

## **Lecture 4**

### **User Retention and Engagement**

**Instructor: Ali Pilehvar, Ph.D.**



9/23/2021

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# Agenda for today

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- ▶ Group Projects [team and details]
- ▶ 10 min discussion from last week
- ▶ User Retention is getting users back, but how?
- ▶ How companies calculate customer retention rate?
- ▶ Understanding the retention using Cohort Analysis
- ▶ Engagement and power user metrics
- ▶ In-class example
- ▶ Homework 3 to be posted after the class [HW 1-2 grades will be posted by next week]

# Office hour moving forward

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- ▶ Wednesday 7pm-8 pm EST
- ▶ Monday 7:30-8:30 am EST

**10 min discussion from last week**

# Learnings from last week

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- **Reading:** [Customer Acquisition cost](#)
- **Podcast:** [The Basics of Growth — User Acquisition](#)
- **Reading:** [Optimizing TV Advertising Toward Return on Investment](#)
- **Reading:** [How To Become A Customer Acquisition Expert](#)
- **Reading:** [The 19 Channels You Can Use to Get Traction](#)

**User Retention is getting users back,  
But how?**

# Customer retention is all about how well we can create loyal customers base and keep them coming back

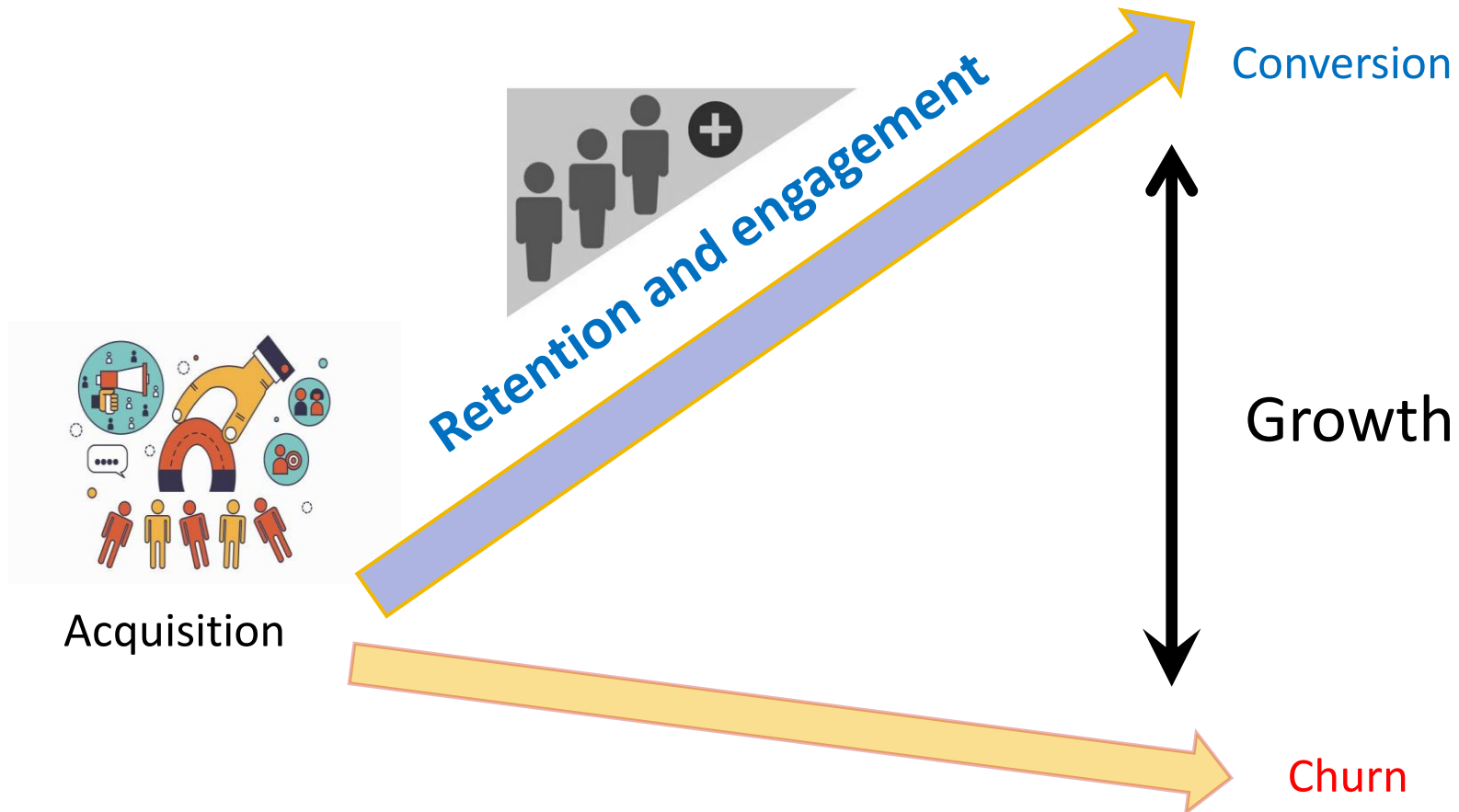
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- As a business, in addition to attracting new customers, you always want to keep your current customers **engaged and interested in your products**
- Customer retention increases your customers' lifetime value and **boost your revenue**
- **The best customer retention tactics enable you to form a lasting relationships with consumers who will become loyal to your brand.**



# Retention is the essential for long-term growth, *specifically for companies in a competitive space*

- Once you acquire new users, we must keep them engaged, retain or even reactivate them ( *e.g., most women in America have downloaded the Pinterest app, so how they can grow more then?* )





Retention is a continuous process and necessitates using different marketing tactics and strategies

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You Send	That Contain	So Users
<ul style="list-style-type: none"><li>• Emails</li><li>• Push Notifications</li><li>• In-App Notifications</li><li>• Web Notifications</li><li>• SMS/MMS</li><li>• &amp; more</li></ul>	<ul style="list-style-type: none"><li>• Personalized messaging</li><li>• Deals, coupons</li><li>• Promotions</li><li>• Announcements</li><li>• &amp; more</li></ul>	<ul style="list-style-type: none"><li>• Click</li><li>• Buy</li><li>• Upgrade</li><li>• Share</li><li>• Consume content</li><li>• Create content</li><li>• Review</li><li>• &amp; more</li></ul>

# Retention is **cheaper** than acquiring new customers

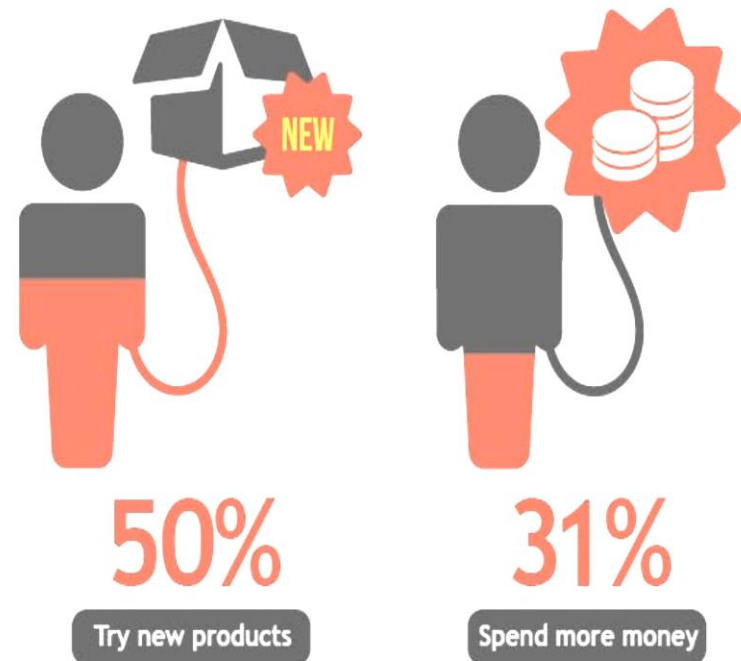
- It costs 5 times as much to attract a new customer than to keep an existing one

[Source]

- Research done by Bain and company shows increasing customer retention by 5% increase profit by 25%-95%

[Source]

Existing customers are **50%** more likely to try new products and spend **31%** more, when compared to new customers.



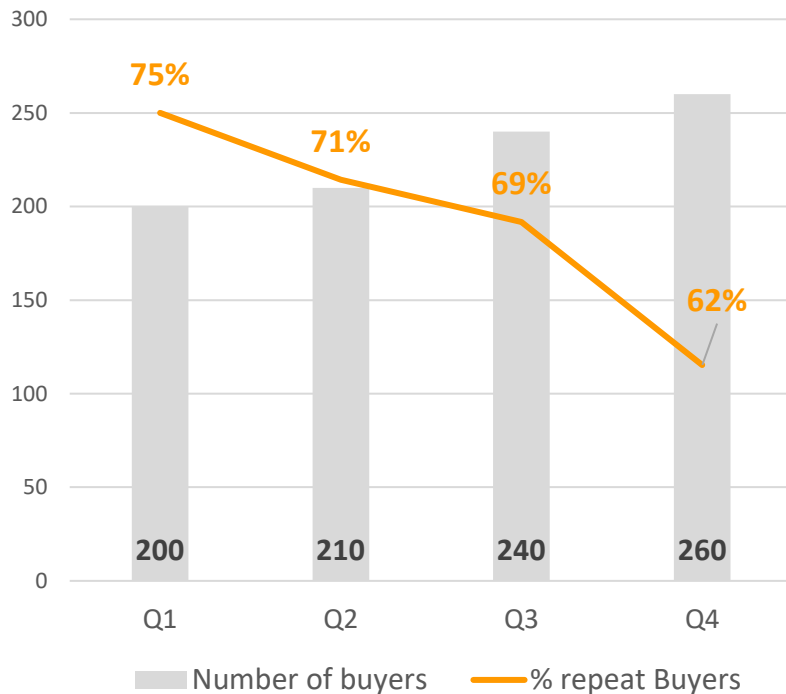
Source: <https://www.invespcro.com/blog/customer-acquisition-retention/>

# We can derive some quick insights about **retention mode** of a business by looking into repeat customer behavior

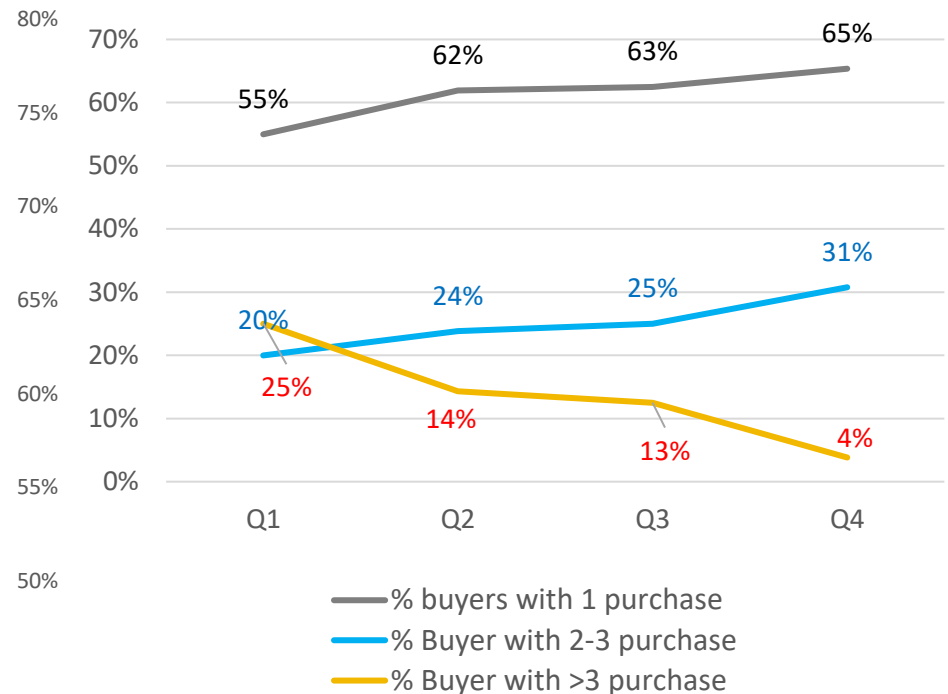
➤ **What** can we learn from repeat buyer behavior?

➤ **How** can we increase the repeat behavior here?

### Repeat buyer versus new buyers



### Freq. of purchase



# Online Channels used primarily for customer retention versus acquisition among companies

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Online Marketing Channel	Acquisition	Retention	Both Equally
Mobile messaging	23%	58%	19%
Email	21%	52%	27%
Mobile apps	30%	44%	26%
Mobile and web push notification	34%	39%	27%
Social media marketing	31%	28%	41%
Web retargeting	61%	22%	18%
Mobile web	52%	18%	30%
Website	29%	16%	55%
SEO (Organic) search	66%	6%	28%
Online display advertising	85%	4%	11%
Paid search	86%	2%	13%

Source: <https://www.invespcro.com/blog/customer-acquisition-retention/>

**How companies calculate customer retention rate?**

# Customer Retention Rate (CRR) is a marker of how loyal your customers are

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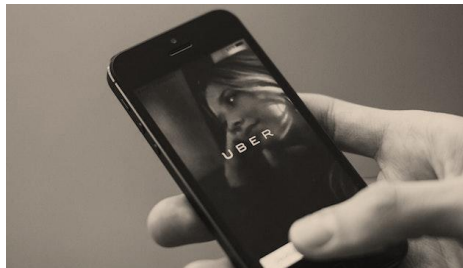
- Retention Rate simply means among a group of customers that shopped with you in some historical period (e.g., 6-12 months ago), what proportion of them are still active now because they've shopped recently (*e.g., within the last 6 months*).
- **Retention rate** incorporates a window of time between two orders. The window of time that you choose to use is dependent upon the types of **product you sell**.

## Grocery industry



Biweekly or daily?

## Ride Hailing



Weekly or Monthly?

## Furniture

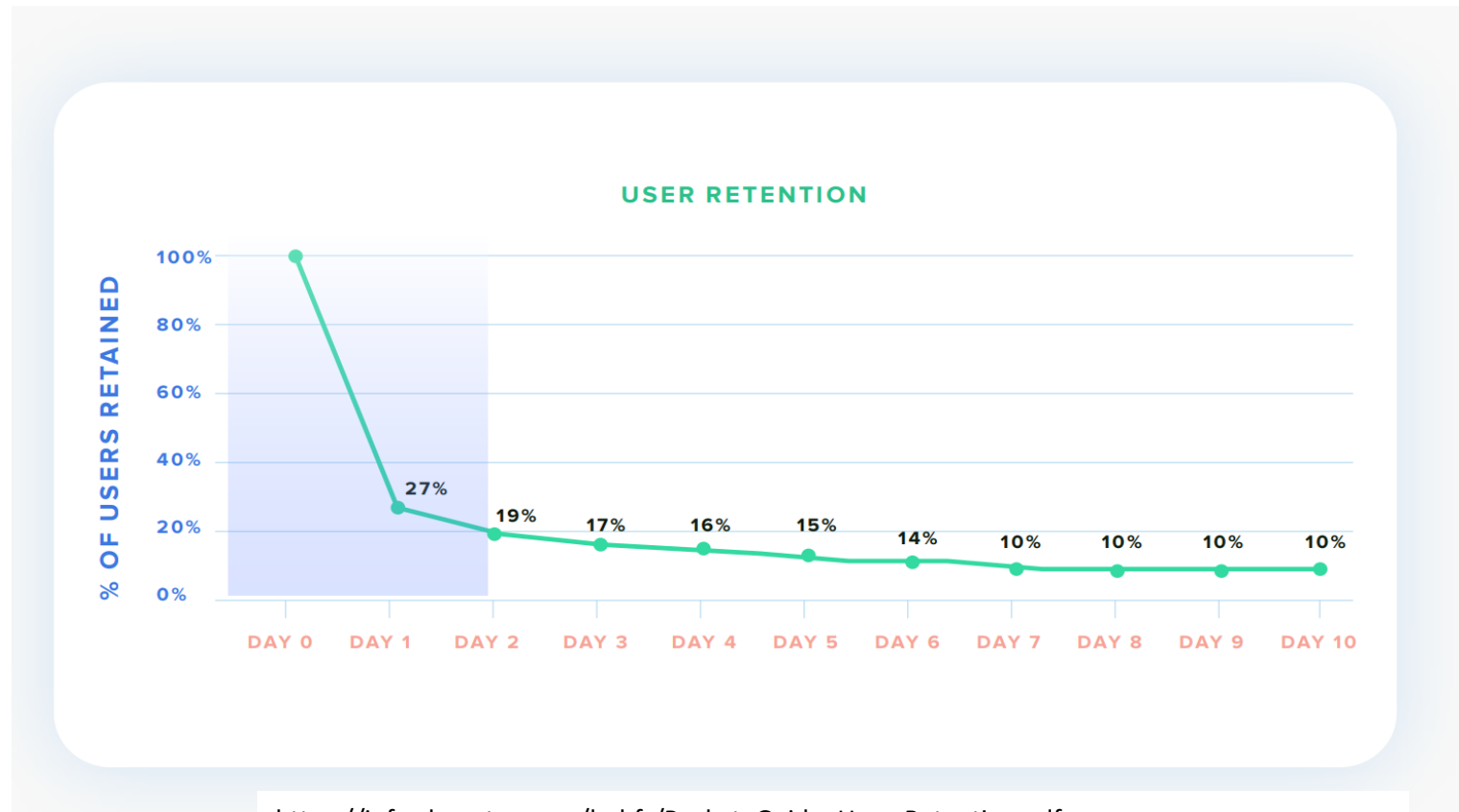


Monthly or annually?

Source: <https://ometria.com/blog/how-to-calculate-customer-retention-rate-in-ecommerce>

# Customer retention rate (CRR) is one important metric to measure business retention

- Many companies have problem retaining and engaging their customers
- Retention is a very big problem for **mobile apps**



[https://info.clevertap.com/hubfs/Pocket\\_Guide\\_User\\_Retention.pdf](https://info.clevertap.com/hubfs/Pocket_Guide_User_Retention.pdf)

# Customer Retention Rate (CRR) Formula for **subscription-based SaaS businesses**

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$$\left( \left\{ \begin{array}{c} \text{Number of} \\ \text{Customers} \\ \text{at the end} \\ \text{of Period} \end{array} \right\} - \left\{ \begin{array}{c} \text{Number of new} \\ \text{Customers} \\ \text{acquired during} \\ \text{Period} \end{array} \right\} \right) / \left\{ \begin{array}{c} \text{Number of} \\ \text{Customers at the} \\ \text{beginning} \\ \text{Period} \end{array} \right\}$$

	Jan	Feb	Mar
Number of customer at the beginning	50,000	50,000	50,000
Number of new Acquired customer	7,000	10,000	8,000
Number of customer at the end	52,000	55,000	52,000
Number of Retained Customers	45,000	45,000	44,000
Overall Retention Rate	90%	90%	88%



# Customer Retention Rate (CRR) Formula for E-Commerce businesses

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$$\left\{ \begin{array}{c} \text{Number of Buyers in this} \\ \text{period who also} \\ \text{purchased in previous} \\ \text{period} \end{array} \right\} / \left\{ \begin{array}{c} \text{Number of} \\ \text{Buyers in} \\ \text{previous period} \end{array} \right\}$$

Number of buyers  
Number of new buyers  
Number of repeat buyers  
Number of buyers from previous month

Jan	Feb	Mar
50,000	54,000	48,000
7,000	10,000	8,000
43,000	44,000	40,000
	30,000	35,000
Retention Rate (from prev period)		60%
		65%

# Difference between Repeat Rate and Retention Rate for E-Commerce businesses

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## Repeat Rate:

$$\left\{ \begin{array}{c} \text{Number of Buyers in this} \\ \text{period coming from} \\ \text{previous periods} \end{array} \right\} / \left\{ \begin{array}{c} \text{Number of} \\ \text{Buyers in this} \\ \text{period} \end{array} \right\}$$

	Jan	Feb	Mar
Number of buyers	50,000	<b>54,000</b>	<b>48,000</b>
Number of new buyers	7,000	10,000	8,000
Number of repeat buyers	43,000	44,000	40,000
Number of buyers from previous month		<b>30,000</b>	<b>35,000</b>
Retention Rate (from prev period)		<b>60%</b>	<b>65%</b>
Repeat Rate	<b>86%</b>	<b>81%</b>	<b>83%</b>

# Other retention-related metrics which measure the loyalty, frequency of purchase and customer experience

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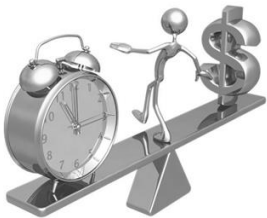
## #1. Repeat Customer rate:

- **Total repeat buyers/total customers**
- This is a great measure of the overall pulse of your customer experience



## # 2. Average order value (AOV)

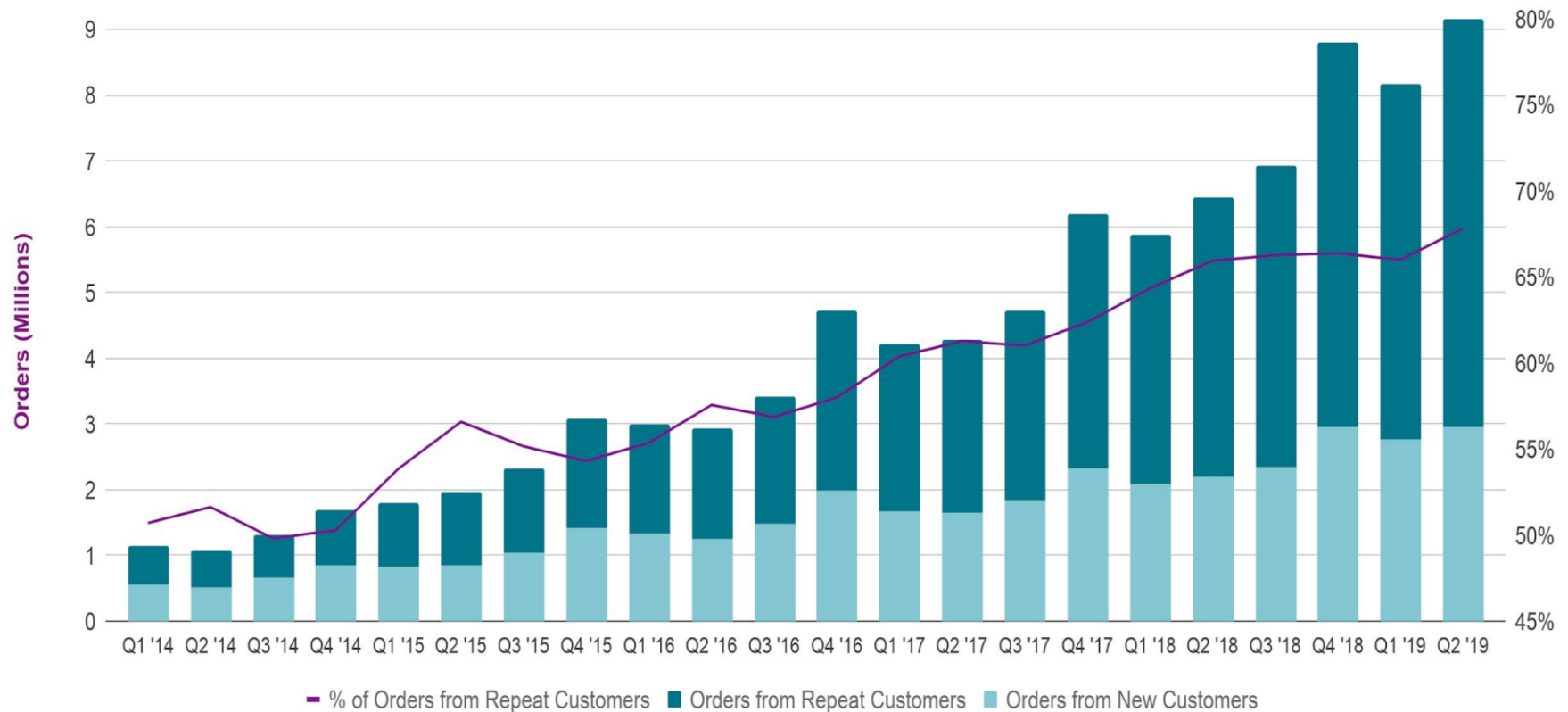
- **Revenue/number of orders**
- Focus on deriving more revenue value from loyal customers
- Can a good purchase experience can encourage more spending?



## #3. Customer lifetime value (CLV)

- **The amount of value a customer contributes to your business over their lifetime**
- It's worth determining which customers have the highest CLV

Retention metrics are reported by companies (e.g., Wayfair.com) in their quarterly earning call to the public



Source: [https://s24.q4cdn.com/589059658/files/doc\\_financials/quaterly/2019/q2/Q2'19-Wayfair-Investor-Presentation.pdf](https://s24.q4cdn.com/589059658/files/doc_financials/quaterly/2019/q2/Q2'19-Wayfair-Investor-Presentation.pdf)

# There are some rule of thumbs to increase retention in a product within a specific demographic of the customers

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**Raise your price**

**Reconsider your value proposition**

**Follow up on every interaction with the customer**

**Upsell**

**Emphasize engagement as soon as possible**

**Develop a regular interaction schedule**

**Follow your customers on social media**

**Consider a loyalty program**

**Create a retention team**

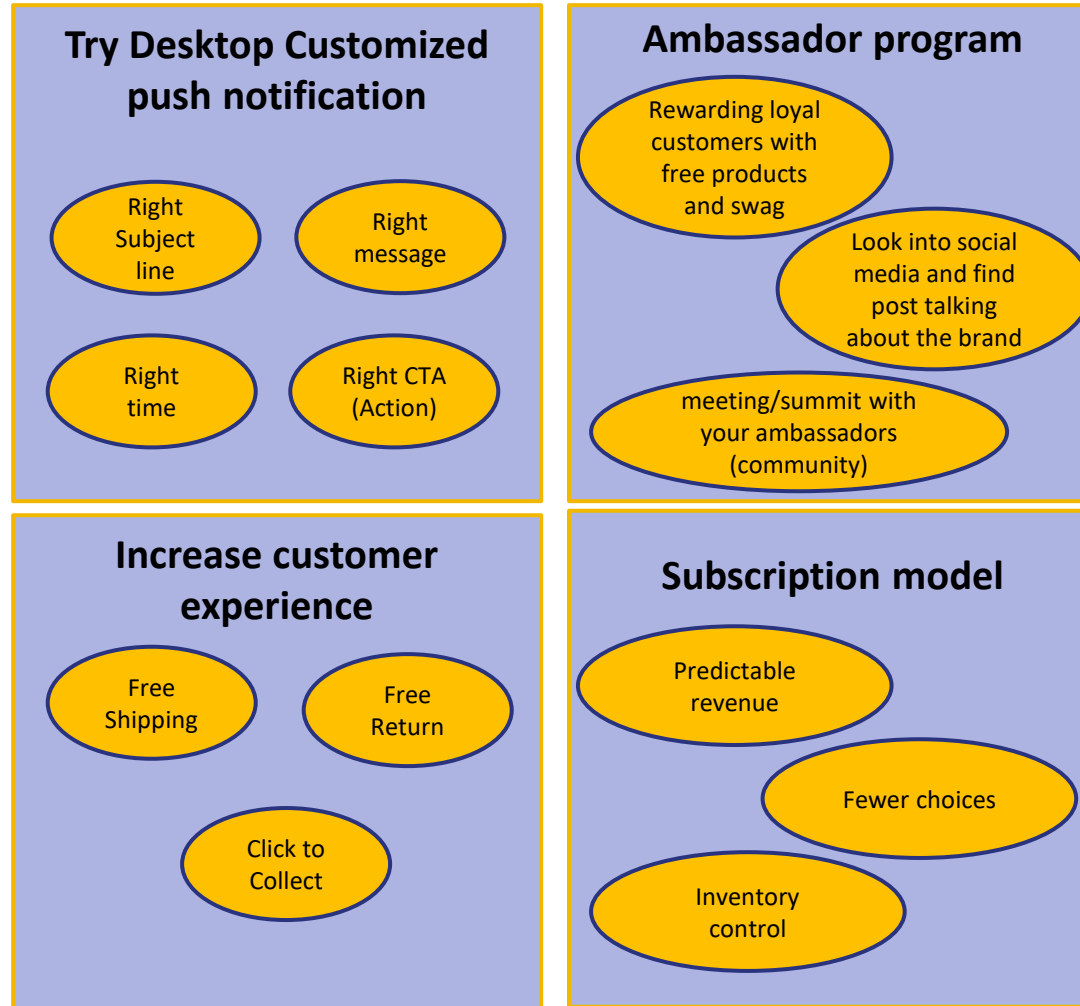
**Measure meaningful customer engagement**

**Upgrade the customer automatically**

**Make it easy for customers to leave**

# Some effective retention methods which can apply to E-commerce businesses

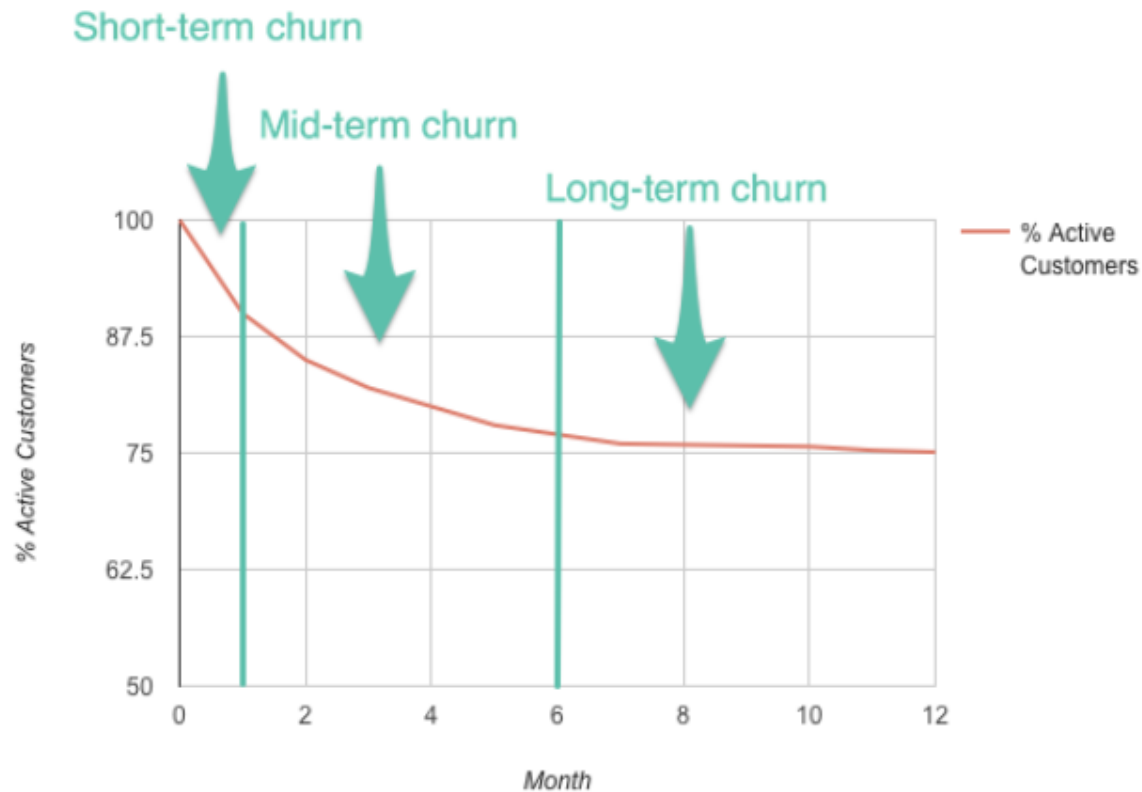
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# One big mistake is Not Calculating Retention at different Stages of Customers' Lifetimes

Retention Rate can vary within customer lifecycle.

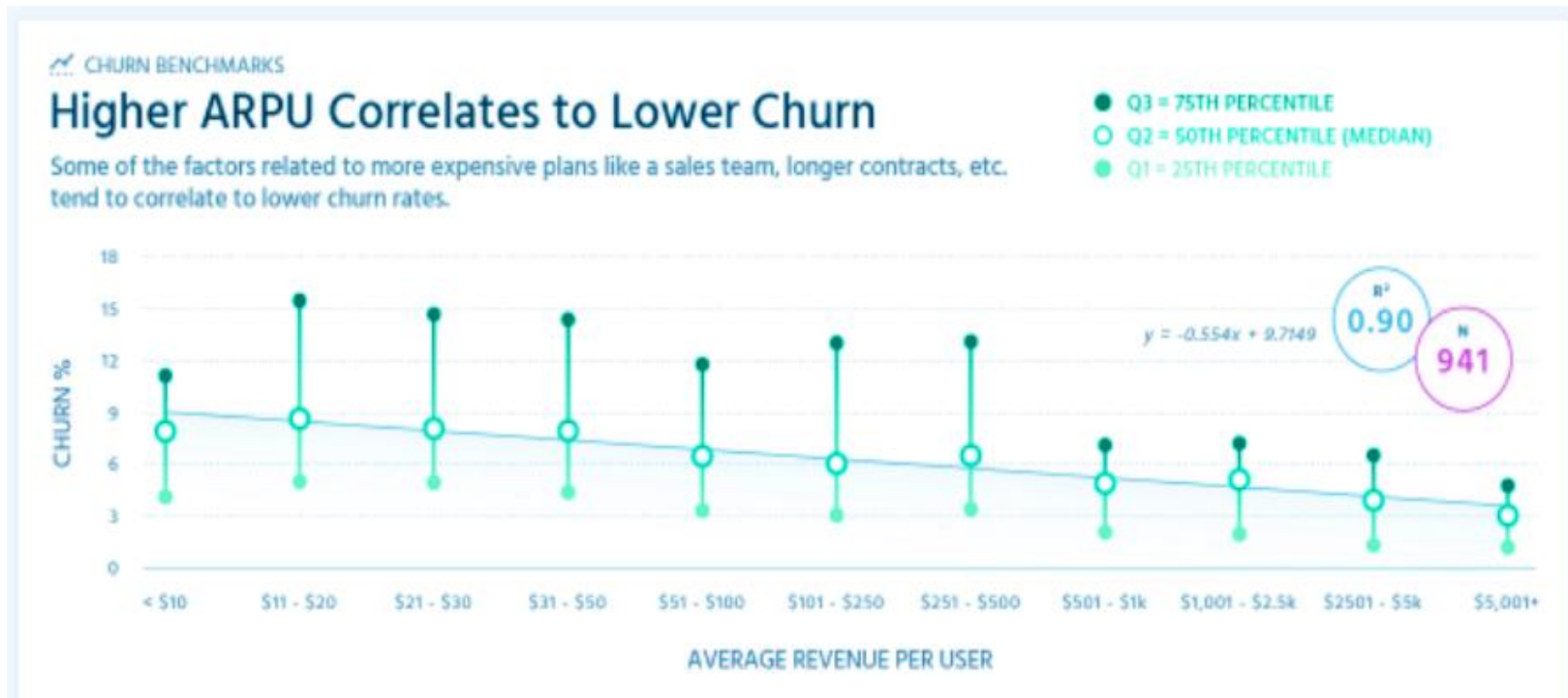
*(customers who sign up at different times will have different retention rates)*



Source: <https://www.profitwell.com/customer-retention/calculate-retention-rate>

# Customers on different plans (different segments) will typically show different rates of user retention

- Enterprise-tier customers, or those customers with most expensive plans more likely to have higher user retention
  - One study also found that higher percentages of annual contracts correlate with better retention.



Source: <https://www.profitwell.com/customer-retention/calculate-retention-rate>



# **Understanding the retention using Cohort Analysis**

# What is cohort analysis?

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- **A cohort** is a group of customers who share something in common such as their sign-up date, first purchase date, acquisition channel, location etc.
- Cohort analysis is a temporal study of users' data to get insights on how different cohorts behave over the time.
- It enables us to look at growth metrics at a disaggregated level to get a more accurate and realistic picture of the actual growth rate, customer lifetime values, churn rates, etc.
- It is also helpful in studying customers' loyalty and how it evolves over time with changes to our product designs

# Cohort analysis example

- **Monthly acquired users** are considered *cohorts here*
- Users who are acquired every month could be engaged/retained/churned over next few months

Conversion Month	New Users
January	50
February	60
March	70
April	75
May	85
June	100

Number of Users Retained in Each Month

January	February	March	April	May	June
50	45	42	39	37	35
	60	57	55	50	48
		70	68	65	61
			75	72	69
				85	84
					100
50	105	169	237	309	397

## Cohort analysis example, *cont'd*



- We can re-label the previous table to show the number of users from each cohort retained after '*n*' month from their first conversion

Conversion Month	New Users	Number of Users Retained 'n' Month After Conversion					
		0	1	2	3	4	5
January	50	50	45	42	39	37	35
February	60	60	57	55	50	48	
March	70	70	68	65	61		
April	75	75	72	69			
May	85	85	84				
June	100	100					
		440	326	231	150	85	35

## Calculating the retention rate for each cohort, *example cont'd*

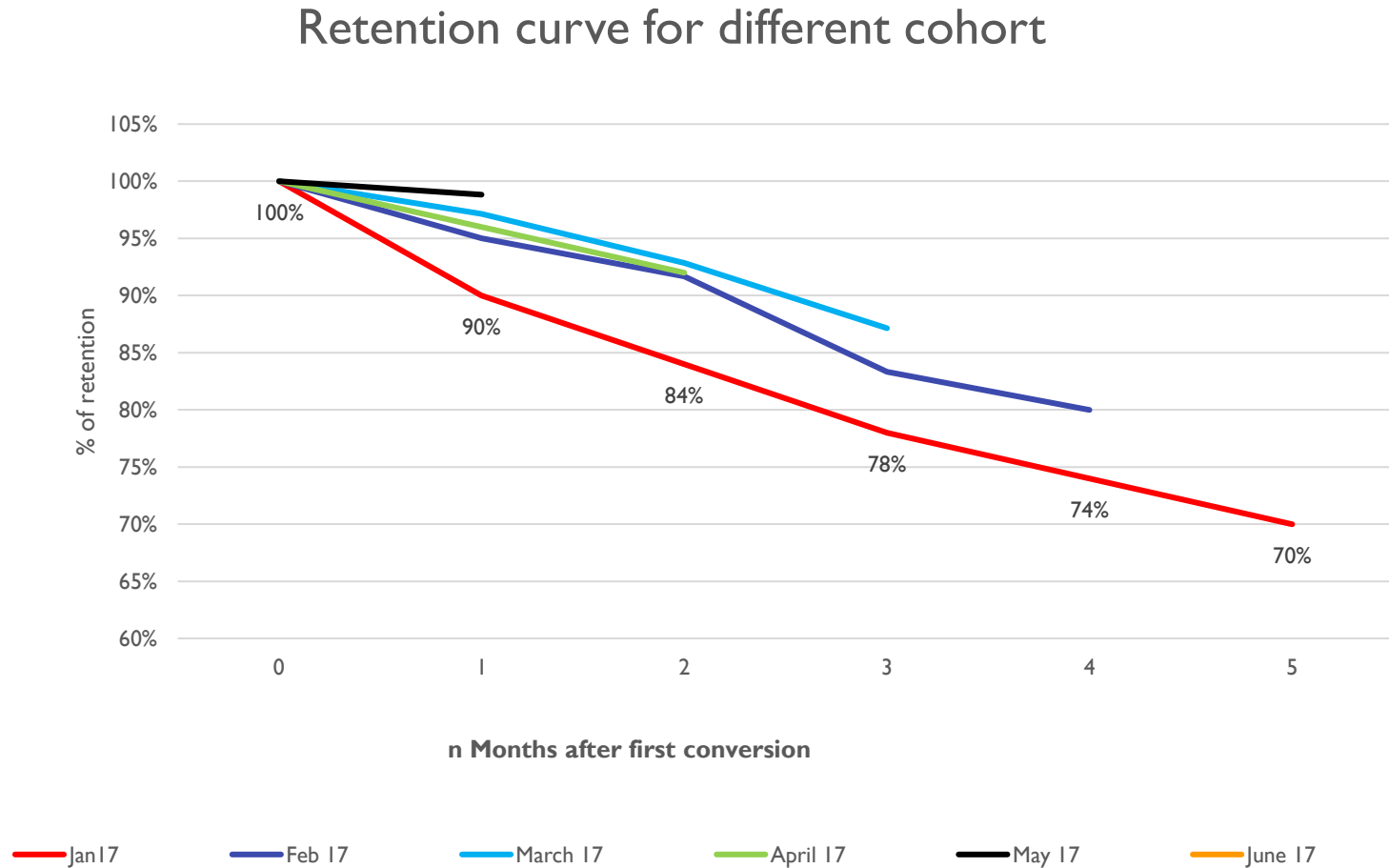
### ➤ What can we learn from our cohort analysis example?

*More recently acquired cohorts have higher retention rate across their tenure (is it surprising?)*



	Percent of Users Retained 'n' Month After Conversion					
	0	1	2	3	4	5
January	100%	90%	84%	78%	74%	70%
February	100%	95%	92%	83%	80%	
March	100%	97%	93%	87%		
April	100%	96%	92%			
May	100%	99%				
June	100%					
	100%	96%	91%	83%	77%	70%

# Retention curve for different cohorts



# Retention is measured relative to two factors: **time frames** and **meaningful activity events**

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% of active users

## Meaningful activity metrics

<b>Uber</b>	Completed ride
<b>Netflix</b>	Seeing a content
<b>WhatsApp</b>	Reading and sending message



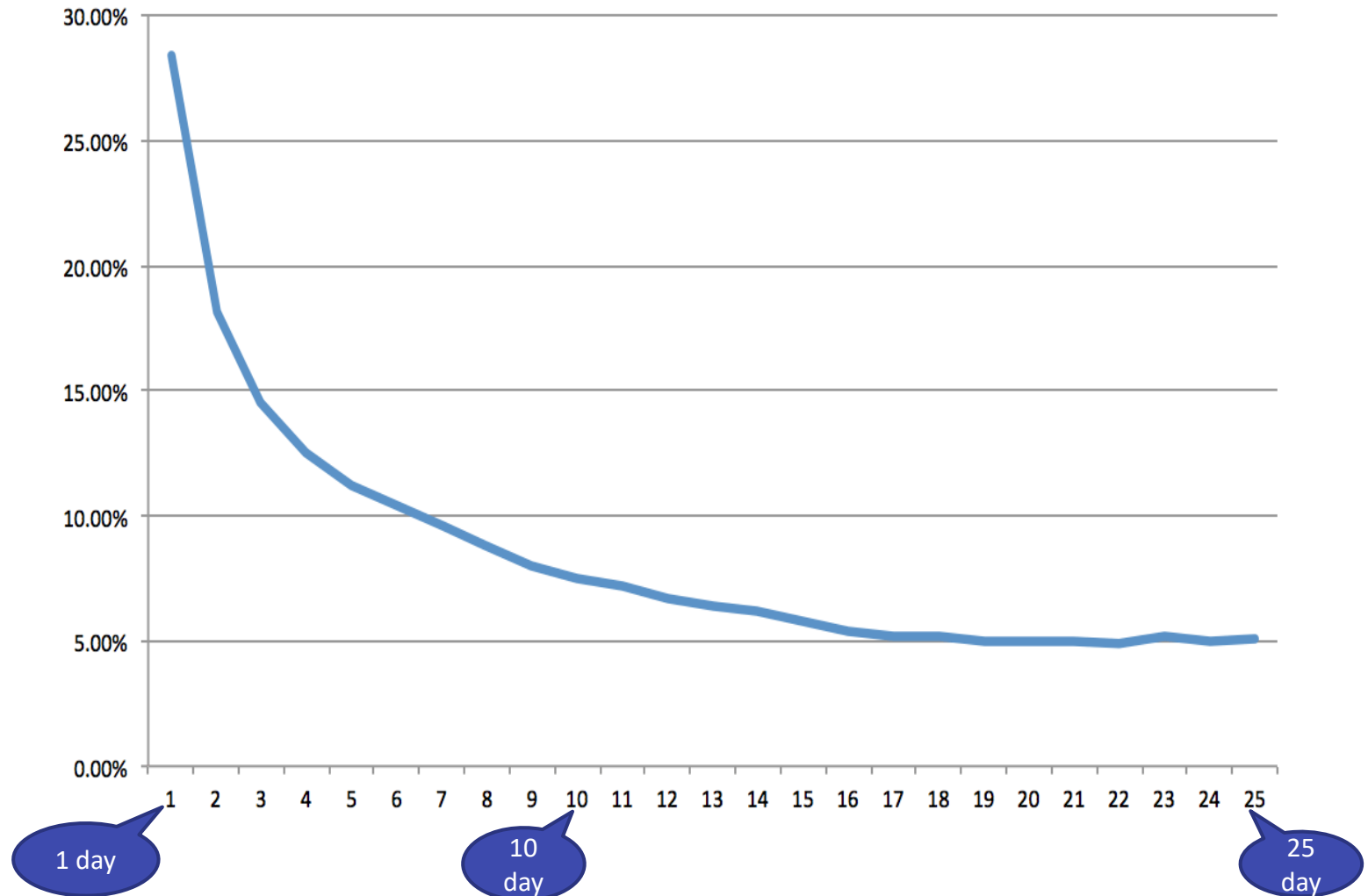
Time frame

a daily, weekly or monthly time frame may be more meaningful

<b>Daily</b>	a social app or game would expect daily usage.
<b>Weekly</b>	Ride sharing app
<b>Quarterly</b>	travel product might expect users to come back once per quarter

Below retention curve shows the percent of users that remain active after a period of time

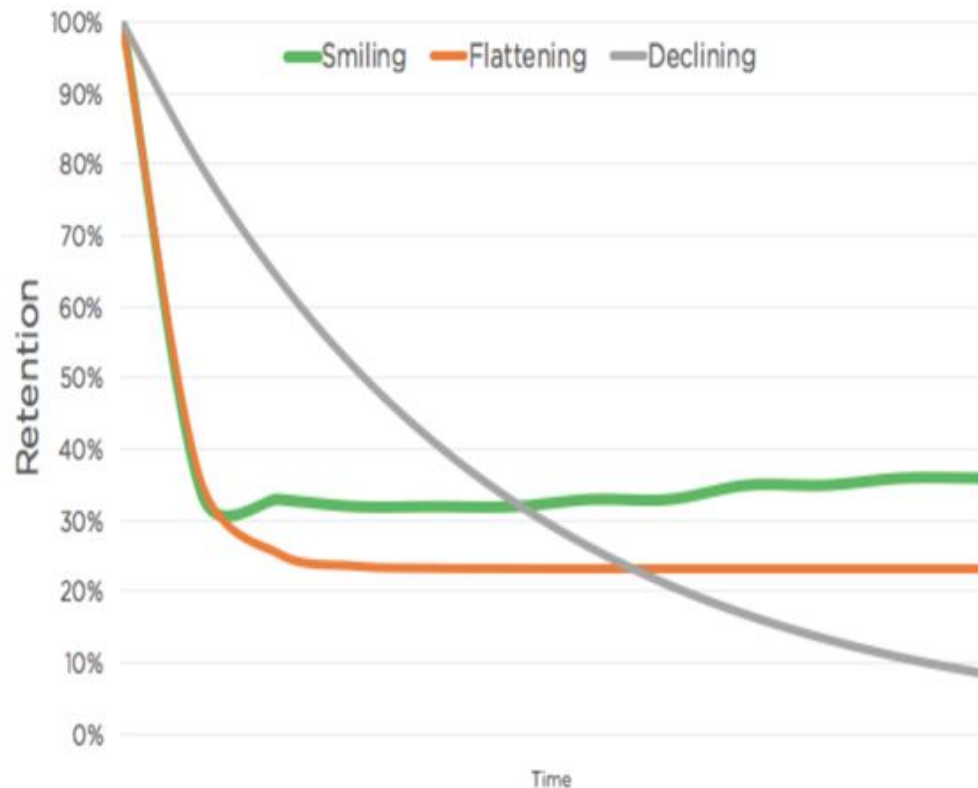
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# Different types of retention curves

- **Smiling curves** when a product is truly exceptional, its retention curve will rise over time
- **Flattening curves** suggests that a percentage of users who sampled the product found value
- **Declining curves** when a product has not achieved product-market fit, the retention curve will continuously decline

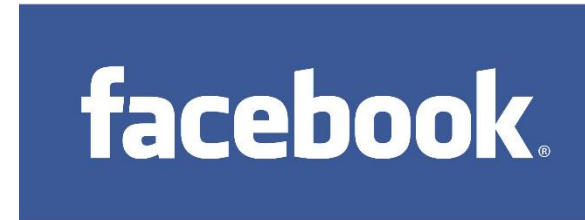


<https://www.sequoiacap.com/article/retention/>

Can you think of some **user cohorts** for below businesses to calculate the retention rate?

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- **How do you define a meaningful retention metric in each business?**
- **What can we learn from these cohorts?**



# How to Get Users and Grow - **Alex Schultz** (Facebook Growth)

min 2:30-6:30

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Growth

alex schultz

[https://www.youtube.com/watch?time\\_continue=3&v=n\\_yHZ\\_vKjno&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=3&v=n_yHZ_vKjno&feature=emb_logo)

# Engagement and power user metrics

User engagement is when your customer is realizing value from your product/service/website/app

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**"Engagement is when your customer is realising value from your SaaS."**

- Lincoln Murphy ([sixteenventures.com](http://sixteenventures.com))

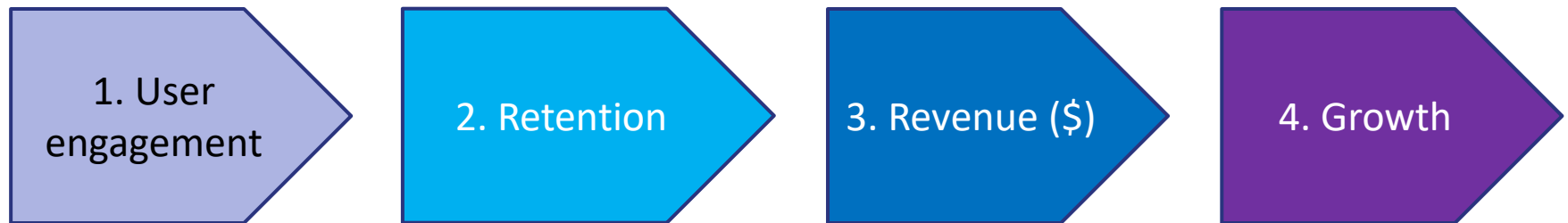


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<https://blog.popcornmetrics.com/5-user-engagement-metrics-for-growth/>

# User engagement deeply impacts growth metric of the business

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1. If users are getting more value from your business, then they are going to stay around for longer.
2. If user stays longer, we can retain them longer leading to
3. more opportunity to generate revenue and increase Customer life-time value, and this
4. All leads to GROWTH

# Power user curve is the best way to understand the most engaged users

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- **Power users** drive some of the most successful companies (power users love the products more than anyone else and are highly engaged)
- Who are power users here?



- What are most meaningful engagement metrics in order to find power users?



**DAU/MAU** can be used to measure engagement metric or **stickiness** for a daily product like Facebook and Pinterest

**DAU:** Daily Active users, **MAU:** Monthly Active users

# Where can be DAU/MAU used or not used?

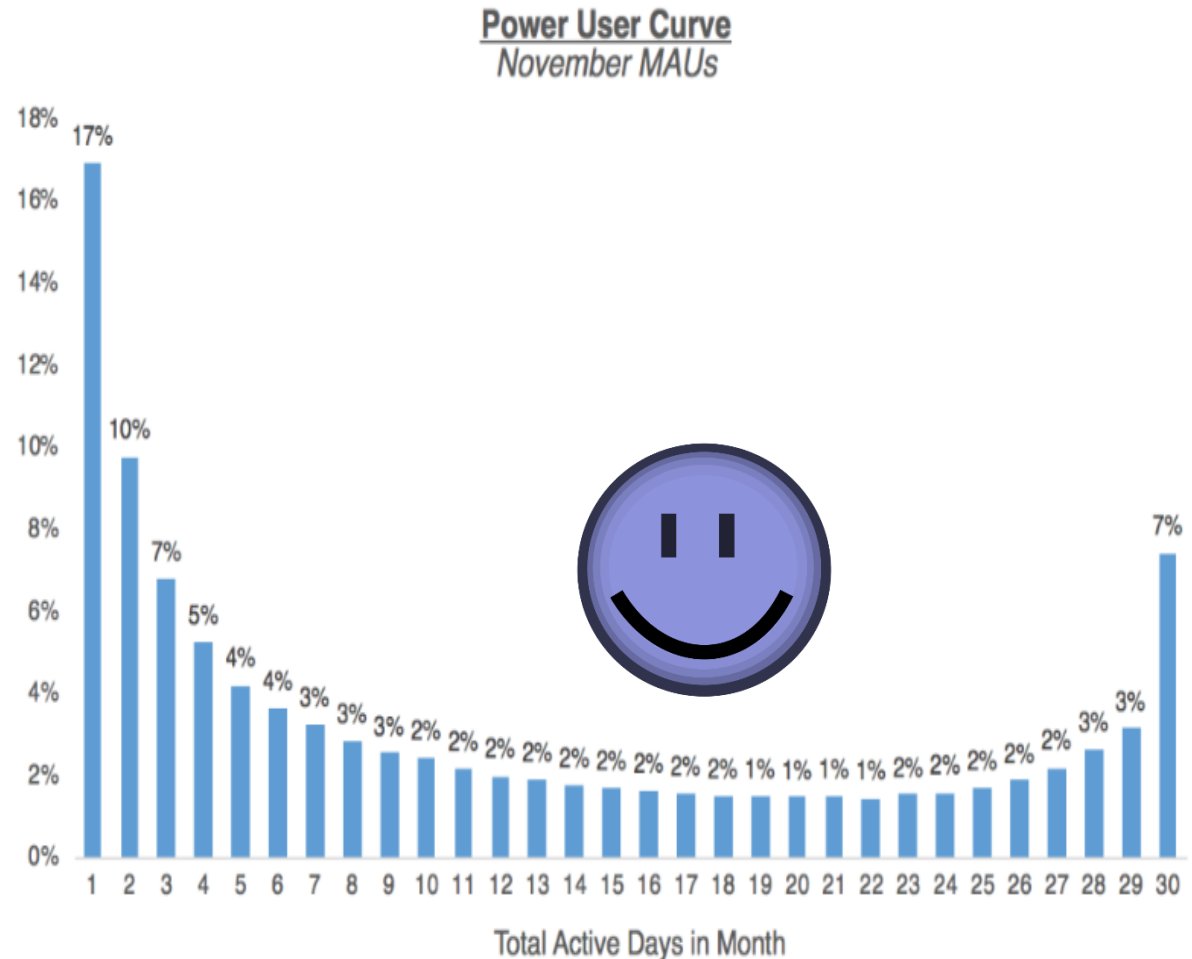
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- **DAU/MAU is more than 60% for Facebook-** 60%+ of its MAUs coming back daily.
  - DAU/MAU is good for **daily used products and apps.**
  - A lot of super important products like Google Analytics, Dropbox, Salesforce, etc. might only be used 1-2x/week at most.
  - For Airbnb, users only travel a few times a year (the average consumer only travels ~2x/year). Yet there are multi billion-dollar companies built in this space.
  - Much of e-commerce have infrequent user behaviors. You buy mattresses, new sunglasses, watches, etc. infrequently.



# What is Power User Curve (also commonly called the activity histogram or the “L30”)?

- **L30 [L28] is coined by the Facebook growth team.**
- L30 is a **histogram** of users' engagement by the total number of days users were active in a month (*from one day in a month all the way to 30 days*)
- Like L30, L7 is used to capture 1-7 days activity of users in a weekly basis.



<https://andrewchen.co/power-user-curve/>

For website and web-apps, typically 60%-80% of new users are lost within the first week of signup

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- Improvements that company makes in week 1 engagement carry through the entire retention curve (**week 1 is very important**)

**Week 1 User Engagement:  
"has one of the biggest  
impacts on your retention  
over time"**

*- Brian Balfour (VP Growth, Hubspot)*



**Popcorn  
Metrics**

<https://blog.popcornmetrics.com/5-user-engagement-metrics-for-growth/>

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# Retention versus frequency for different app categories

1. **Social games** have high frequency but once you burn through the content, you tend to churn [*high DAU/AMU*]

2. **E-commerce/retail** sites have low retention rate as well as low frequency

3. You don't often check **weather app**, maybe only on cloudy days, but you might do it through your entire life

4. **News apps** have both high frequency and high retention



<https://andrewchen.co/dau-mau-is-an-important-metric-but-heres-where-it-fails/>

# The Power user curve (L30) has some advantages over DAU/MAU

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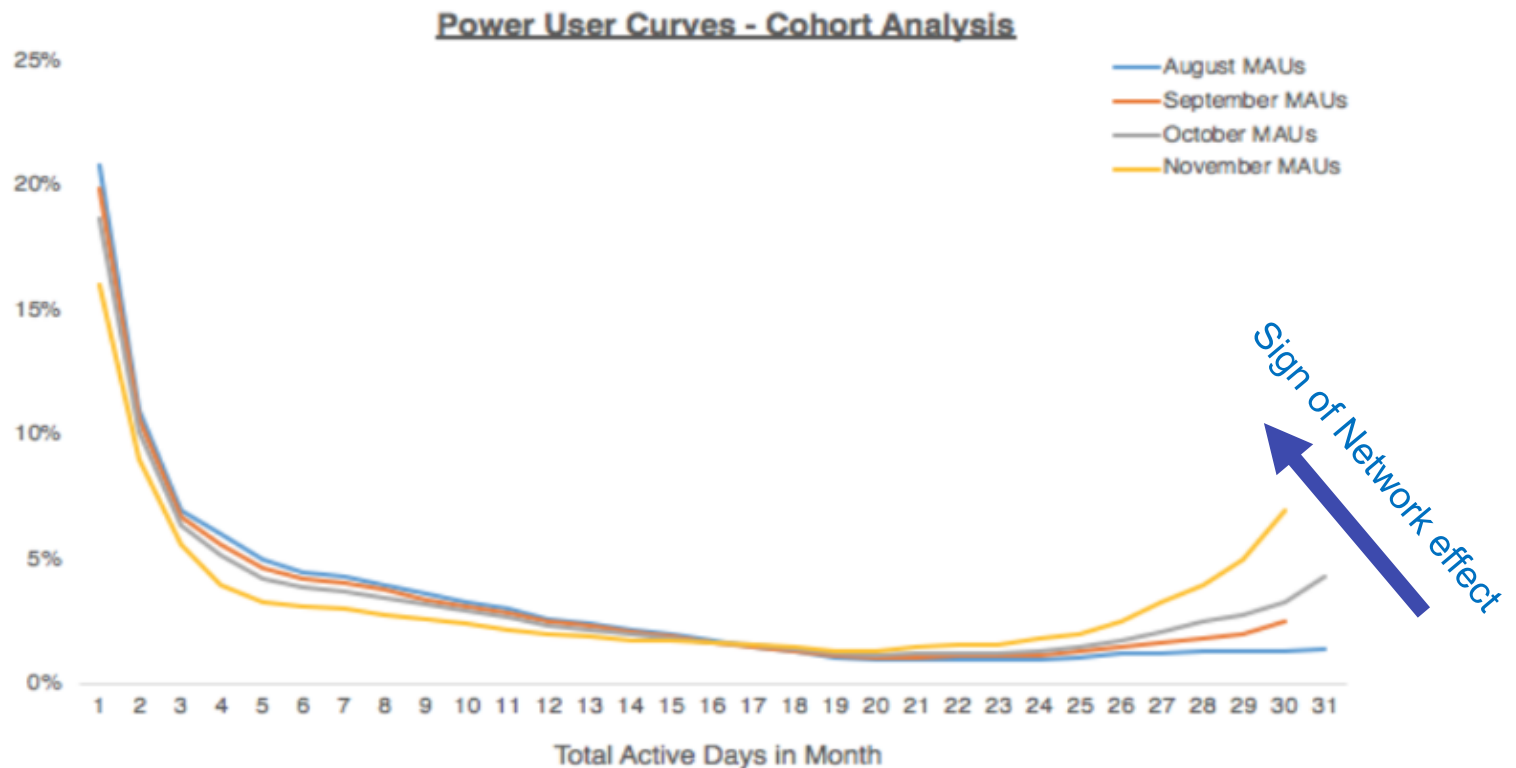
- It shows if you have a hardcore and engaged segments that coming for most days of month
- **DAU/MAU is only a single number**, whereas L30 shows the variability among your users: some are slightly engaged, whereas others are power users.
- When Power User Curves mapped to cohorts, it will let you see if your engagement is getting better over time.
- Like retention curve, **the power user curve will “smile” when things are good**



# When network effect kicks in, the retention rate and engagement will improve for newer cohorts

Plotting the Power User Curve for different WAU\* or MAU cohorts can also be very insightful

\*WAU=weekly Active user



<https://andrewchen.co/power-user-curve/>

**In-class example**

## In-class example (L7)

- We do have a data on 7-day activity (e.g., login) for around 19 customers in a product

User_id	Whether they come to the APP or not (Yes=1, NO=0)						
	day 1	day 2	day 3	day 4	day 5	day 6	day 7
222	0	1	0	0	0	0	0
336	0	0	0	0	0	1	0
743	0	0	0	0	1	0	0
876	0	1	0	0	0	0	0
883	1	1	0	1	0	1	1
1103	0	0	0	1	0	0	1
1443	1	1	1	1	1	1	1
1816	1	1	1	1	1	1	1
1986	1	0	0	0	1	1	1
2230	1	1	1	1	1	1	1
2526	0	0	0	0	1	0	0
2730	0	0	0	1	0	0	1
2821	0	1	0	1	0	0	1
5551	1	0	0	1	0	1	1
5847	1	0	1	0	0	0	0
6298	1	1	1	1	1	1	0
6520	1	0	0	1	1	0	0
6856	0	0	0	1	1	0	1
6972	1	1	1	1	1	1	0

## In-class example (L7), Cont'd

- We should find out how many days in 7 day they are active in the app

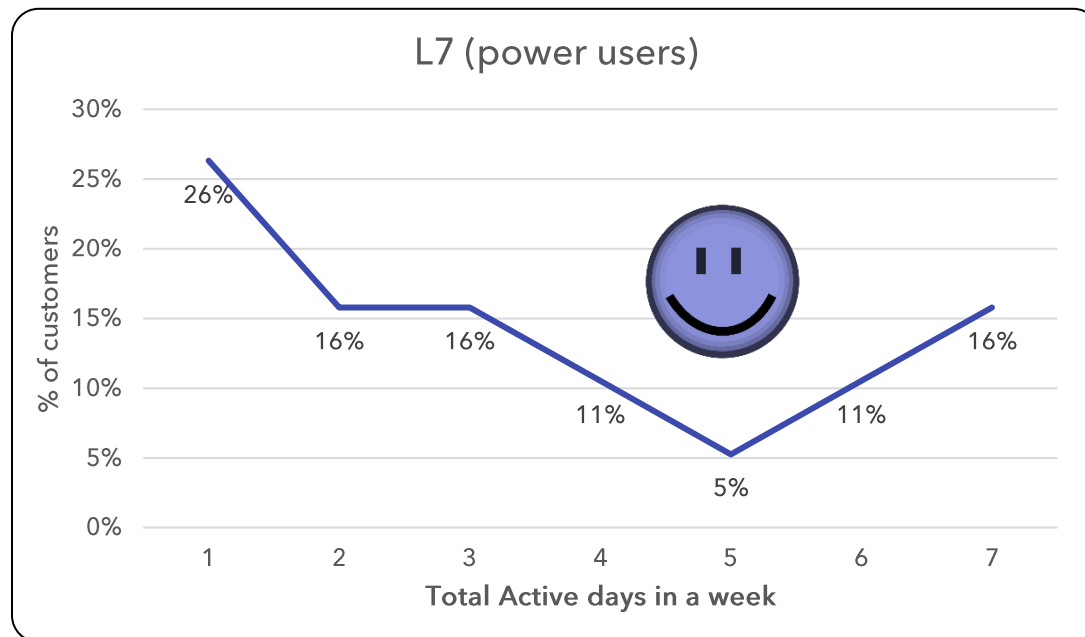
User_id	Whether they come to the APP or not (Yes=1, NO=0)							Sum
	day 1	day 2	day 3	day 4	day 5	day 6	day 7	
222	0	1	0	0	0	0	0	1
336	0	0	0	0	0	1	0	1
743	0	0	0	0	1	0	0	1
876	0	1	0	0	0	0	0	1
883	1	1	0	1	0	1	1	5
1103	0	0	0	1	0	0	1	2
1443	1	1	1	1	1	1	1	7
1816	1	1	1	1	1	1	1	7
1986	1	0	0	0	1	1	1	4
2230	1	1	1	1	1	1	1	7
2526	0	0	0	0	1	0	0	1
2730	0	0	0	1	0	0	1	2
2821	0	1	0	1	0	0	1	3
5551	1	0	0	1	0	1	1	4
5847	1	0	1	0	0	0	0	2
6298	1	1	1	1	1	1	0	6
6520	1	0	0	1	1	0	0	3
6856	0	0	0	1	1	0	1	3
6972	1	1	1	1	1	1	0	6



## In-class example (L7) Cont'd

- What can be learned from L7 graph?

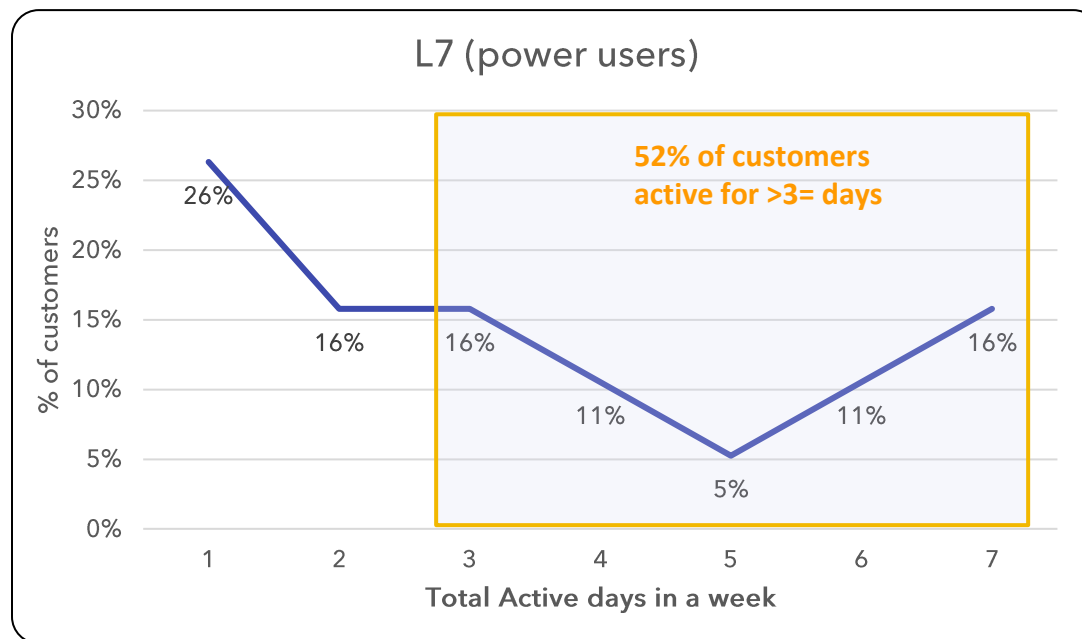
	# of days active						
	1	2	3	4	5	6	7
N customer	5	3	3	2	1	2	3
%	25%	15%	15%	10%	5%	10%	15%



## In-class example (L7) Cont'd

- What can be learned from L7 graph?

	# of days active						
	1	2	3	4	5	6	7
N customer	5	3	3	2	1	2	3
%	25%	15%	15%	10%	5%	10%	15%



## In-class example (L7), Cont'd

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- DAU/WAU is around 50%.
- What can we learn from this?

	day 1	day 2	day 3	day 4	day 5	day 6	day 7
DAU	10	9	6	12	10	9	10
WAU	19	19	19	19	19	19	19
DAU/WAU	<b>53%</b>	<b>47%</b>	<b>32%</b>	<b>63%</b>	<b>53%</b>	<b>47%</b>	<b>53%</b>

## In-class example (L7), Cont'd

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- DAU/WAU is around 50%.
- What can we learn from this?

	day 1	day 2	day 3	day 4	day 5	day 6	day 7
DAU	10	9	6	12	10	9	10
WAU	19	19	19	19	19	19	19
DAU/WAU	53%	47%	32%	63%	53%	47%	53%

**DAU/WAU of 50% means, on average users are active on average for 3 days in a week.**

**Reading/listening assignment**

## Deliverables for next week

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HW3 will be posted in the assignment section of BB, 9/23, 9pm EST **[Due 9/30, 7pm EST]**

# Relevant readings, articles, podcasts and videos

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## 10-min round discussion for next week

- **Reading:** [The Power User Curve: The best way to understand your most engaged users](#)
- **Podcast:** [The Basics of Growth — Engagement and retention](#)
- **Video:** [How to Get Users and Grow - Alex Schultz \(Facebook Growth\)](#)
- **Video:** [You are calculating Retention Wrong: RETENTION RATE FORMULA AND TOP MISTAKES](#)

## Extra interesting and relevant content

- **Reading:** [Retention is king by Andrew Chen](#)
- **Reading:** [Use this spreadsheet for churn, MRR, and cohort analysis, by Andrew Chen](#)
- **Reading:** [Customer Acquisition Vs. Retention Costs – Statistics And Trends](#)
- **Reading:** [4 KPIs You Should Track to Measure Ecommerce Retention](#)
- **Reading:** [User Engagement: 5 Awesome Metrics for Growth](#)

# Questions

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