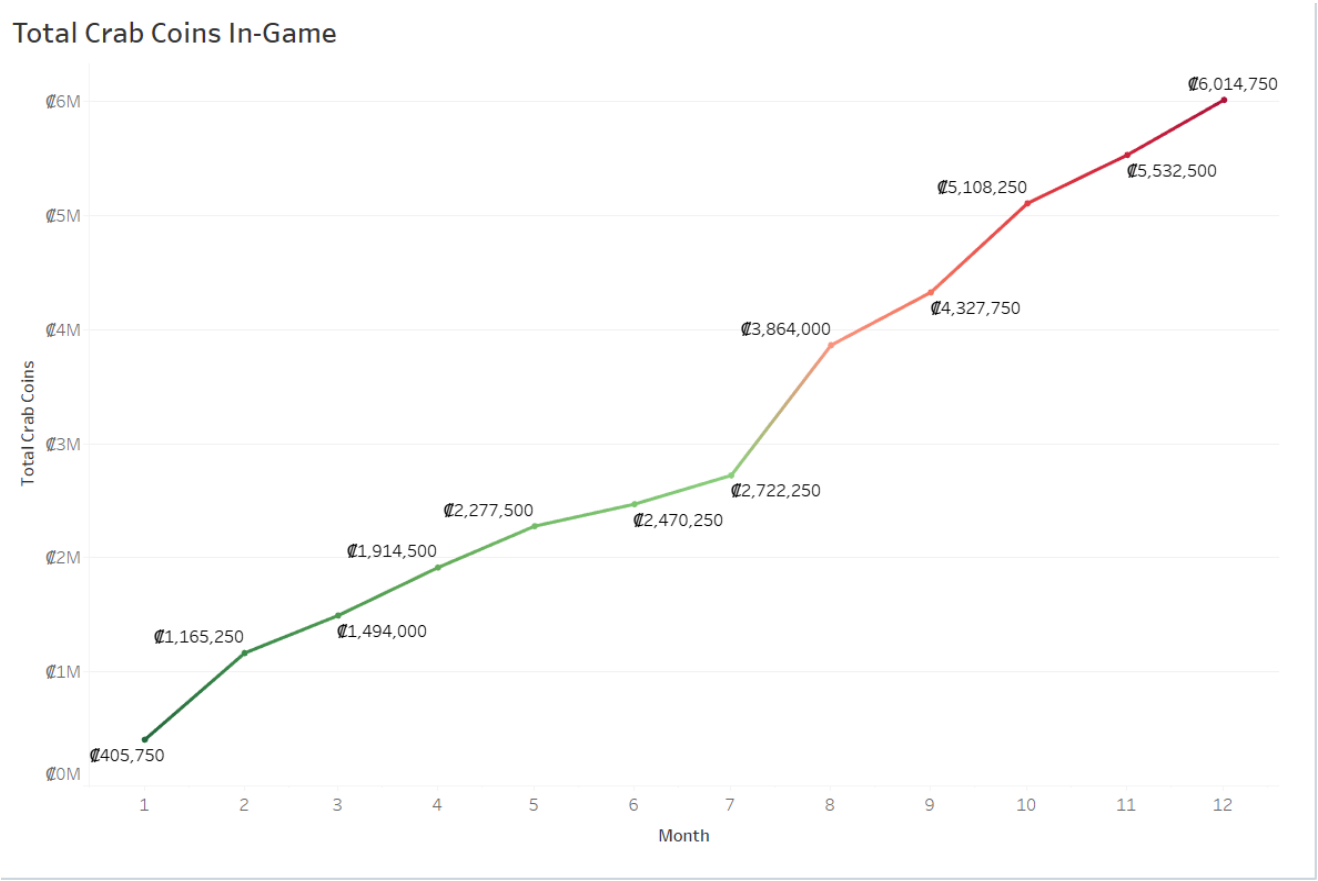
action_id	user_id	action_date	action_desc	effect
1	10001	2020-01-01 00:00:00.000	first_log_in reward	25000
2	10001	2020-01-01 00:00:00.000	battle	5000
3	10001	2020-01-01 00:00:00.000	purchased blue crab	-10000
4	10001	2020-01-01 00:00:00.000	purchased iron sword	-2500
5	10001	2020-01-01 00:00:00.000	battle	7500
6	10001	2020-01-01 00:00:00.000	purchased blue crab	-10000
7	10001	2020-01-01 00:00:00.000	battle	1250
8	10001	2020-01-01 00:00:00.000	battle	5000
9	10001	2020-01-01 00:00:00.000	milestone - tier 2 clan	50000
10	10001	2020-01-01 00:00:00.000	battle	7500
11	10002	2020-02-01 00:00:00.000	purchased blue crab	-10000
12	10002	2020-02-01 00:00:00.000	milestone - tier 3 clan	75000
13	10002	2020-02-01 00:00:00.000	found magic sea-shell	10000

Effective mobile game economy design aims to create a cycle where players are motivated to engage, generate the game currencies / resources and enjoy spending it.

For better user engagement and monetization, the currency in game should have meaning so we don’t want to have it inflated too much, but at the same time we also should consider to not frustrate the users by making the currencies / resources too scarce. The goal is to strike the right balance.

"Crab Coins" is the name of the in-game currency.

The following graph shows the total amount of "Crab Coins" that was in game: **total Crab Coins generated** – **total Crab Coins spent** running total over the year.



There seems to be an increase in total amount of "Crab Coins" over time.

Not necessarily a bad thing or a worrying sign, it is affected by number of total players and over the year there was an increase in the number of new users that joined our game world, but for better monetization as our mobile game is free-to-play with microtransactions we should monitor the game currency to make sure it's not inflated too much.

There are few things I would like to analyze in the game economy:

1. Analyzing the relationship between the number of active users and the total amount of "Crab Coins" that is in the game and not spent.

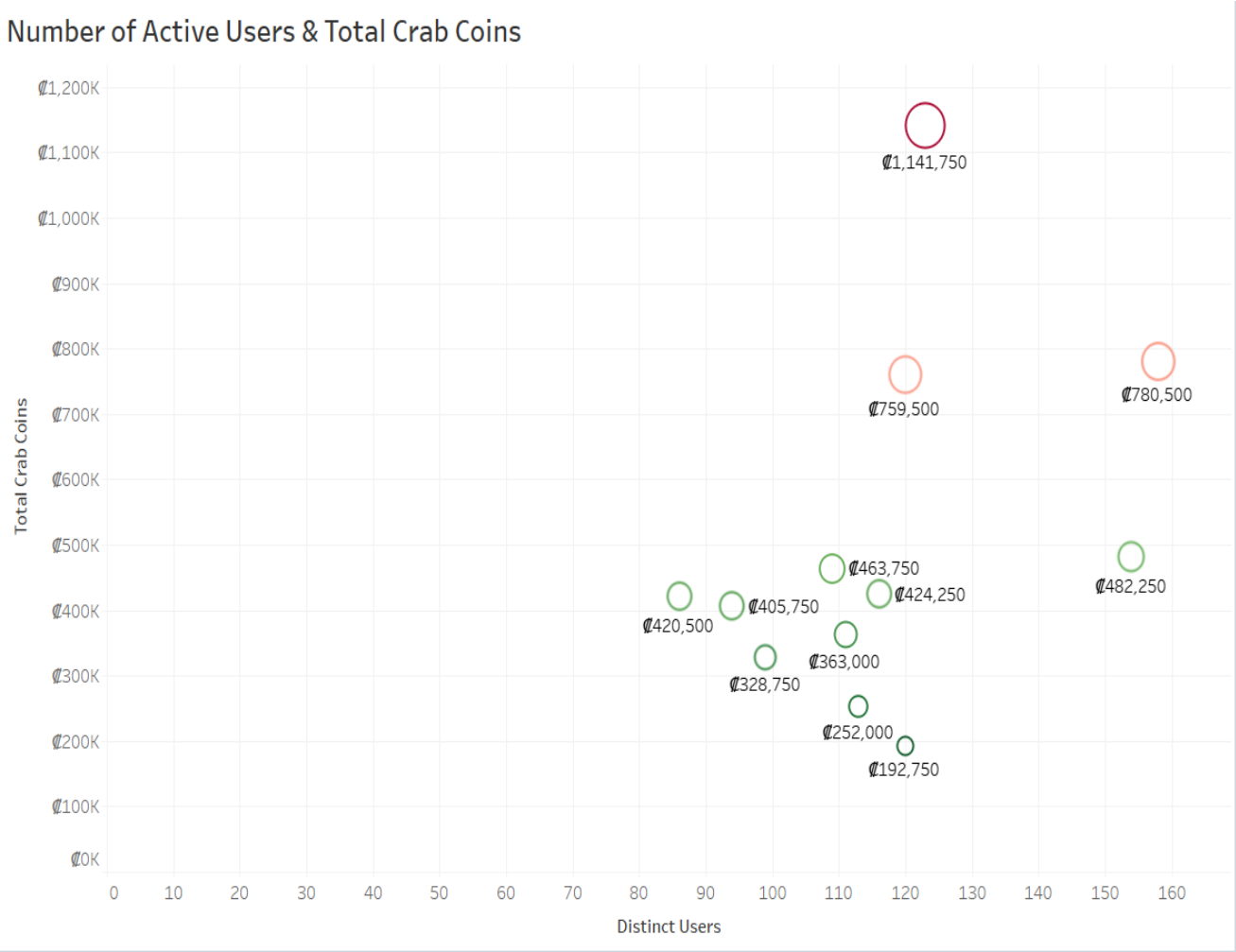
2. Analyzing the number of actions a user make in game and the amount of "Crab Coins" he has left (how effective are our "sinks").

3. Are there enough sinks to control inflation? do users engage with those sinks?

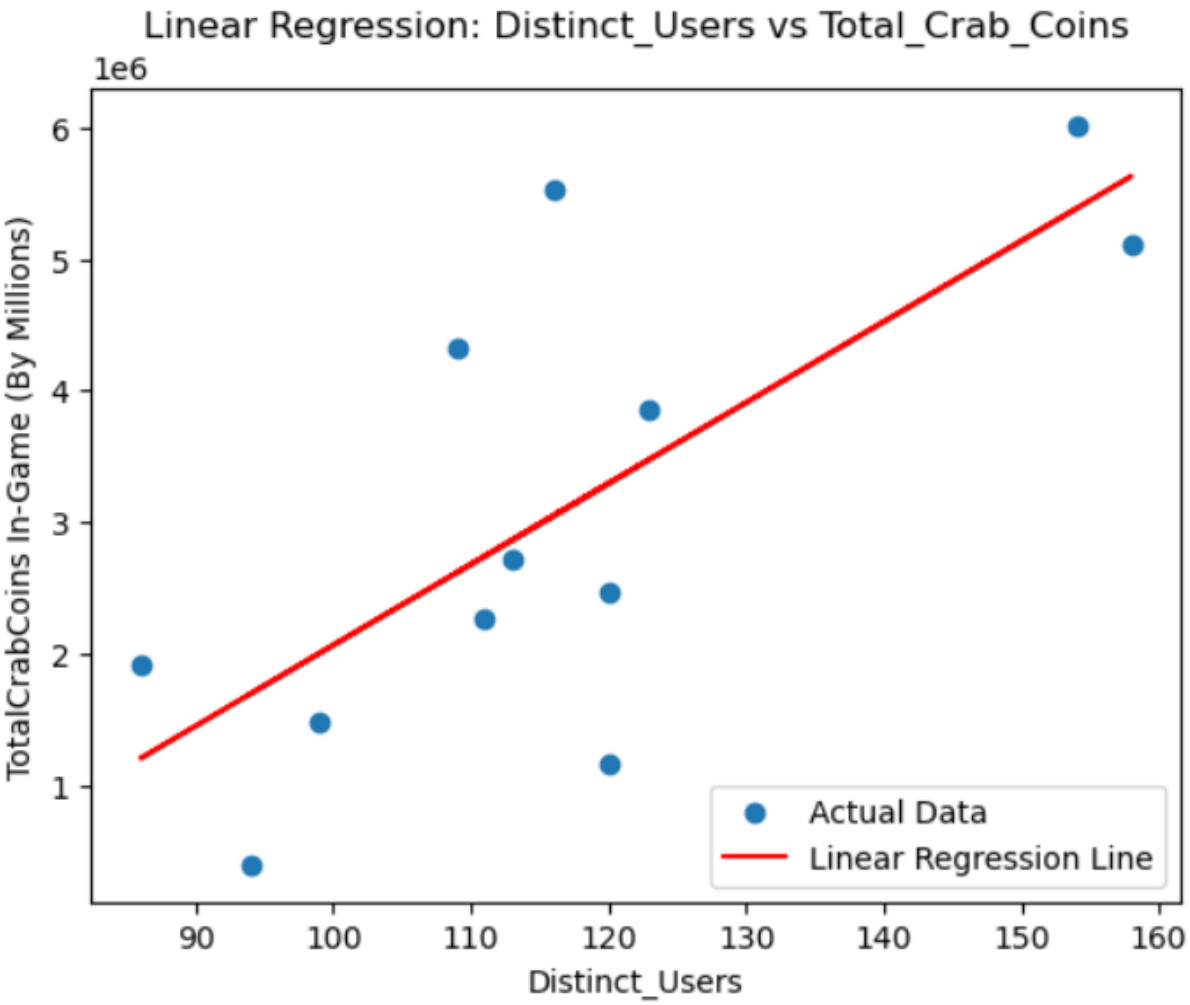
The logic is that if our "Crab Coins" currency is inflated users will have less incentive to purchase microtransactions. If our currency is worthless users will have less incentive to engage with currency generating activates – less user engagement.

The next graph tries to answer the first questions, what's the relationship between the number of active players and the total "Crab Coins" in-game.

The graph shows the total amount of crab coins that active users generated each month in-game and did not spend (total remaining game currency) as well as the number of active users each month.
every circle is different month.



In order to analyze to connection between total currency in-game and the number of active players I decided to run a liner-regression calculation when the number of distinct players is the explanatory variable (x) and total "Crab Coins" in-game is the response variable (y), in words - **how the number of distinct players effect the total-currency not spent in-game**.



*Each circle is different month.

the results of linear regression are the following:

```
Slope: 61351.623661431004
R-squared: 0.5158445387651833
```

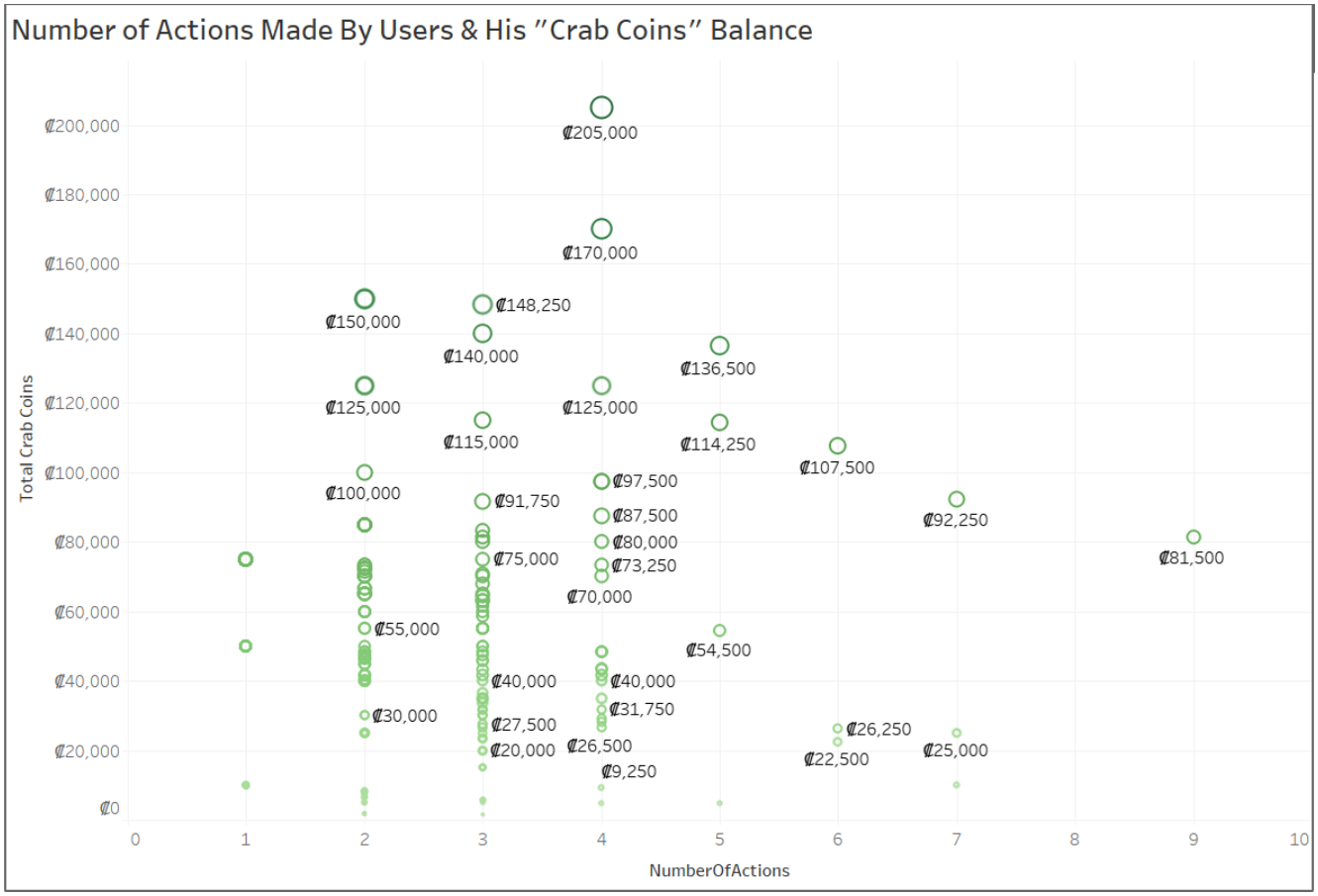
Slope - A positive slope (like in our results) means that as the number of distinct active users increases "TotalCrabCoins" tends to increase and the number 61,351 is the rate of change of "TotalCrabCoins" for a one-unit change in number distinct active users.

R-squared – R-squared provides a measure of how well the linear regression model fits the data. A higher R-squared value indicates that the model's predictions are closer to the actual data points

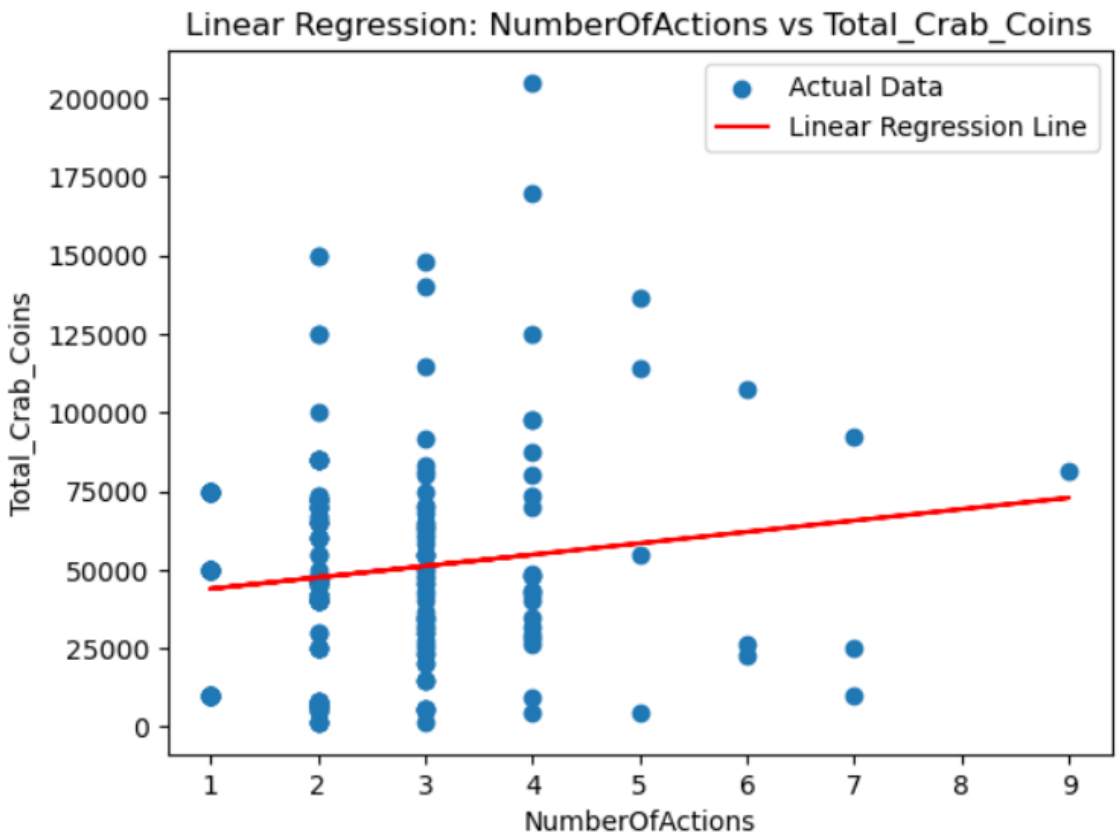
the results put into words say that 51% of the variance in "TotalCrabCoins" can be predicted by the number of active users.

Moving forward, next I tried to analyze the relationship between number of actions a user made and that user's total "crab coins" balance.

*we will consider actions as currency generating actions or purchasing game items using in-game currency and not clicking on different menus / switching screens.



Observing the graph the relationship between the variables is not clear, I decided to run regression calculations.



Slope: 3620.8862488051304

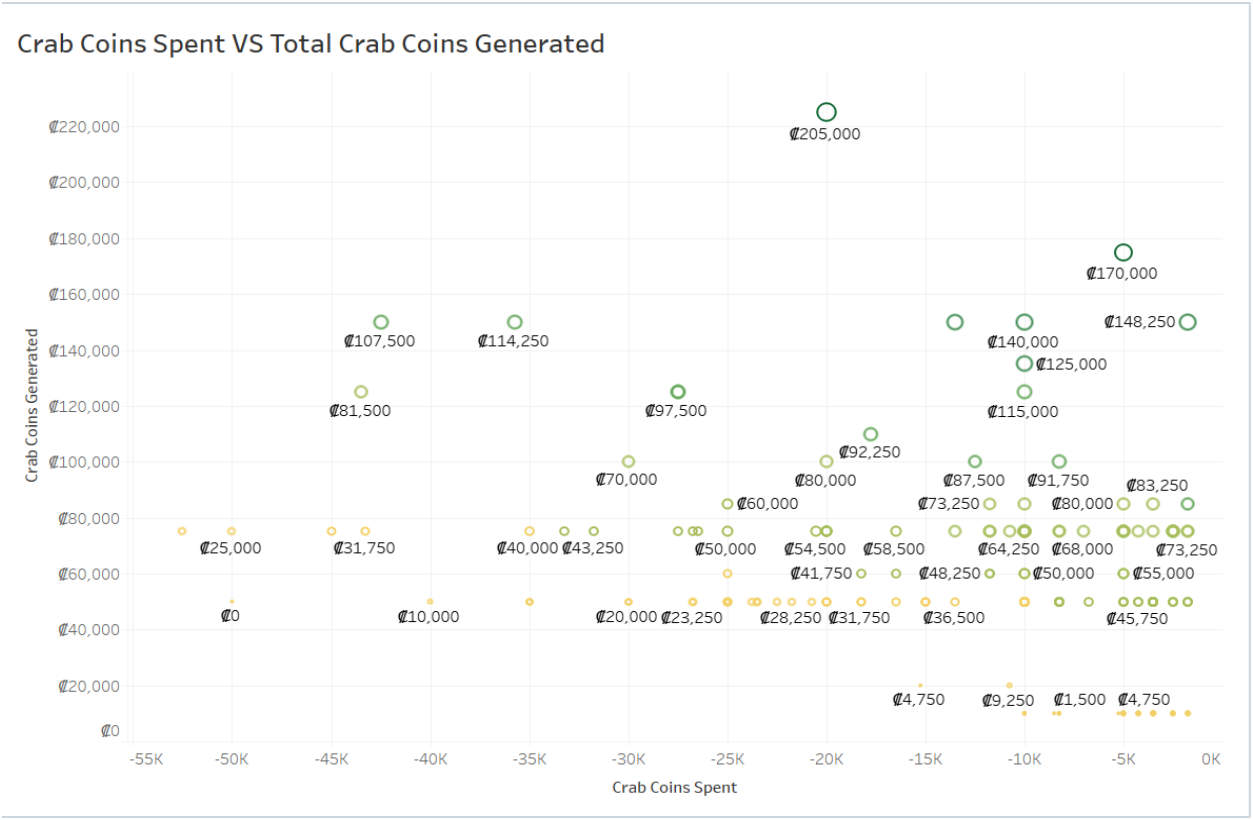
R-squared: 0.018975813281307322

Based on these results, the linear regression model does not appear to provide a strong fit for the data, and the relationship between the variables is quite weak.

Carefully interpreting the outcome of the results there is a **positive but very weak relationship between the total "CrabCoins" and the number actions taken**.

The goal should be based on the game strategy, if the game strategy is based on progression so the more actions a user make the more total currency he should have (positive relationship between those variables).

The next graph shows -
total "Crab Coins" user generated, from lower to higher;
compared to total "Crab Coins" user spent from right to left.



I would like to analyze the relationship between currency generated & currency used, the goal is that there will be a positive correlation between generating our game currency and spending it.
to put in words – if there is negative correlation then perhaps the users don't value the game currency enough / hoard it / don't have enough incentive to keep engaging with resource generating actions.

```
Pearson Correlation Coefficient: -0.3019117892515O9
```

The results indicate a negative correlation meaning **the higher total currency the user generated (x) the less total currency they spent (y).**

*Correlation does not imply causation and there could be other hidden variables that influence the relationship between those variables.

With that being said, negative correlation is opposite of our goal.
This may indicate that the more user generated game currency the greater his "Crab Coins" balance will be, danger of inflation and not effective resources sinks in game.

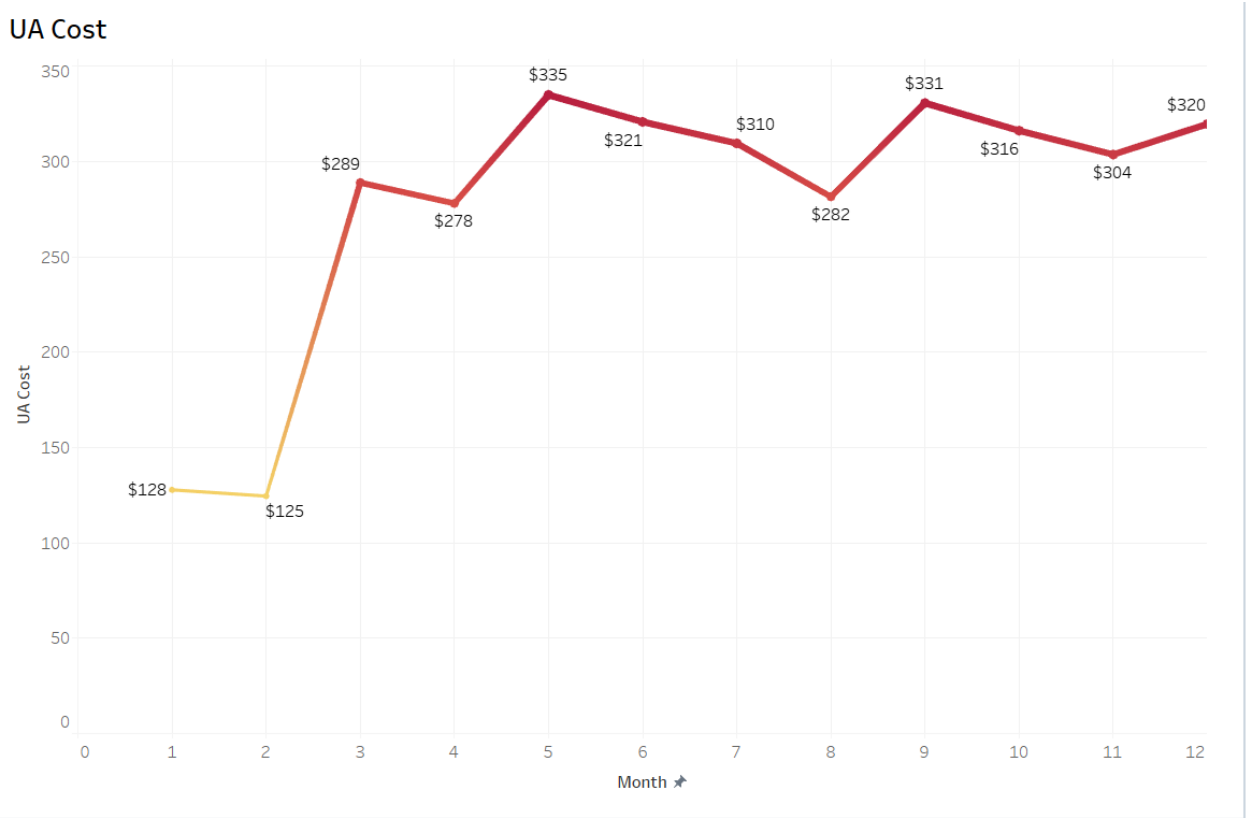
3.4 Expenses

marketing_id	campign	start_date	end_date	cost_per_month
1	facebook_ads	2020-01-07 00:00:00.000	2020-03-06 00:00:00.000	10
2	creative	2020-01-07 00:00:00.000	2021-01-05 00:00:00.000	5
3	app_store_fees	2020-01-07 00:00:00.000	2021-01-05 00:00:00.000	3

UA Cost

User acquisition is a metric used in marketing and business to measure the cost of acquiring new customers, users, or clients for a product, service, or platform.

User Acquisition Cost = Total Marketing and Advertising Expenses / Number of New Customers Acquired



Judging the graph there is a **big jump in UA cost from February onward** that should be looked into.

*As I mentioned earlier in this project, the game was developed by a single developer and all the expenses are marketing and platform fees that were included in the marketing table.

3.5 Monetization

premuim_item_id	premuim_item_name	item genre	cost
1	Green Crab	skin	2.3
2	Crown	power-up	3
3	Aurora Shell Shimmer	skin	4
4	Oceanic Elegance	skin	6.5
5	Enigmatic Moonstone Claw	power-up	2.3
6	Cursed Relic	power-up	4.99
7	Crystal Cavern Chateau	house	5.3

purchase_id	purchased_item_id	user_purchased	purchase_date
1	15	12164	2020-06-05 00:00:00.000
25	15	5274	2020-08-20 00:00:00.000
50	15	5071	2020-05-28 00:00:00.000
52	15	4485	2020-03-01 00:00:00.000
55	15	6931	2020-07-09 00:00:00.000
57	15	4812	2020-01-09 00:00:00.000

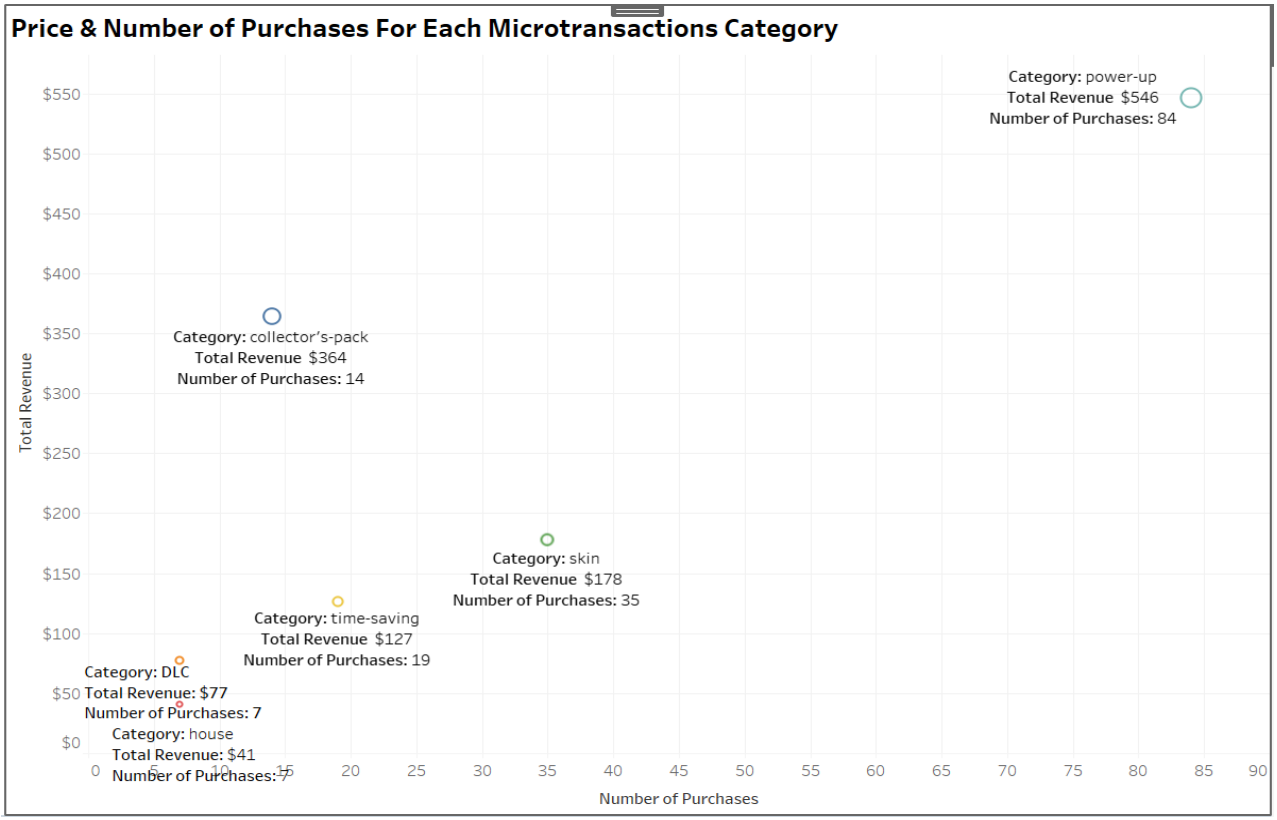
The most important metric.
Essentially, this is how game developers make money from the games they created.

Our product, the mobile app is free-to-play with **in-app microtransactions.** These transactions allow players to access premium content, customizations or enhancements within the game.
in our mobile-app the users have the ability to purchase:

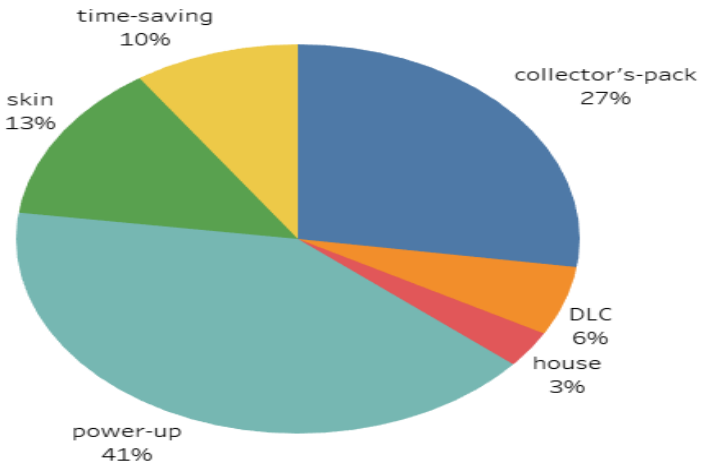
cosmetic Items like skins
power-ups and boosts
time-saving mechanisms
premium content (DLC)

Category analysis

First, I would like to analyze how different microtransactions categories perform.



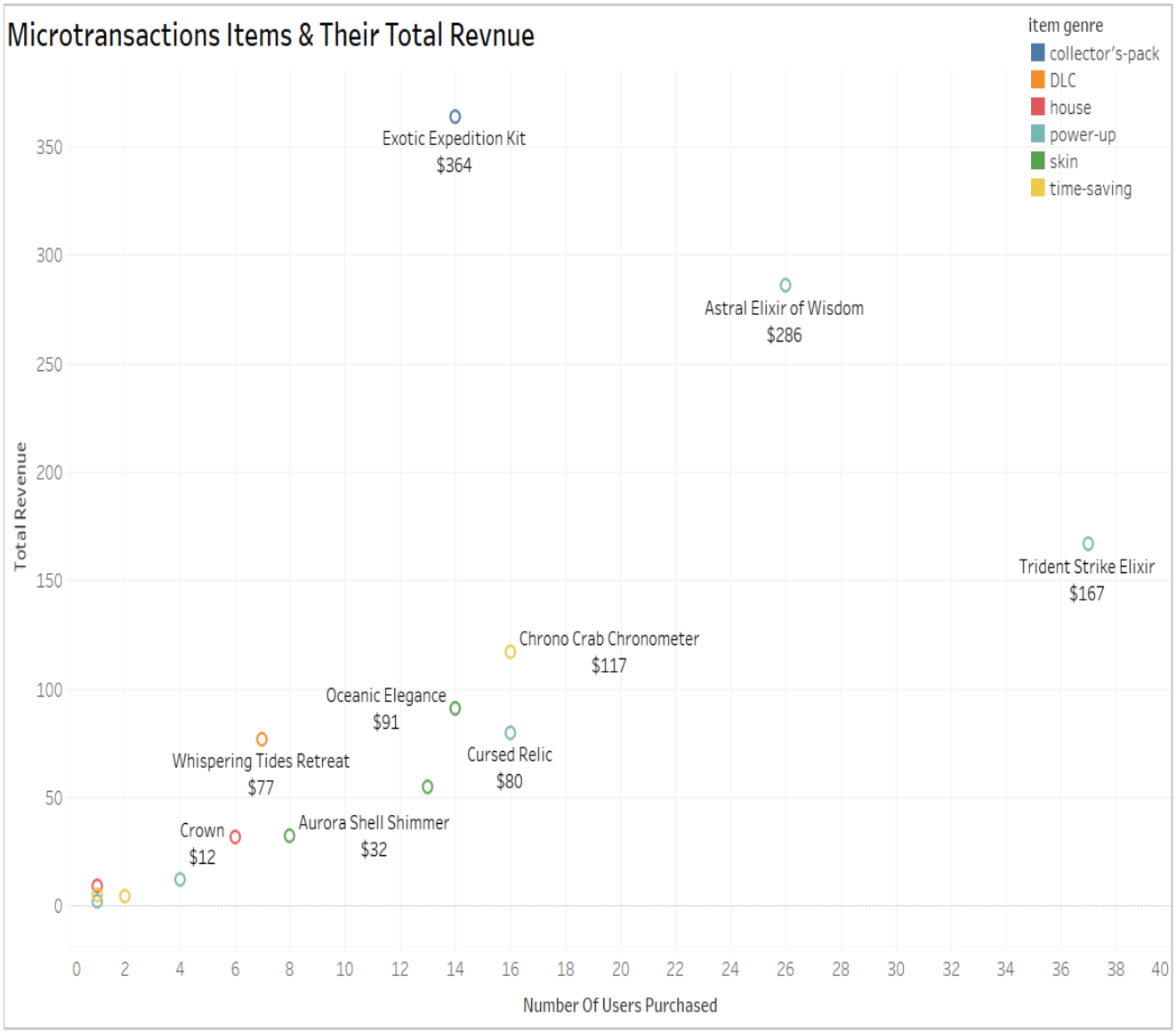
Percent From Total Revenue for Each Microtransactions Category



The most profitable category is power-ups and the least profitable is the housing category.

In order to improve monetization perheps its advisable to get back to the "drawing board" for the weak perfoming categories.

The graph below shows how different microtransactions item performed.

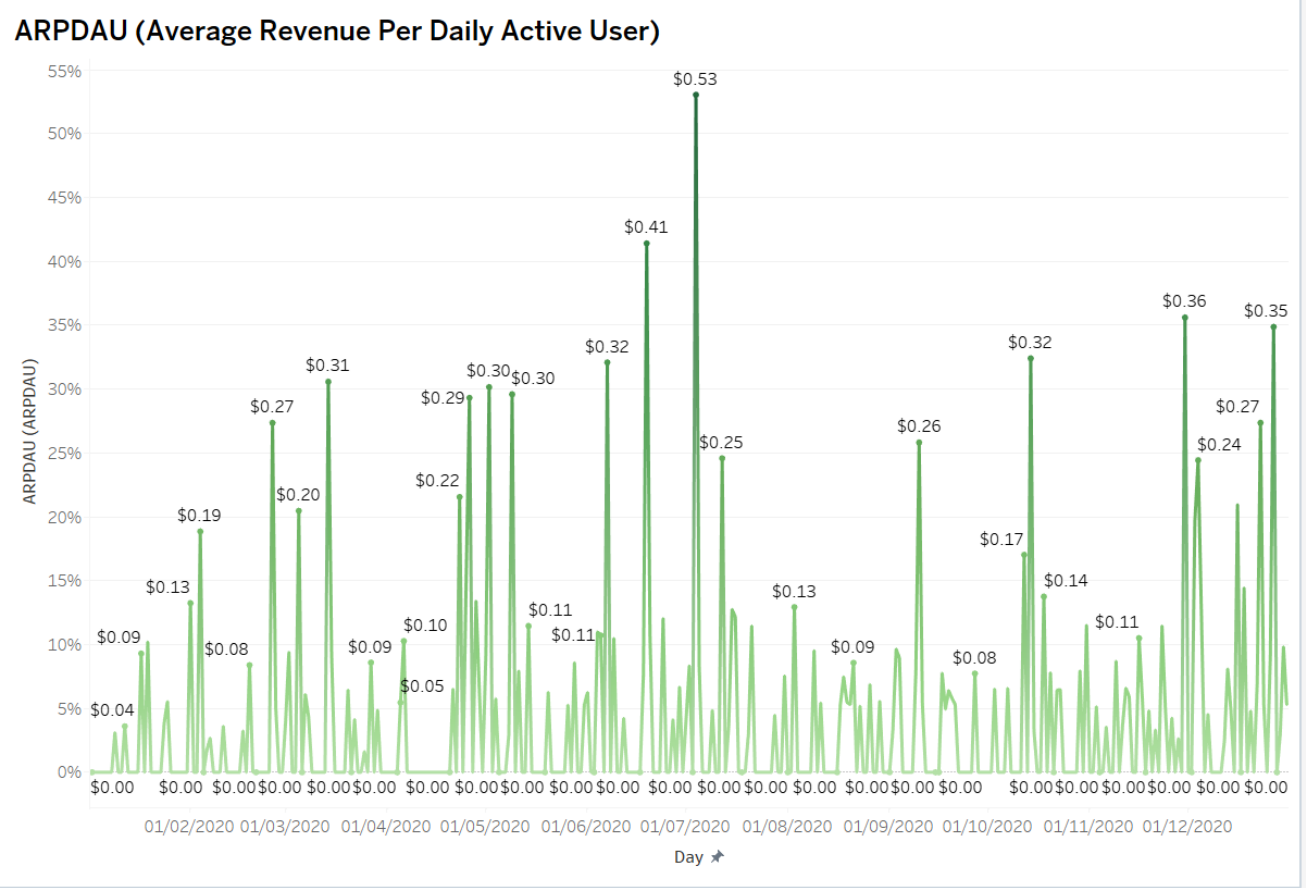


ARPDAU

Average Revenue Per Daily Active User, pretty much describe the relationship between the number of daily active users and monetization.

ARPDAU = Total Revenue / Daily Active Users (DAU)

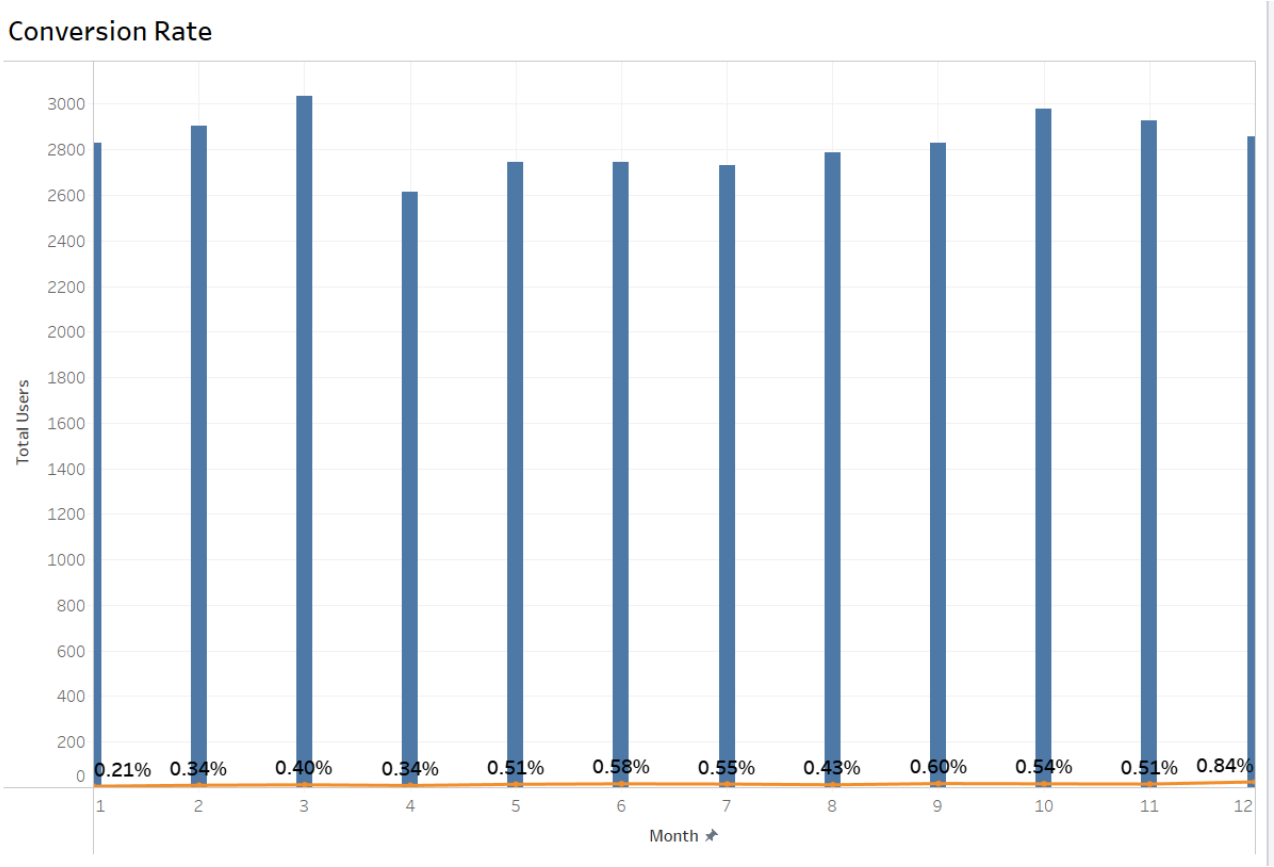
The rational is that our ARPDAU can hint if the daily active users in our app are the right audience in term of monetization.
if the ARPDAU is low then maybe we need to accurate our marketing campaigns.



IAP Conversion Rate

In-App Purchase Conversion Rate refers to the percentage of users who made purchases in app out of all total users that had the opportunity to do so.

Improving IAP conversion rates can lead to increased revenue without necessarily needing to acquire a larger user base.



4. Conclusions & Suggestions Based on The Analysis

Opening Remarks

First thing first, I would like to note that **metrics change over time**, the important thing is to **monitor the KPI's and understand what they mean**.

KPI's can give you a snapshot of the **product perfomence**.

They can help you to check if you are on track to achieve your pre-defined goals, can help you make informed choices about resource allocation and strategy adjustments.

KPI's also help identify areas where processes can be improved. When you track performance over time, you can pinpoint inefficiencies or areas with high variability and work to optimize them.

Furthermore KPI's can act as an early warning indicators. If certain KPI's start to decline, it could signal underlying issues.

User Engegment

DAU (Daily Active Users)

There is high scattering in the number of daily users, meaning users don’t have enough incentive to log in day after day. A suggestion to Improve this KPI I would like to make is to set-up a **daily log-in reward** or **daily quest** (perheps even both) giving the users an encourgment to log-in on different days.

Rating & Number of Installs

user ratings help others **decide whether to use the app**.

There is a high number of users that rated the app "1".
after analyzing the total minutes users spent in-app compared to the rating they gave there is indication that the ratings are mostly based – meaning **some user have genuine problem with our app that is affecting overall user satisfaction** and that should be examined.

As long the rating won't improve it will be harder to convince potential users to download the app.

Frequency & Retention

From the analysis results its quite visible that users with high number of log-in's have fewer average minutes in-app, on the opposite side of the scale there are some users with low number of log-in's and high average minutes in-app.

this kind of user activity pattern means that some users log-in and stay in the app for an extensive amount of time, which can be good but -
a game with monetization strategy of in-app microtransactions should probably be designed as "GaaS" (Game As a Service).
The rationale is that users won't invest in a game that they don’t expect to play it again in the future, meaning that **if our game monetization strategy is microtransactions thus our goal should be on encouraging higher number of log-in's and retention, less about total time in-app.**

Game Economy

Game Sinks

From the analysis there is negative correlation between the total currency the user generated and the total currency that user spent.

The interpretation of that outcome is that the higher total currency the user generated the less total currency they spent citing game **currency sinks don't work properly as the user progress in game,** the more user progress the higher his currency balance will be – less incentive to purchase game boosters nor less motivation to keep carrying out actions that generate game currency.

My suggestion is to design game **currency sinks tailored for all levels of user progression**, meaning that users should always have a need to spend, whether it's paying for utilities (getting stronger, quality of life upgrades), rare collectibles, crafting or gambling (pay x for a chance to win y).

Monetization

Microtransactions Categories

Stems from the analysis a high variance in different categories performance in terms of revenue.

Concerning the **weaker performing categories**, it might be good idea to **get back to "drawing board**" after analyzing what is good and bad about the purchasable items in those categories according to user feedback, as well as doing A/B test and experimenting with changes in order to try to improve those categories.

Another possible thing to do is to offer limited-time promotions, discounts, or special incentives to encourage players to explore these categories.

As for the **best performing categories – more of the same**.
Analyze the factors contributing to the success of the best performing categories and consider expanding the offerings within the best performing categories. Introduce new content, items, or features that are aligned with what players are enjoying

Mixing - **Offer bundle deals** that include items from the best performing categories **along with items from other categories**.

Closing Remarks

This data-driven approach can help us to identify strengths, weaknesses, and opportunities for improvement.

The suggestions put forth based on the KPI's analysis are designed to capitalize on the game's strengths and address its challenges.

Tools Used in This Project

SQL – to view through GitHub Click Here

Python – to view through GitHub Click Here

Tableau – to view through Tableau Public Click Here

Excel – to download files Click Here

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