THE DIFFERENCE OF SOCIAL ACTIONS FOR USERS:

RETENTION AND ENGAGEMENT

by

Apaven Stepanyan

Presented to the

Department of English and Communications

in Partial Fulfillment of the

Requirements for the Degree of Bachelor of Arts

American University of Armenia

Yerevan, Armenia

May 5, 2017

Introduction

Although social media has only existed for a short period of time, it has already become a huge part of everyday life. Nowadays most of the people on the planet are depending on social media. Only one social media platform Facebook has 1.7 billion MAU (monthly active users), and this number is growing each day. So we can say that approximately one-fifth of the world population is using Facebook (this is only Facebook, not including Messenger and other apps that Facebook owns). And according to predictions by the year 2020 five billion people will have smartphones, which will definitely lead to the growth of social media platforms in general.

Through the development of social media environment people (users) started to adapt to specific platforms with their specific requirements and measures of success. In most of the cases, the measurement of success is presented through likes, comments, shares, and followers. As many likes, comments, shares, and followers users have, it more likely for them to be more successful on the particular platform and sometimes even outside of it.

According to Facebook new users consider having activated profile/ self-growing profile only when they could already follow seven other users. Activated profile/self-growing profile is the type of profile, which already integrated in the community and does not have to be taught how and what to do in it. It also characterized as a profile, which already have enough content in his feed to start consuming and eventually start producing similar content. Facebook came up with this number after collecting an enormous amount of data and

analyzing it very intensively. This means that as soon as regular users have at least seven followings they could grow in the community faster and be self-growing profiles.

This number may differ from each other depending on the particular platform, and its unique characteristics. It is because Facebook itself is a very unique platform, which differs from others. So in the social media environment, this number is conventionally set at 10. So the amount of followings that new user should have to be a self-growing profile is found to be 10. It is not 5 because of the simple reason Facebook is the top app and if Facebook could not reach to 5, no other app could reach to that number.

This is a fascinating number, but it does not show the impact of each following for the user. In other words, someone could have only one following but be a full member of the particular app community. In this case, the number of likes, comments and share the user gets is critical and even crucial.

In this research, I am going to study not the number of followings for the activation of the profile but the amount of likes, comment and even photo uploads and followers. And I will also look and the difference between getting likes and comments, uploads and followers. I will look at those differences regarding which of them are more likely to activate profiles sooner and cause higher retention. Retention is measured by percentage, which shows how many percent of users came back to the app after first time opening it. So if user has higher retention rate that means the used feature by that user was effective. So I will compare the retentions of likes and comments, uploads and followers.

Literature Review

Since the Internet nowadays is a big part of our everyday life, our goals and objectives started to differ in social media. Nowadays we become in some sense addicted to "likes," "comments," "shares" and our initial goal is to have as many followers as we can. This phenomenon opens new areas of study for better understanding human psychology and behavior in social life.

John R. Suler considered as one of the founders of cyberpsychology. In his published articles and books and talks about how to manage identity online. He discusses the difference between communication by text and photographs, misunderstandings in online relationships, and most importantly addiction, in virtual reality. In this "The Online Disinhibition Effects" article he claims that consciously or unconsciously people feel that their "creations" (profiles) exist in different space and they have different demands and responsibilities in the online world as well. So here "likes," "comments" and "shares" are needed for those creations to "survive."

We can see how much effect "likes" and "comments" have in social media by looking at the fake accounts. Many websites and social media representatives started to use algorithms to detect and deactivate fake accounts. During the deactivation process the algorithm also removes fake likes and comments of that accounts. In Cambridge University professors Wendy Moe and David Schweidel did research and found out that after Google and Facebook began to use these algorithms, several fan pages lost a significant amount of likes and publicity. For example, Lady Gaga lost more than 66000 Facebook fans,

games like Texas HoldEm Poker lost 200000 likes within few days. Even pages, which are not meant to be actively engaging ones during this process, in general, lost 1-2% of their followers.

There are two types of opinion: collective and combined. The combined opinion reflects the unbiased opinion of the individual while collective opinion reflects the consensus reached by the group. When we consider opinion dynamics, we are referring to how our personal opinions interact with each other in social media and become collective opinion. So in social media, the collective opinions first are formed by some likes and positive comments.

Many users "block" their identity in social media environments. This can include in it rewriting/hiding information such as name, age, gender, profession, location, and also information that portrays users in particular ways. For example, Kaplan and Haenlein explain that the presentation of a user's identity can often happen through the conscious or unconscious 'self-disclosure' of personal information such as thoughts, feelings, likes, and dislikes. They were also many cases where users become more socially active after gaining few constant like and comments; in other words they gain reputation.

Reputation in social media might be very tricky because it can have the same meaning on different social media platforms. The main reason for this is that reputation is a matter of trust; however social media and information technologies are not developed enough to measure this trust. Plus in social media reputation also refers to content, it doesn't necessarily refer to a person. So here particular media outlet uses its tools to evaluate trust. For example the reputation in YouTube is measured by view counts and likes and ratings. On Facebook, this will be likes and comments the page received and the number of friends. In

Twitter, Instagram, PicsArt and in other social media platforms the situation is the same. But the question here is that can the number of followers or friends indicate the popularity of the page or person? It does not show how many followers read all the posts from that page. Because people can like/follow as many pages they want and if there is not a huge and significant reason they usually never go back and unfollow or unfriend someone.

Facebook says that the like button is the small version of share button; it is the quickest way to react to something. Many people do not "appreciate" likes, they think about it as a lazy option. In some case, they are right because comments and shares are hard to do regarding user perspective. Research done by Marketo and Brian Carters shows that people are doing eight times more likes than comments and shares. Interestingly enough the commenting and sharing have the same number 10%, the other 80% only likes. So it's pretty obvious that likes are easier to get and more quick to do. The question here is that this researcher did not count the distinct/ unique numbers of users. In other words, there might be cases where a user did like and comment or even submitted likes, comments and shares together. So in this situation, the percentage might change a little bit.

Another study done by Pew Research Center shows that in America 44% out of thousands of people who did the survey like content posted by some of their friends. Out of them, 29% did it few times per day. So here likes are the primary source of the users to get shown for the other users. So through getting likes users can get more comments and shares.
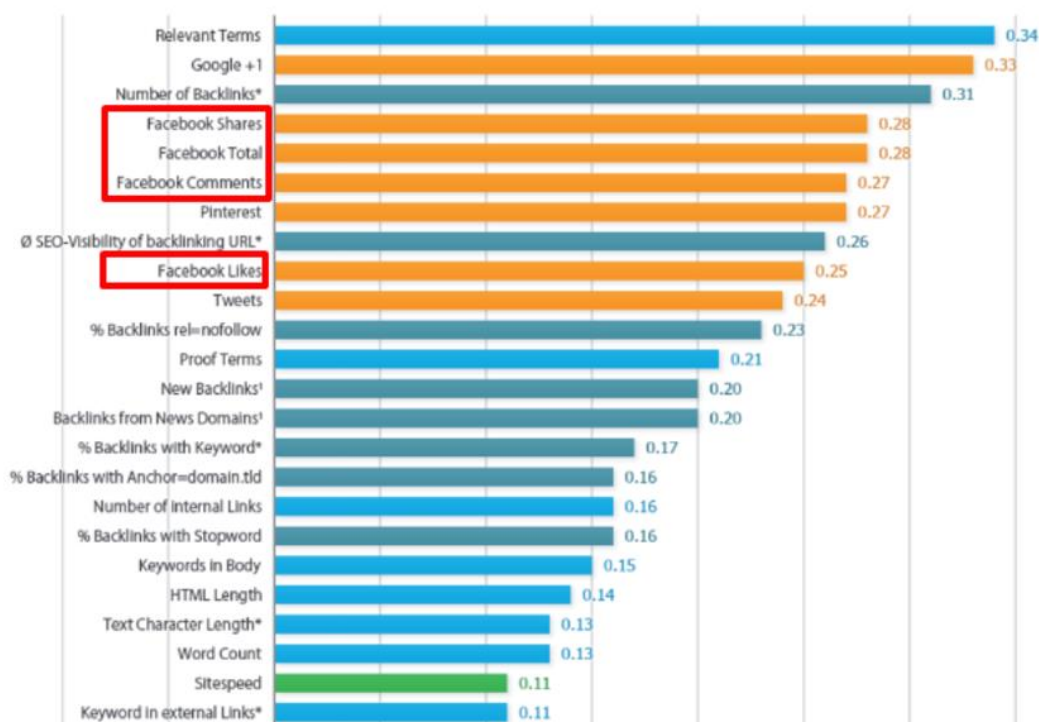
So this is one of the icons that confuse us with its meaning: "like." People tap on the like button when they like something. And even at the beginning of the

Facebook, this icon intended to be called "Awesome," but for some reasons, the name was changed. One of the reasons might be that statistically, it is different to determine what is awesome and use collected data to distinguish the awesomeness of something.

Steve Rayson, Director of BuzzSumo, which is a search tool, which mainly helps marketers and journalists to find interesting and meaningful content and understand its influence, did an interesting research. Using data from Searchmetrics (a data collecting and selling platform) he made a report, which showed the rankings of the factors that distinguish well-placed sites from those with lower positions in the Google search results.

The report showed that on average, quality content ranks better, which is "identifiable by properties such as a higher word-count and semantically comprehensive wording."

See the actual results below:

Factor	Value
Relevant Terms	0.34
Google +1	0.33
Number of Backlinks*	0.31
Facebook Shares	0.28
Facebook Total	0.28
Facebook Comments	0.27
Pinterest	0.27
Ø SEO-Visibility of backlinking URL*	0.26
Facebook Likes	0.25
Tweets	0.24
% Backlinks rel=nofollow	0.23
Proof Terms	0.21
New Backlinks¹	0.20
Backlinks from News Domains¹	0.20
% Backlinks with Keyword*	0.17
% Backlinks with Anchor=domain.tld	0.16
Number of Internal Links	0.16
% Backlinks with Stopword	0.16
Keywords in Body	0.15
HTML Length	0.14
Text Character Length*	0.13
Word Count	0.13
Sitespeed	0.11
Keyword in external Links*	0.11

The highlighted ones are the Facebook related rankings. From here we can see that Facebook shares have a little bit more association than comments and likes of Google rankings. But we also can see that the associations of all Facebook interactions such as shares, likes, and comments, are the same as Facebook shares. This is not something, which shows that Facebook activity causes higher Google rankings. However, it illustrates that Facebook interactions have the similar correlation as Facebook shares.

Gary Vaynerchuk in his *Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy Social World* book talks about Facebook likes, comments and shares in a very interesting way: "Likes, comments, shares are clicks—not purchases. You could put out a piece of content with a hyperlink to your product page that garners $2 million in sales in thirty minutes. Facebook would take note of the heightened interest, and the algorithm would push you to the forefront of your current fans' News Feeds. But link clicks do not create stories, so if no one shares that piece of content or even likes or comments on it, the content will reach your current community, but Facebook will not deem it interesting enough to show it to a wide number of people outside that." So here we can see that to have real success in social media, in this case on Facebook, users should create stories which will be first liked, commented on and finally shared in outside community from your feed, to the feeds of another person who will be interested in that particular story.

Overall, all these researchers show the correlation between tapping on buttons like *follow, like, share and comment* to the actual people/users who do that. However, it also informative to see the actual profit that particular

companies, social media outlets get from each button mentioned above. It is also fascinating to see the differences such as: which one is more influential for users, which of them will keep the user in a community and which of them users need the most. And overall what keeps the retention of the social media environment higher: is that likes, comments or shares, or do they give the same result? To evaluate each button's real role in the particular social media environment, those questions will be very helpful.

Research Questions

In this research, there are primary and secondary research questions. The primary research question is "Which action is more engaging and important for users in a social media environment, likes or comments?" Here we can see what is more popular and important for users to get when they use a particular social media platform. And the secondary research question is "Which action is more engaging and important for users in the social media environment, the number of followers they get or the number of photo uploads?" And from here we can see the difference of engagement between getting a follower and uploading the photo.

Methodology

        To answer both research questions, I did a content analysis. I analyzed PicsArt social media application. It has more than 400 million downloads and more than 92 million monthly active users. As it has its community and is a photo-editing app, it's very similar to the major social platforms like Facebook, Instagram, etc. So here the concept of likes, comments, photo uploads, and followers are the same.

        The actual data was collected using analytical programs SQL and Scala. Those programs collected data from August 1 to 10 of 2016 (for ten days). However, as data from one month might not be the same as in other months, those programs also collected data from September 01 to 10 of 2016 and also from October 01 to 10 of 2016. I chose those particular months because in August there is more engagement in social media in general, September is considered as a passive month, meaning there is not high engagement in social media and finally October is a normal, consistent month. Through analyzing data, I highlighted the difference from month to month. But in general, the results were approximately the same. During this process, the data from the same user was not included in other months' data. So in the end, we had data only from unique/distinct users.

        The collected data was separated into several categories. For the primary research question there are these separations of data:

- 1-3 Likes for August (Likes_Received >= 1 and <= 3)

- 4+ Likes for August (Likes_Received >3)

- 1-3 Comments for August (Comments_Received >= 1 and <= 3)

- 4+ Comments for August (Comments_Received >3)

- 1-3 Likes for September (Likes_Received >= 1 and <= 3)

- 4+ Likes for September (Likes_Received >3)

- 1-3 Comments September (Comments_Received >= 1 and <= 3)

- 4+ Comments for September (Comments_Received >3)

- 1-3 Likes for October (Likes_Received >= 1 and <= 3)

- 4+ Likes for October (Likes_Received >3)

- 1-3 Comments for October (Comments_Received >= 1 and <= 3)

- 4+ Comments for (October Comments_Received >3)

For the secondary research question there are these separations of data:

- 1-3 Followers for August (Follower>= 1 and <= 3)

- 4+ Followers for August (Follower >3)

- 1-3 Uploads for August (Uploads>= 1 and <= 3)

- 4+ Uploads for August (Uploads >3)

- 1-3 Followers for September (Follower>= 1 and <= 3)

- 4+ Followers for September (Follower >3)

- 1-3 Uploads for September (Uploads>= 1 and <= 3)

- 4+ Uploads for September (Uploads >3)

- 1-3 Followers for October (Follower>= 1 and <= 3)

- 4+ Followers for (October Follower >3)

- 1-3 Uploads for October (Uploads>= 1 and <= 3)

- 4+ Followers for October (Uploads >3)

In both cases number 3 was chosen as possible maximum number of likes and

comments that users could receive from only one user. So in the case of 4+ likes

or comments there is only a tiny chance that all of them received from one person (as we are looking only to new users, who are not famous yet). The same number was set for photo uploads and followers to make the numbers the same. This will help to compare them more efficiently.

During each day a number of users whose data was collected was also depended on the existence of users with specific criteria (for example August 11, Follower$>= 1$ and $<= 3 = 850$ users). So this number also differs day to day. However, we set in a way that each day was collect data no more than from 1500 users and no less than 400 users. In average, this number was between 800-900 users per day. And all these users were unique and distinct users, so the programs never used data from the same user in the different category.

The most important thing, the results, to answer to the research questions were answered by measuring the retention rates of the users for that day from the first day and up to the 10th day. So we have been able to see the percentage of users who came back to the app after coming the first time and getting one of the actions below:

- Likes, from one and up to three ($>= 1$ and $<= 3$)

- Comments from one and up to three ($>= 1$ and $<= 3$)

- Likes, more than three (>3)

- Comments, more than three (>3)

- Photo Uploads, from one and up to three ($>= 1$ and $<= 3$)

- Follows, from one and up to three ($>= 1$ and $<= 3$)

- Photo Uploads, more than three (>3)

- Follows, more than three (>3)

Looking at the percentages of the 10th day, we saw the difference between users' retention rates. Higher numbers meant that more users came back to the app during the ten-day period. So for example if out of 10 users who got a single like, only three users came back and from 10 users who got a single comment and six users came back , we can say that users who got a single comment are twice likely to come back than the users who got a single like. This, of course, was a simple example, and in real case scenario the numbers were much higher, and even few exceptions could not make a significant difference between the final numbers.

My initial hypothesis was that comments would have higher retention than likes and uploads would have higher retention than followers. For likes and comments I also thought that retention for comments would be higher for both cases, 1-3 comments would be higher than 1-3 likes and 4+ comments would be higher than 4+ likes. I came to this hypothesis taking into consideration the difficulty of the both features. Getting likes is easier, users can just tap on the like button and that's it. But comments are harder to do, so the user gets more appreciation when someone spends time and writes a comment rather than just putting likes; thus, retention from comments would be higher than from likes. In case of followers I though that uploading is the action which triggers following, and the user who uploads more photos, will get more followers. Furthermore, the user who uploads something in the community would like to know the "fate" of it, so the retention would be higher from uploads than from followers in both cases: 1-3 uploads would have higher retention than 1-3 followers, and 4+ uploads would have more retention than 4+ followers.

Analysis

Before getting deeper to the analysis of each section, we should first see what the average numbers and retention rates are in the industry and to quickly see the difference between those and to have a baseline in general. In this research, we concentrate on the industry standard days for counting retention. Those are Day 1 retention, Day 7 retention and Day 10 retention. For the Day 1 retention there is not a standard number, but specialists in this field can say that if the Day 1 retention is less than 50% than the app/feature is not considered to be successful. In general, retention is also connected to the type of applications and location of the users so that this number can vary in some cases. Day 7 and Day 10 retentions are very similar to each other; some agencies prefer to look at the Day 10 retention, but in the social media industry, most experts consider Day 7 most reliable. If Day 7 retention is less than 30% then the app/feature is not considered successful.

Figure 1: *1-3 Likes Retention vs 4+ Likes Retention*
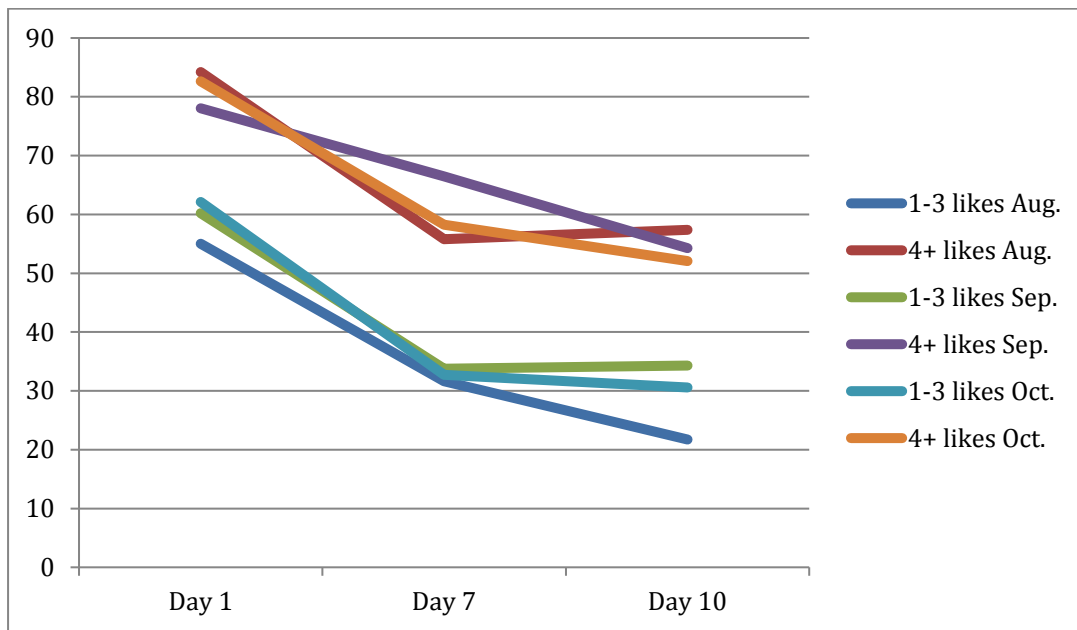
1-3 Likes

As we can see from the Figure 1 above data for the 1-3 Likes for the August shows these results of retention for first day users: Day 1 – 62.12 %, Day 7 – 32.73% and Day10 – 30.56%. And the average retention result for ten days is approximately 20-25 %. The retention results for September of the first day users are 60.21% for Day 1, 33.77 % for Day 7 and 34.39 for Day 10. For the average ten days of 1-3 Likes, the retention rate is approximately 30-35%. Looking at the numbers of October first day users we can see following results: 62.12% retention of Day1, 32.73% retention for the Day 7 and 30.58% for the Day 10. And the average retention rate for ten days is approximately 33-37%.

Also, we see here that the average 10-day retention for all three months is 25-33%. This means that out of total users who got likes between 1, 2 and 3, 25-33% of them will return to the app after ten days. We see here that Day 1 retention for August, September and October is 62.12%, 60.21% and 62.12 % and for Day 7 it becomes 32.73%, 34.39% and 32.73%. This means that the

feature itself, getting likes, even three likes, was not a valuable feature for retention, because approximately 38% did not come back at Day 1. We can see here also that almost half of the users who were retained at Day 1 did not come back on Day 7.
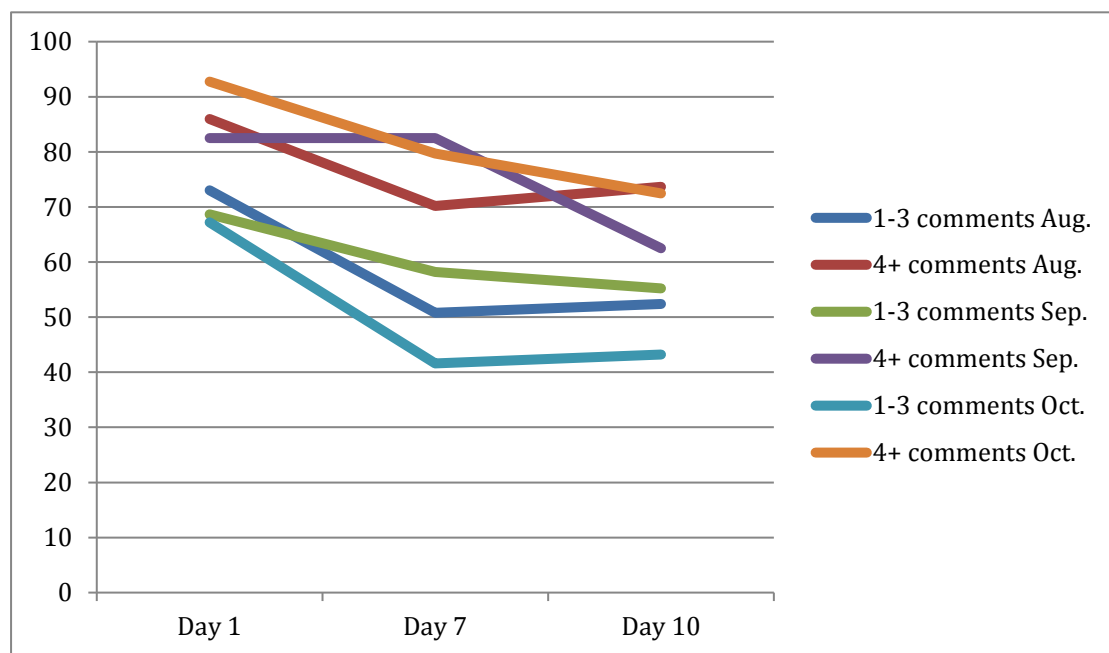
4+ Likes

4+ Likes for the August shows these results of retention for first day users: Day 1 – 84.21 %, Day 7 – 60% and Day10 – 57.37%. And the average retention result for ten days is approximately 55-60 %. The retention results for September of the first day users are 78.05% for Day 1, 66.46 % for Day 7 and 54.27 for Day 10. For the average ten days of 4+ Likes, the retention rate is approximately 55-60 %. Looking at the numbers of October first day users we can see following results: 82.64% retention of Day1, 58.26% retention for the Day 7 and 52.07% for the Day 10. And the average retention rate for ten days is approximately 55-60 %. We see here that the average ten-day retention for all three months is 55-60 %, which is almost twice as big as the average retention rate of 1-3 Likes.

To compare with the Day 1 retention rates for August, September and October we can see that getting more than three likes is much more influential for users. For the 1, 2 and 3 likes almost 38% did not retain for Day 1, whereas for more than three likes this number is approximately 16%. The difference is more than two times. Looking at the numbers of the Day 7 retention we see for August the number is 60% for September 66.46% and for October 58.26%. So approximately 40% did not come back to the app for the Day 7, whereas for likes 1, 2 and 3 this number is near 70%. The difference is too big for both cases. We

can also say that the effectiveness of certain features also depends on how many times that particular feature was used. And finally, here we can bring the argument that if the user gets approximately two times more likes, it's very likely that the retention of that user would be twice as high.

Figure 2: 1-3 Comments Retention vs 4+ Comments Retention

1-3 Comments

      1-3 Comments for the August shows these results of retention for first day users: Day 1 – 73.02 %, Day 7 – 50.79% and Day10 – 52.36%. And the average retention results for 10 days are approximately 45-50 %. The retention results for September of the first day users are 68.66% for Day 1, 58.21 % for Day 7 and 55.22 for Day 10. For the average 10 days of 1-3 Comments the retention rate is approximately 45-50 %. Looking at the numbers of October first

day users we can see following results: 67.2% retention of Day1, 41.6% retention for the Day 7 and 43.2% for the Day 10. And the average retention rate for 10 days is approximately 40-55 %.

Looking at the Day 1 data from August, September and October we can see that the numbers are 73,02%, 68.66% and 67.2%. This means that approximately 30% of users did not come back to the app on Day 1. If we look at the numbers of Day 7, we see that almost 20% of users did not retain from the Day 1 for all three months. Also if we just look at the Day 7 retention (50.79%, 58.21% and 41.6%), we see that almost half of the users did not come back at the day 7. This number is higher than the 4+ Likes for Day 7, which was 40%. We also see here that the average 10-day retention for all three months is 45-50 %. This number is high compared to the 1-3 Likes but as we can see it could not reach to the number of 4+ Likes. From here we can say that getting more than 3 likes affects users more than receiving comments between 1 and 3.

4+ Comments

4+ Comments for the August shows these results for retention of first day users: Day 1 – 85.96 %, Day 7 – 70.18% and Day10 – 73.68%. And the average retention result for ten days is approximately 70-80 %. The retention results for September of the first day users are 82.50% for Day 1, 82.50% for Day 7 and 62.50 for Day 10. For the average ten days of 4+ Comments, the retention rate is approximately 70-80 %. Looking at the numbers of October first day users we can see following results: 92.75% retention of Day1, 79.91% retention for the Day 7 and 72.46% for the Day 10. And the average retention rate for ten days is

approximately 70-80 %. We see here that the average 10-day retention for all three months is straight between 70-80%.

Looking at the Day 1 data from August, September and October we can see that the numbers are 85.96%, 82.50% and 92.75%. This means that approximately 15% of users did not come back to app on Day 1. This is a very impressive number because 85.96% retention for Day 1 is higher than the industry's standard expected number. If we look at the numbers of Day 7 we see that almost 12% of users did not retain from the Day 1 for all three months. Also if just look at the Day 7 retention (70.18%, 82.50% and 79.91%), we see that almost 20% of the users did not come back at the day 7. This number is twice higher than the 4+ Likes for Day 7, which was 40%. And also this number is 30% better than the numbers of comments 1, 2 and 3, which was 50%. This shows how much important comments are for users. The retention is almost two times higher than the retention for comments 1, 2 and 3. The difference between 4+ Likes and 4+ Comments is also significant. So this means that receiving 4+ Comments is the best incentive for users to come back to the app more often.

Figure 3: 1-3 Followers Retention vs 4+ Followers Retention
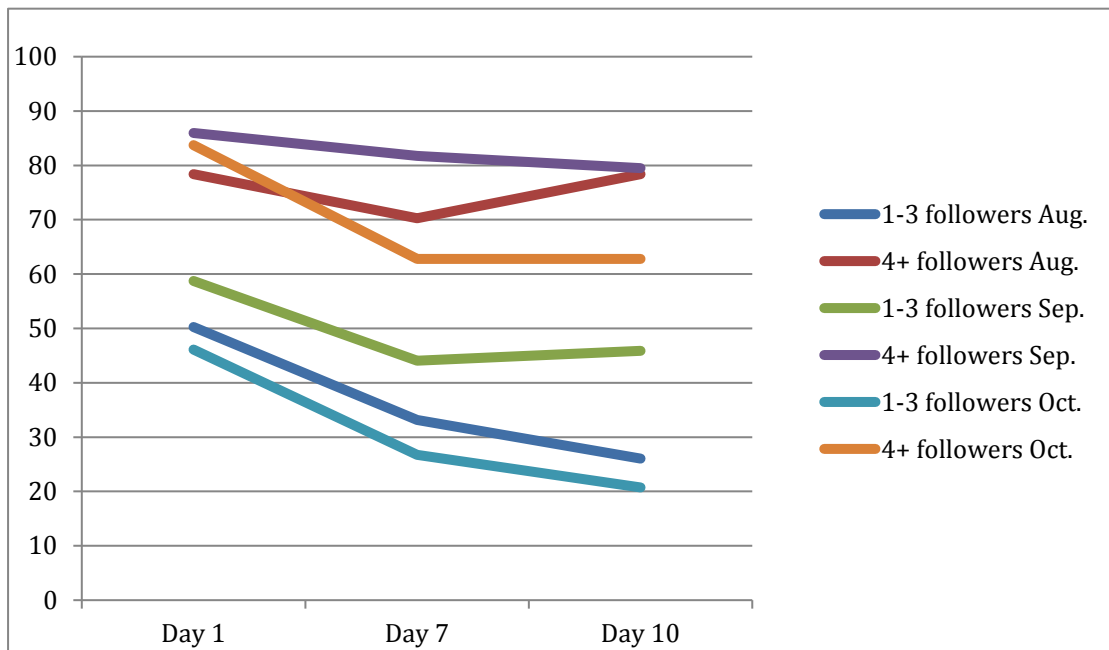
1-3 Followers

     1-3 Followers for the August shows these results of retention of first day users: Day 1 – 50.26 %, Day 7 – 33.16% and Day10 – 26.05%. And the average retention result for ten days is approximately 17-27 %. The retention results for September of the first day users are 58.73% for Day 1, 44.06 % for Day 7 and 45.9 for Day 10. For the average ten days of 1-3 Followers, the retention rate is approximately 40-50%. Looking at the numbers of October first day users we can see following results: 46.11% retention of Day1, 26.72% retention for the Day 7 and 20.74% for the Day 10. And the average retention rate for ten days is approximately 10-30%. We see here that the average 10-day retention for all three months is 25-33%. This means that out of total users who got between 1 and three followings 25-33% of them will return to the app after ten days. Looking at the Day 1 data from August, September and October we can see that

the numbers are 50.26%, 58.72% and 46.11%. This means that approximately 50% of users did not come back to the app on Day 1.

We see from the Figure 3 that half of the users do not care when they receive 1, 2 and 3 followers. If we look at the numbers of Day 7, we see that almost 18% of users did not retain from the Day 1 for all three months. Also if just look at the Day 7 retention (33.16%, 44.06% and 26.72%), we see that almost 70% of the users did not come back at the day 7. This number is very high, and this might mean that for PicsArt it is not very relevant whether users have 1, 2, or 3 followers. We also see that September has a higher retention rate than August and October. This might be connected with seasonality. One of the reasons why September has higher retention might be that there is "back to the society" factor, meaning schools and worked are getting started which increases engagement in social life as well. Surprisingly, this same retention rate we can see for 1, 2 and 3 Likes.

4+ Followers

4+ Followers for the August shows these results of retention of first day users: Day 1 – 78.38 %, Day 7 – 70.27% and Day10 – 78.38 %. And the average retention result for ten days is approximately 70-80 %. The retention results for September of the first day users are 85.96 % for Day 1, 81.74 % for Day 7 and 79.49 for Day 10. For the average ten days of 4+ Followers, the retention rate is approximately 75-85%. Looking at the numbers of October first day users we can see the following results: 83.72% retention of Day1, 62.79% retention for the Day 7 and 62.79% for the Day 10. And the average retention rate for ten days is

approximately 70-80%. Looking at the Day 1 data from August, September and October we can see that the numbers are 78.38 %, 81.74 % and 83.72%. This means that approximately 20% of users did not come back to the app on Day 1.

Having 20% retention is a surprising number as it is very close to the number of comments more than 3, which is 15%. After comments more than 3, this is the best feature, which brings more retention to the app. If we look at the numbers of Day 7, we see that almost 10% of users did not retain from the Day 1 for all three months. This number is also very low compared with the industry's standard numbers, which illustrates that users appreciate having many followers. Also if we just look at the Day 7 retention (70,27%, 81.74% and 62.79%), we see that these numbers are not that different from the numbers for Day 1. So whether one gets 1,2 or 3 followers does not matter that much for users. However, we see that these numbers prove that getting more than three followers is a very powerful thing, which brings many users back to the app. So users feel appreciated if the numbers of followers are more than 3. We also see here that the average 10-day retention for all three months is 72-82%. This means that out of total users who got between 1 and 3 followings 72-82% of them will return to the app after ten days. This was the highest rate that we have 72-82%. This is even slightly higher than comments more than 3.

Figure 4: 1-3 Uploads Retention vs 4+ Uploads Retention
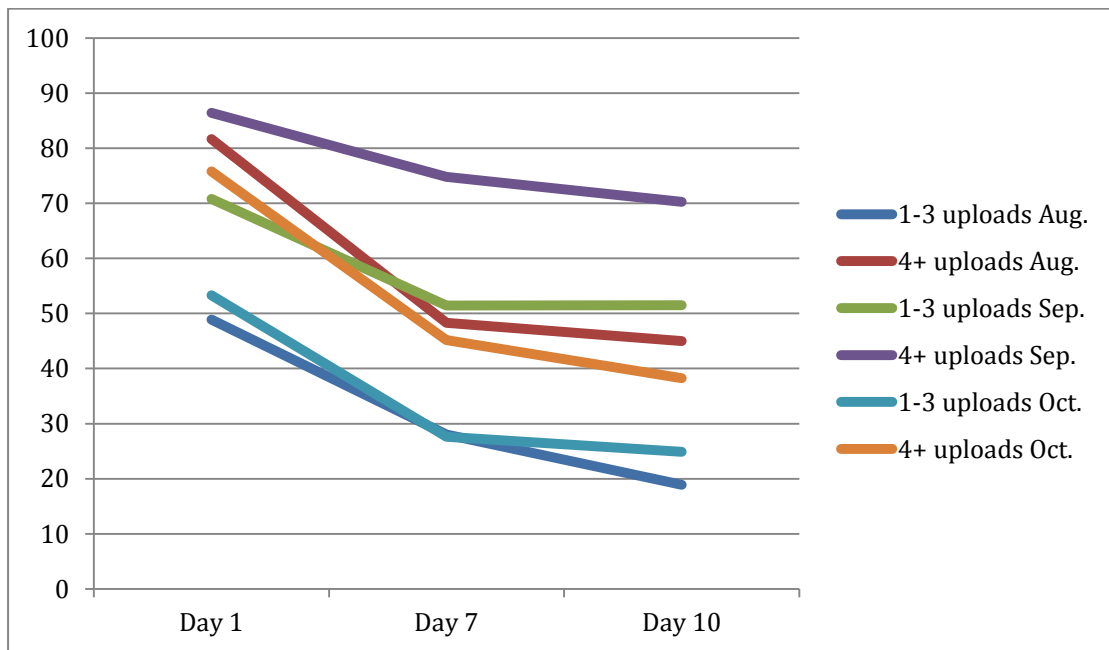
1-3 Uploads

      1-3 Uploads for the August shows these results of retention of first day users: Day 1 – 48.9 %, Day 7 – 28.01% and Day10 – 18.89%. And the average retention result for ten days is approximately 12-22 %. The retention results for September of the first day users are 70.78% for Day 1, 51.48 % for Day 7 and 51.52% for Day 10. For the average ten days of 1-3 Uploads, the retention rate is approximately 45-55%. Looking at the numbers of October first day users we can see following results: 53.3% retention of Day1, 27.6% retention for the Day 7 and 24.9% for the Day 10. And the average retention rate for ten days is approximately 17-27%. Looking at the Day 1 data from August, September and October we can see that the numbers are 48.9%, 70.78% and 53.3%. In this case,

it will be unusual to compare those three numbers because we have a big spike in September for photo uploads. This happened due to the huge release in September on PicsArt. This was also known in the industry as an "Awesome launch", where users had an opportunity to engage more with the app and upload photos and stickers from various places of the app.

However, we also see that August and October have approximately the same numbers. Most probably some new feature released might cause this spike on September or it might be the cause of seasonality. If we do not look at the spike and analyse the data, that would mean that approximately 50% of users did not come back to the app on Day 1. So we have here the same number of 1-3 Likes and followers 1,2 and 3. If we look at the numbers of Day 7, we see that almost 20% of users did not retain from the Day 1 for all three months. This is the same number of comments 1, 2 and 3. Also if just look at the Day 7 retention (28,01%, 51.48% and 27.6%), we also notice the huge spike here, this also caused by the same reason as the retention for Day 1. We also see here that the average 10-day retention for all three months is 25-35%. Here we also have the higher number for September, which might be caused by the seasonality as well.

4+ Uploads

4+ Uploads for the August shows these results of retention of first day users: Day 1 – 81.67 %, Day 7 – 48.33% and Day10 – 45%. And the average retention result for ten days is approximately 35-45 %. The retention results for September of the first day users are 86.4% for Day 1, 74.79 % for Day 7 and 70.25 for Day 10. For the average ten days of 4+ Uploads, the retention rate is approximately 65-75%. Looking at the numbers of October first day users we

can see following results: 75.77% retention of Day1, 45.15% retention for the Day 7 and 38.27% for the Day 10. And the average retention rate for ten days is approximately 43-53%.

Looking at Figure 4, which shows Day 1 data from August, September and October we can see that the numbers are 81.67 %, 74.79 % and 75.77%. This means that approximately 25% of users did not come back to the app in a Day 1. This is a normal number compared to with the industry standard one. It is not as bad as the number of 1-3 Comments, but it is very close to it, the difference is approximately 5%. If we look at the numbers of Day 7, we see that almost 20% of users did not retain from the Day 1 for all three months. This is the same number of comments 1, 2 and 3. Also if just look at the Day 7 retention (48.33%, 74.79% and 45,15%), we also notice the huge spike here; his also caused by the same reasons as in the case of 1-3 Uploads. We also see here that the average 10-day retention for all three months is 45-55%. Here we also have the higher number for September, might be caused by the seasonality as well. And compared with the numbers of 4+ Follower and Comments more than 3, 4+ Uploads shows us very low numbers in general.

Conclusion

So the results of this research show how certain features are very important for user engagement and how other features are insignificant. It also clearly illustrates the fact that how important certain features are for the users, because as we can see retention rates differ dramatically when there is case 1-3 feature and 4+ feature.

An obvious example of this is a 1-3 like when the feature itself, getting like, or even 3 of them, was not a valuable feature for retention. It's because we saw here that approximately 38% did not come back on Day 1. However, if we look at the 4+ likes, we can bring the argument that if the user gets approximately two times more likes, there is a chance that the retention of that user would be higher for two times. If we compare 1-3 likes with 1-3 comments, we see that the retention rates are higher for 1-3 comments. So we can say that single comment is more effective and engaging for users than the single like. But as we can see the retention rate for 1-3 comments could not reach to the number of 4+ likes. From here we can say that getting more than 3 likes affects users more than receiving 1-3 comments.

Numbers for getting 4+ comments shows how much important are many comments for users in general. The retention is almost two times higher than the retention for comments 1, 2 and 3. The difference between 4+ likes and 4+ comments is also significant. So this means that receiving 4+ comments is much more important for users than getting 4+ likes. So getting 4+ comments during one session is the best way to come back to the app more often and be engaged.

If we look at the retention rates for 1-3 followers we see that it might mean the concept of 1, 2 or 3 followers are not very much important for and even understandable for PicsArt. The user does not appreciate it because maybe they think that if someone is creative and could create something, getting only 1-3 followers is not a huge metric of success. So when getting 1,2 or 3 followers does not matter that much for users. However, we see that these numbers prove that getting more than three followers is very powerful thing. At this point, users get more appreciation, which brings many users retain to the app. The numbers are almost the same as for 4+ comments.

The numbers for 1,2 and 3 uploads show approximately the same retention rates as we saw for 1-3 likes and 1-3 followers. But this is in a case when we do not look at the spike and analyze the data, which occurred because of that spike. But the numbers of 4+ uploads are higher. It shows the significant difference compared with the 1-3 uploads. Day 1 retention rates are very close to the retention rate for 4+ likes, which is in its case close to retention rates for 4+ comments and 4+ followers.

So part of my hypothesis was correct, and some of it was incorrect. I expected the comments to have higher retention than likes for both cases. That came out true according to the collected data. But my other hypothesis that uploads would have higher retention rates than followers were incorrect. For 1-3 followers and uploads, we saw that uploads have slightly higher retentions. But in the case of 4+ followers and uploads, retention rates for followers had approximately 10 % higher, which is very significant. We also saw that the features are very important but only in a right amount of them, which in our case

should be more than 3 (comments/followers). So in general users have the highest retention rates after getting either 4+ comments or 4+ followers.

Limitations and Suggestions for Future Research

Any research, of course, has its limitations, and this one is not an exception as well. One of the main limitations was the number of participants. The number of participants in each day was between 800-900. So approximately 8000 users (not distinct ones) participated for this research, which is not a very low number. However, it might not show the whole image of user behavior because it is not even 0.1% of all users. So results gathered from this research might differ from the overall picture. Another limitation was that in this research data was collected from only three months (August, September and October). To understand the whole behavioral pattern of users, the data should be collected from one complete year. In this case, the seasonality and other factors connected with certain months and days should not affect the overall result.

Another limitation for this research was that how results might change in social media. For this research data was collected from August, September and October in 2016. In the industry, the things are changing so quickly that it most probably does not match with the data collected a year ago. So the results of this research will be irrelevant after some time.

During this research, I mainly concentrated on the Day 1, Day 7, and Day 10 retentions for all three months. For upcoming researches, there is a list of retentions rates for each ten days, and also it's averaging. So later studies could be done to measure the difference between each day of the week and their retentions. For example, users who opened the app for the first time on Sunday might have higher retention rates and vice versa. It is also is a good idea for later research to calculate each retention rates with the push notifications which PicsArt sends and count the impact of it in the retention of the users. For example, I noticed that Day 3 retention was almost in each case lower than the Day 2 and even Day 4. This might be the cause of the successful push notification campaigns send on the Day 4. So external factors like marketing strategies can also affect the overall retention rates.

Another suggestion for the upcoming research would be comparing the data of likes, comments, follows and uploads with the remix. "Remix" is a new and unique feature in PicsArt. It was created in PicsArt no any other social media platform has it. The concept of remixes is a very easy and interesting one. If someone uploads photo or a sticker and tags it with "freetoedit" tag, other users can remix the photo, meaning they can edit the original photo or sticker and come out with creative results. It tends to be the key social action in PicsArt, and it is also placed next to the like and comment buttons. So it would be interesting to see the retention rates for "Remix" versus retention rates for other features in the app. So future researches could focus on "Remix" action and compare the retention of it with other social actions as well as check the impact of push notifications on the user retention.

References:

Burke M., Marlow C. and Lento T., *Social Network Activity and Social Well-Being*, Human-Computer Interaction Institute Carnegie Mellon University,
https://pdfs.semanticscholar.org/6773/9eab6289ca65f05a0747433c25b892962cb9.pdf

Harnad S. (1995) *Interactive Cognition: Exploring the Potential of Electronic Quote/Commenting*. In: B. Gorayska & J.L. Mey (Eds.) Cognitive Technology: In Search of a Humane Interface. Elsevier. Pp. 397-414.
http://cogprints.org/1599/1/harnad95.interactive.cognition.html

Kietzmann J. H., Hermans K., McCarthy I. P., Silvestre B. S.,
Social media? Get serious! Understanding the functional building blocks of social media, Kelley School of Business,
http://www.academia.edu/959458/Social_Media_Get_Serious_Understanding_the_Functional_Building_Blocks_of_Social_Media

Moe W. W., Schweidel D. A. (2014), *Social Media Analysis and Intelligence*
https://books.google.am/books?hl=en&lr=&id=x2bLAgAAQBAJ&oi=fnd&pg=PR9&dq=Social+Media+Intelligence&ots=a3PWE9oJeP&sig=Q

XE6HfUc2g1wzeqSM68hfdq83Ig&redir_esc=y#v=onepage&q=Social%

20Media%20Intelligence&f=false

Suler J. R. (2015) 'Image Talk,' in *Psychology of the Digital Age: Humans*

Become Electric. Cambridge: Cambridge University Press,

https://www.cambridge.org/core/books/psychology-of-the-digital-

age/C1982185D2F87558C9067E3FF685898B

Rayson S., *Facebook Interactions: Why Shares, Likes, and Comments All Count*

Buzzsumo Content Discovery Platform

http://buzzsumo.com/blog/facebook-interactions-why-shares-likes-and-

comments-all-count/

Vaynerchuk G., *Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy*

Social World. iBooks. http://www.academia.edu/3658367/

Waite B. and D. Wheeler (2014) *The "Liked" Department: Using Facebook*

Analytics for Strategic Communication,

https://www.cambridge.org/core/services/aop-cambridge-

core/content/view/49D5A244E0D8DB17A15180031913874C/S1049096

51400081Xa.pdf/the-liked-department-using-facebook-analytics-for-

strategic-communication.pdf

Appendixes

Appendix 1: Data collected from August 01 to 10

August Likes_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
932	10/01/2016	100	62.12	47.32	38.41	38.3	34.98	33.8	32.73	38.41	29.18	30.58
853	10/02/2016	100	57.56	47.95	41.03	39.74	34.35	32.47	41.62	30.48	31.3	27.43
664	10/03/2016	100	57.38	51.05	45.33	43.52	35.39	44.88	37.5	34.79	32.08	37.05
582	10/04/2016	100	61	48.45	40.38	37.8	43.3	33.33	38.83	32.47	37.8	36.78
690	10/05/2016	100	58.12	46.52	34.49	44.64	33.19	33.62	32.9	36.81	20.43	19.41
710	10/06/2016	100	56.62	42.39	48.59	37.18	35.49	33.24	41.13	20.28	20.85	19.83
646	10/07/2016	100	54.8	52.94	37.31	39.94	34.37	37.46	16.41	17.03	16.56	15.54
784	10/08/2016	100	64.03	41.84	35.46	33.55	40.43	10.2	11.22	12.12	14.41	13.39
825	10/09/2016	100	52.61	45.09	36.85	40.73	12.12	11.88	12.36	12.73	13.94	12.92
609	10/10/2016	100	55.67	43.51	44.5	14.29	13.63	14.45	15.44	14.78	17.24	16.22

Appendix 2: Average August Likes_Received >= 1 and <= 3 from day 1 to 10
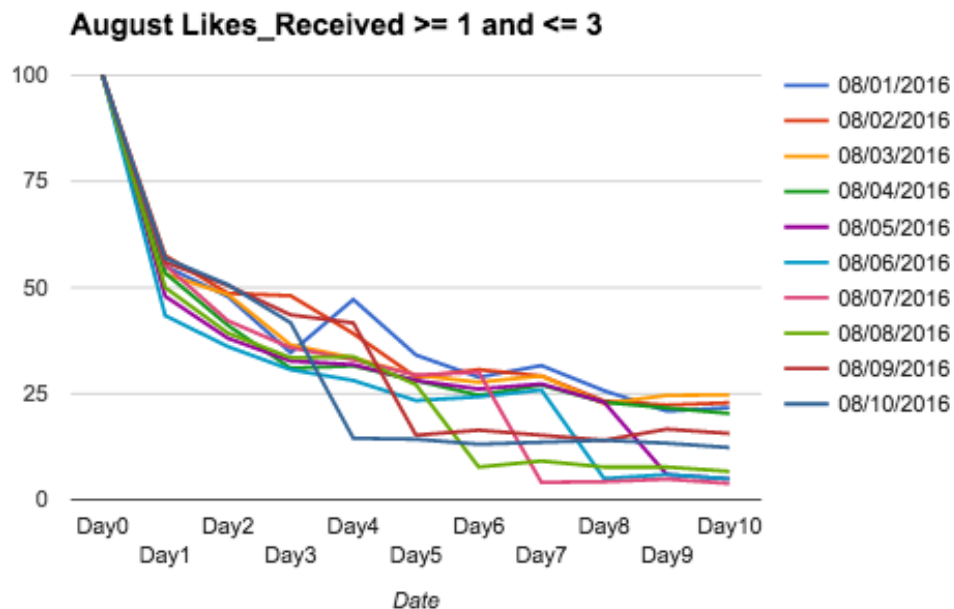
Appendix 3: August Likes_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
190	08/01/2016	100	84.21	76.32	67.89	72.63	66.84	55.79	60	60	58.42	57.37
202	08/02/2016	100	81.19	68.32	69.8	51.98	50.99	52.97	53.47	51.98	48.02	50.5
214	08/03/2016	100	78.97	71.03	65.42	59.81	64.95	63.55	60.75	54.67	57.48	56.07
213	08/04/2016	100	77	66.67	56.81	58.22	57.75	56.34	51.64	53.05	49.77	48.75
234	08/05/2016	100	79.91	67.95	65.81	66.24	61.97	58.55	57.26	54.27	47.86	46.84
245	08/06/2016	100	73.06	67.76	59.18	57.14	52.24	52.65	55.51	35.51	36.33	35.31
210	08/07/2016	100	77.62	67.62	62.38	60	57.14	57.62	34.76	37.62	39.52	38.5
196	08/08/2016	100	81.63	69.9	67.35	65.82	71.94	50	51.53	54.08	47.45	46.43
160	08/09/2016	100	85	74.38	77.5	70	53.13	58.13	56.88	54.37	61.88	60.86
162	08/10/2016	100	85.8	83.33	70.99	53.09	54.32	52.47	54.94	59.26	66.67	65.65

Average August Likes_Received >3 from day 1 to 10

August Likes_Received >3
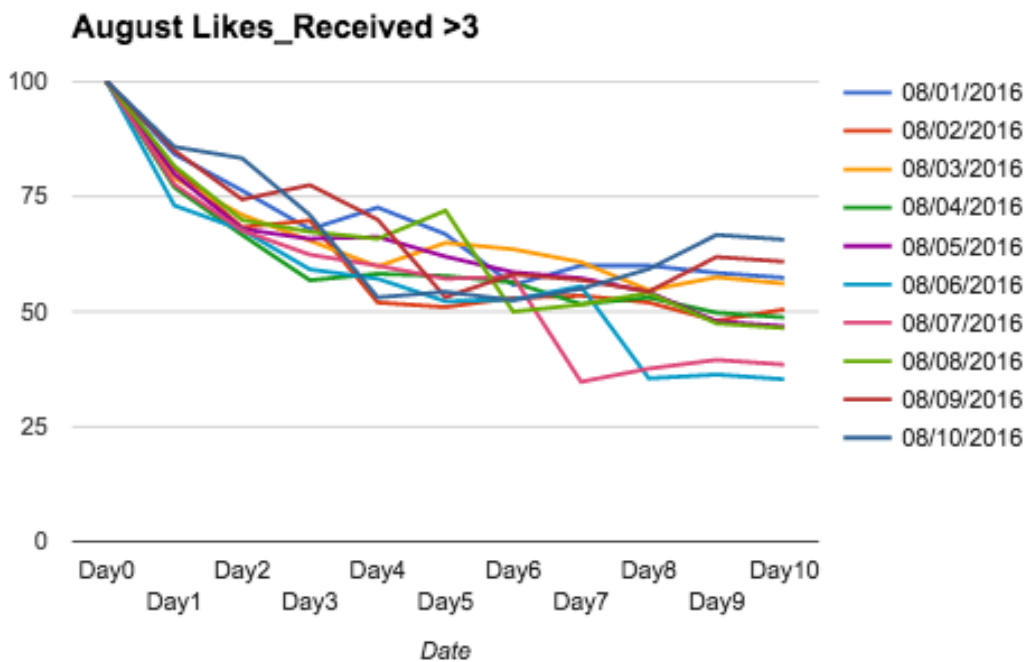
Appendix 4: August Comments_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
63	08/01/2016	100	73.02	68.25	57.14	58.73	61.9	42.86	50.79	52.38	41.27	52.38
76	08/02/2016	100	76.32	60.53	53.95	57.89	50	61.84	55.26	51.32	52.63	50
86	08/03/2016	100	77.91	68.6	63.95	61.63	62.79	62.79	58.14	58.14	52.33	53.49
68	08/04/2016	100	72.06	61.76	52.94	60.29	52.94	48.53	52.94	51.47	48.53	47.51
88	08/05/2016	100	72.73	60.23	64.77	67.05	67.05	61.36	63.64	50	39.77	38.75
77	08/06/2016	100	62.34	50.65	50.65	40.26	37.66	36.36	44.16	29.87	37.66	36.64
88	08/07/2016	100	73.86	70.45	56.82	50	47.73	47.73	30.68	31.82	34.09	33.07
81	08/08/2016	100	74.07	62.96	51.85	53.09	51.85	34.57	38.27	39.51	38.27	37.25
75	08/09/2016	100	77.33	65.33	69.33	60	54.67	56	56	50.67	53.33	52.31
81	08/10/2016	100	71.6	69.14	70.37	53.09	54.32	48.15	48.15	54.32	53.09	52.07

Appendix 5: Average August Comments_Received >= 1 and <= 3 from day 1 to 10
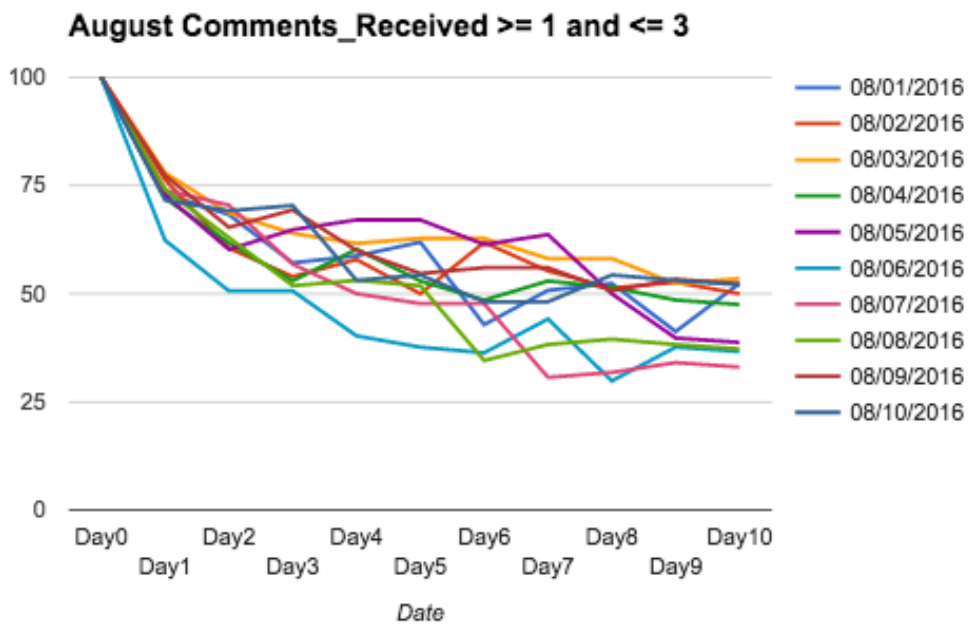
Appendix 6: August Comments_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
57	08/01/2016	100	85.96	85.96	77.19	80.7	75.44	73.68	70.18	71.93	73.68	73.68
42	08/02/2016	100	90.48	88.1	83.33	71.43	66.67	76.19	83.33	80.95	76.19	78.57
46	08/03/2016	100	86.96	78.26	80.43	78.26	84.78	82.61	86.96	80.43	84.78	76.09
43	08/04/2016	100	81.4	79.07	67.44	83.72	83.72	79.07	67.44	81.4	69.77	68.75
55	08/05/2016	100	87.27	80	80	74.55	74.55	72.73	72.73	74.55	74.55	73.53
47	08/06/2016	100	80.85	85.11	78.72	76.6	78.72	80.85	78.72	78.72	72.34	71.32
50	08/07/2016	100	84	82	80	78	80	80	58	64	68	66.98
60	08/08/2016	100	91.67	86.67	86.67	83.33	83.33	78.33	76.67	80	68.33	67.31
49	08/09/2016	100	89.8	75.51	81.63	75.51	63.27	63.27	69.39	57.14	67.35	66.33
51	08/10/2016	100	86.27	94.12	76.47	56.86	66.67	64.71	60.78	68.63	80.39	79.37

Appendix 7: Average August Comments_Received >3 from day 1 to 10

August Comments_Received >3
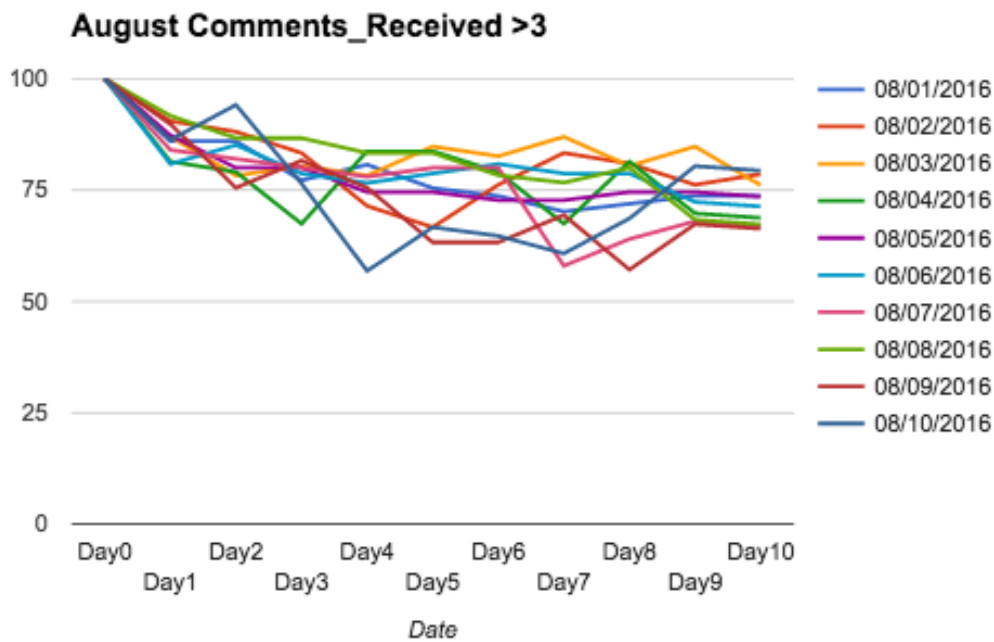
Appendix 8: August Followers>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
380	08/01/2016	100	50.26	45.26	37.63	43.68	32.89	26.58	33.16	29.21	27.89	26.05
410	08/02/2016	100	52.93	43.9	47.32	35.12	27.56	29.51	29.76	25.85	22.68	23.17
568	08/03/2016	100	48.06	44.89	32.57	32.39	27.99	27.29	28.35	23.59	22.54	23.06
847	08/04/2016	100	56.55	41.68	29.16	33.06	26.33	24.91	27.39	23.14	20.31	19.29
722	08/05/2016	100	45.29	35.87	31.99	28.53	24.52	25.07	24.52	23.13	8.31	7.29
678	08/06/2016	100	39.23	35.1	26.4	28.02	24.78	21.98	25.96	7.82	8.11	7.09
740	08/07/2016	100	52.16	41.22	31.89	30.95	29.86	29.86	6.08	7.57	6.76	5.74
525	08/08/2016	100	46.29	37.9	31.62	31.43	29.14	9.33	9.9	9.71	10.29	9.27
629	08/09/2016	100	47.54	37.84	33.39	34.02	9.7	10.33	9.7	9.22	10.49	9.47
667	08/10/2016	100	43.33	38.83	32.83	8.55	9.75	8.7	8.25	9	9.6	8.58

Appendix 9: Average August Followers>= 1 and <= 3 from day 1 to 10
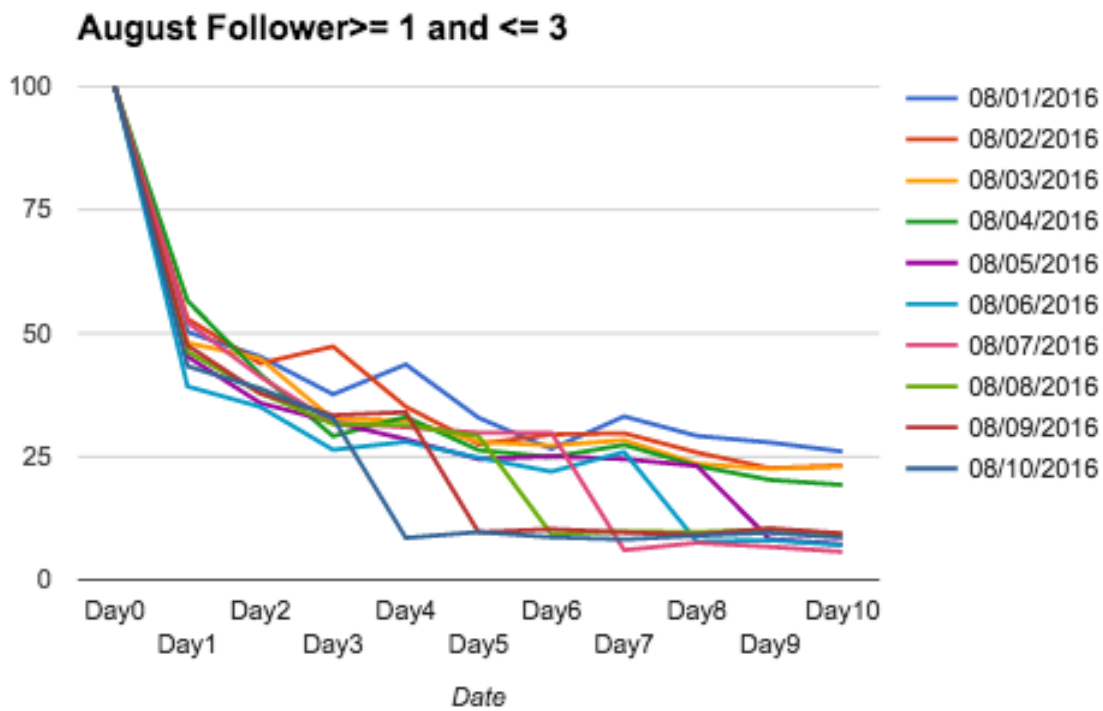
Appendix 10: August Followers >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
37	08/01/2016	100	78.38	78.38	67.57	81.08	83.78	75.68	70.27	78.38	75.68	78.38
25	08/02/2016	100	88	84	84	72	68	80	84	76	80	84
63	08/03/2016	100	85.71	80.95	73.02	71.43	73.02	69.84	74.6	74.6	74.6	73.02
34	08/04/2016	100	85.29	85.29	73.53	82.35	79.41	76.47	79.41	79.41	76.47	75.45
37	08/05/2016	100	81.08	64.86	70.27	70.27	70.27	64.86	70.27	67.57	59.46	58.44
31	08/06/2016	100	74.19	74.19	77.42	70.97	77.42	70.97	58.06	61.29	70.97	69.95
40	08/07/2016	100	87.5	82.5	85	75	80	75	55	60	65	63.98
33	08/08/2016	100	93.94	96.97	93.94	90.91	90.91	72.73	78.79	78.79	72.73	71.71
32	08/09/2016	100	87.5	71.88	71.88	68.75	59.38	62.5	59.38	59.38	68.75	67.73
43	08/10/2016	100	88.37	83.72	76.74	55.81	58.14	58.14	62.79	65.12	72.09	71.07

Appendix 11: Average August Followers >3 from day 1 to 10
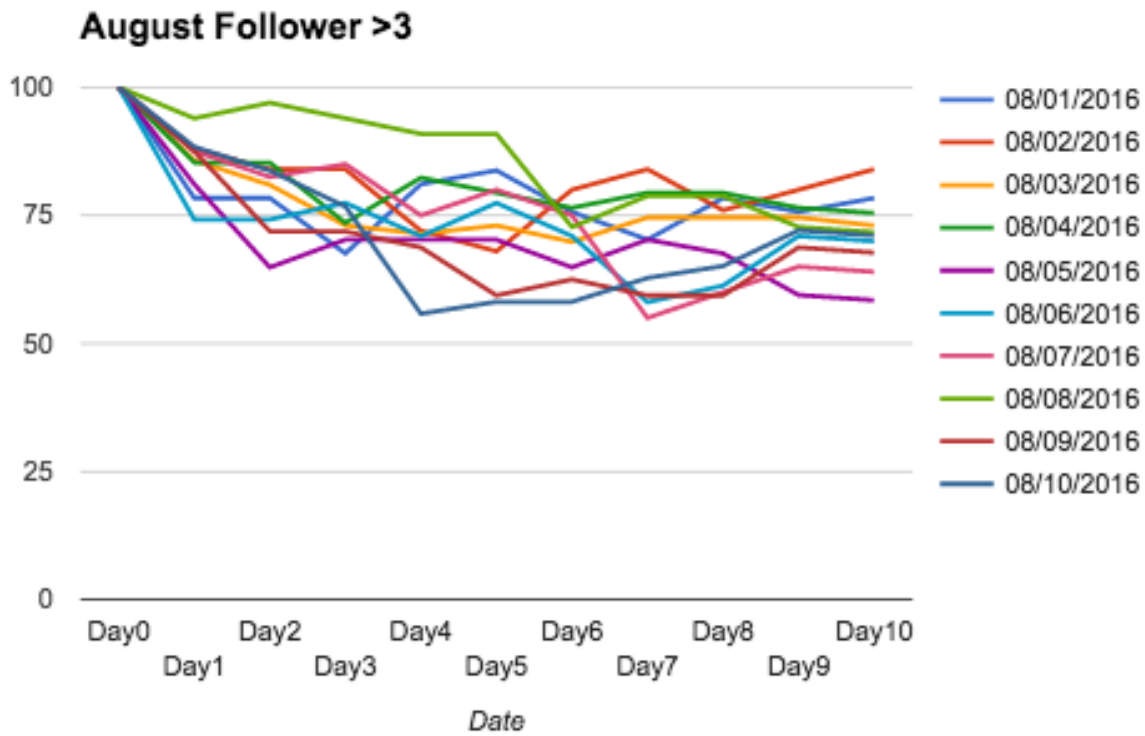
Appendix 12: August Photo Uploads>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
2049	08/01/2016	100	48.9	41.92	30.65	41.48	29.43	23.67	28.01	21.72	19.38	18.89
1608	08/02/2016	100	54.23	44.84	48.13	36.44	26.37	27.92	29.1	20.96	19.96	20.4
3089	08/03/2016	100	45.06	41.99	29.78	27.26	23.96	22.63	23.89	18.52	18.94	19.33
3443	08/04/2016	100	47.49	35.81	26.46	27.56	23.41	20.65	22.54	18.47	18.21	17.19
3890	08/05/2016	100	41.39	30.93	27.1	26.27	21.65	22.24	22.7	19.13	3.24	2.22
3945	08/06/2016	100	35.87	30.75	25.45	24.08	20.18	19.62	21.32	2.76	2.99	1.97
4679	08/07/2016	100	43.45	33.51	27.85	26.46	22.06	23.1	1.77	2.22	2.39	1.37
3355	08/08/2016	100	40.69	32.37	26.77	26.47	22.5	3.28	3.82	3.46	3.4	2.38
1578	08/09/2016	100	52.92	44.42	38.15	37.39	6.78	8.24	7.98	7.03	8.24	7.22
1945	08/10/2016	100	54.29	45.81	37.99	5.71	6.58	6.38	5.6	6.48	7.61	6.59

Appendix 13: Average August Photo Uploads>= 1 and <= 3 from day 1 to 10
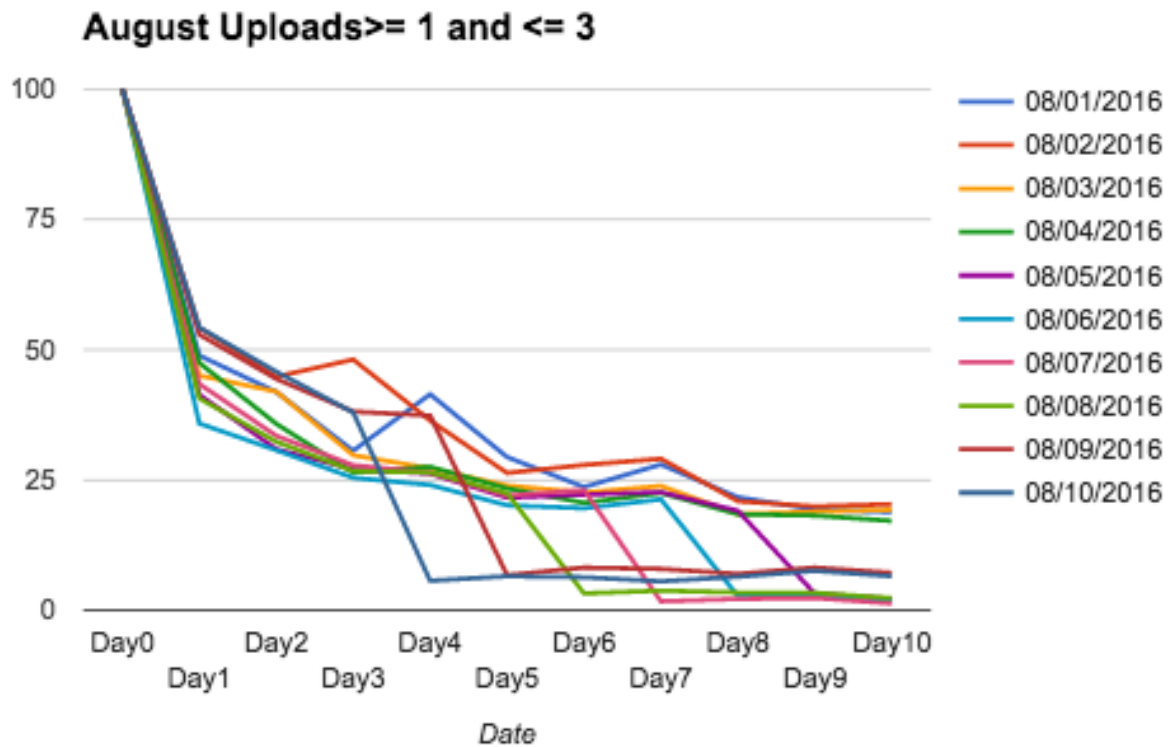
Appendix 14: August Photo Uploads >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
120	08/01/2016	100	81.67	68.33	58.33	60	61.67	47.5	48.33	49.17	45.83	45
111	08/02/2016	100	83.78	65.77	68.47	50.45	47.75	49.55	49.55	48.65	44.14	49.55
154	08/03/2016	100	72.08	64.29	60.39	53.25	55.19	51.95	45.45	43.51	48.05	45.45
135	08/04/2016	100	77.78	60	48.89	51.85	51.11	48.15	45.19	46.67	43.7	42.68
130	08/05/2016	100	75.38	58.46	60	56.15	53.08	50.77	47.69	41.54	32.31	31.29
150	08/06/2016	100	68	60.67	50.67	49.33	42.67	40.67	41.33	18	24.67	23.65
166	08/07/2016	100	70.48	59.64	49.4	52.41	50	48.8	13.86	16.27	19.28	18.26
144	08/08/2016	100	77.08	66.67	58.33	47.92	56.25	25.69	25.69	26.39	22.22	21.2
106	08/09/2016	100	77.36	62.26	65.09	53.77	28.3	31.13	33.96	30.19	32.08	31.06
120	08/10/2016	100	80.83	71.67	57.5	25.83	28.33	25.83	28.33	34.17	36.67	35.65

Appendix 15: Average August Photo Uploads >3 from day 1 to 10
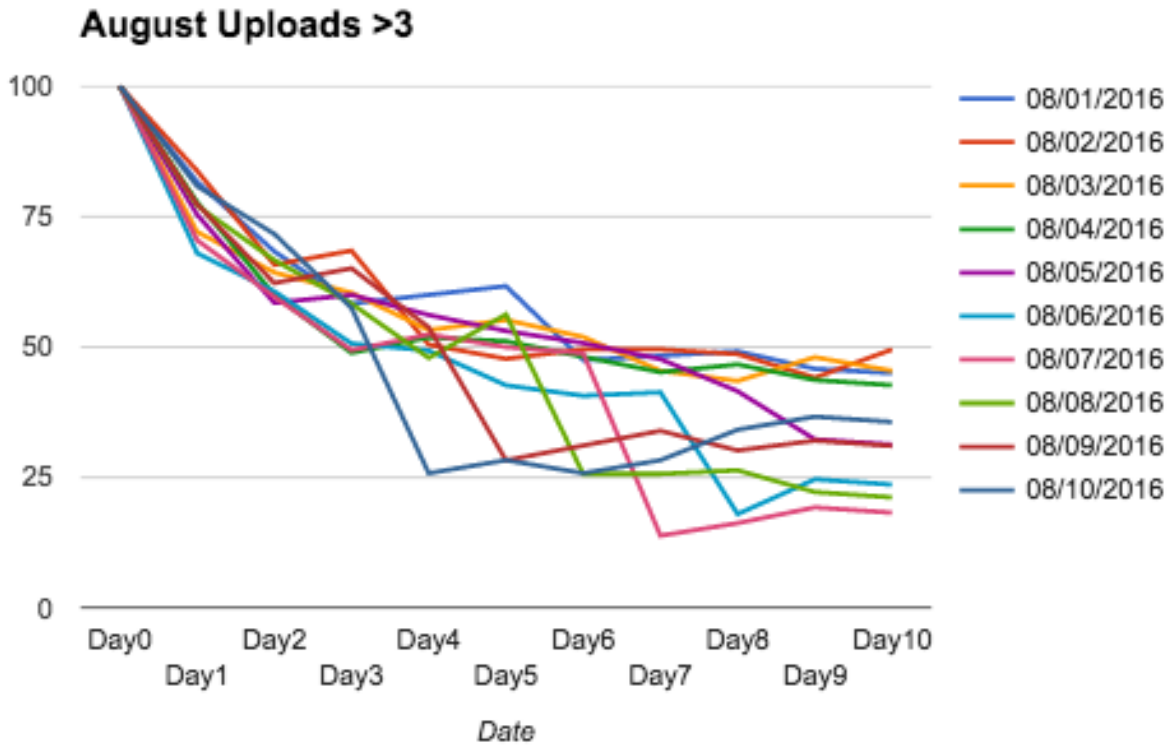
Appendix 16: Complete data collected from September 01 to 10

September Likes_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
382	09/01/2016	100	60.21	46.07	41.36	42.41	36.39	37.7	33.77	32.2	29.58	34.29
342	09/02/2016	100	61.7	52.63	42.69	36.84	32.46	35.38	35.96	34.21	40.35	27.49
406	09/03/2016	100	58.37	47.29	40.39	37.68	34.24	35.47	34.73	38.67	28.33	32.02
458	09/04/2016	100	59.17	46.72	41.27	39.96	33.19	36.03	41.7	28.6	31.44	30.44
398	09/05/2016	100	56.03	49.5	45.23	42.71	38.44	44.72	39.45	34.17	20.1	19.1
344	09/06/2016	100	56.4	47.09	41.86	40.12	42.15	31.4	35.17	16.86	20.06	19.06
339	09/07/2016	100	58.41	48.38	41.59	42.48	34.51	33.92	13.57	15.04	15.93	14.93
302	09/08/2016	100	60.26	51.32	50	42.72	33.77	20.86	22.52	22.85	23.84	22.84
397	09/09/2016	100	59.95	55.67	43.07	44.33	20.65	20.4	20.4	20.4	21.66	20.66
495	09/10/2016	100	57.58	39.8	38.99	16.77	18.38	17.17	17.78	17.37	18.79	17.79

Appendix 17: Average September Likes_Received >= 1 and <= 3 from day 1 to 10
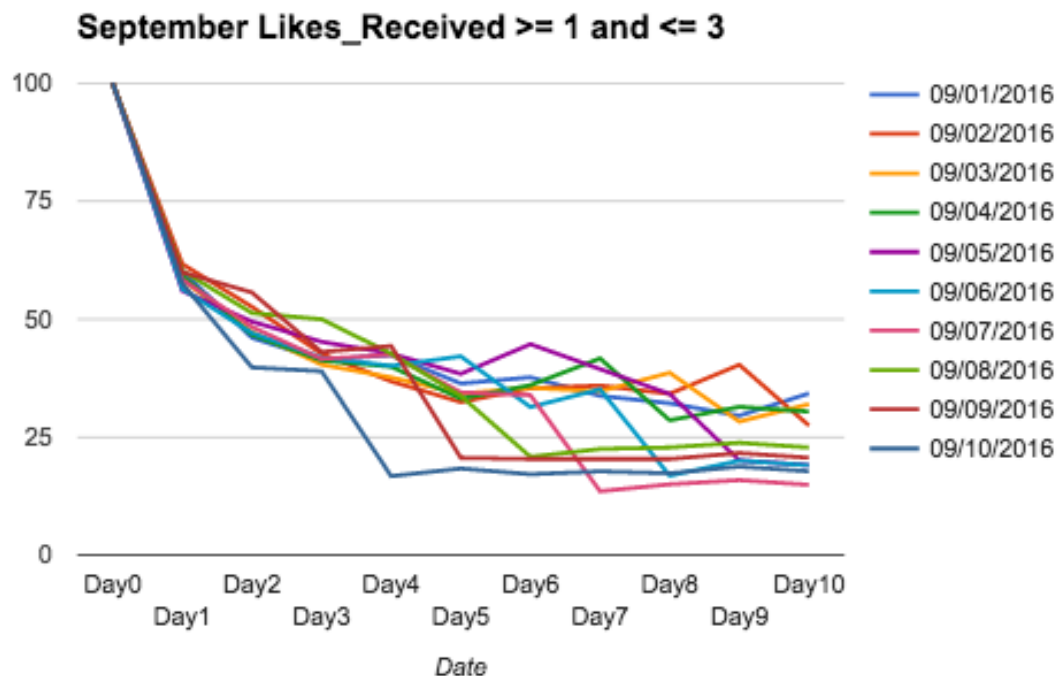
Appendix 18: September Likes_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
164	09/01/2016	100.00	78.05	64.63	67.68	71.34	65.24	62.20	66.46	60.37	59.15	54.27
148	09/02/2016	100.00	77.03	72.97	65.54	63.51	59.46	59.46	64.19	58.78	58.78	59.46
171	09/03/2016	100.00	74.85	67.84	65.50	61.40	60.23	56.73	63.16	63.16	54.39	54.39
205	09/04/2016	100.00	77.07	60.49	62.93	60.49	55.61	59.02	59.51	57.07	49.76	48.76
184	09/05/2016	100.00	77.17	65.22	63.59	59.78	53.26	60.33	59.78	57.07	53.26	52.26
149	09/06/2016	100.00	78.52	73.15	62.42	58.39	62.42	61.74	61.74	44.97	53.02	52.02
165	09/07/2016	100.00	76.36	70.30	64.24	66.06	61.82	64.24	47.88	52.12	55.15	54.15
163	09/08/2016	100.00	81.60	67.48	67.48	63.80	58.28	47.24	46.01	46.63	52.15	51.15
177	09/09/2016	100.00	70.06	73.45	66.10	59.89	42.37	51.41	47.46	51.41	48.59	47.59
203	09/10/2016	100.00	81.77	68.97	65.02	49.75	49.75	45.81	44.83	46.31	50.74	49.74

Appendix 19: Average September Likes_Received >3 from day 1 to 10
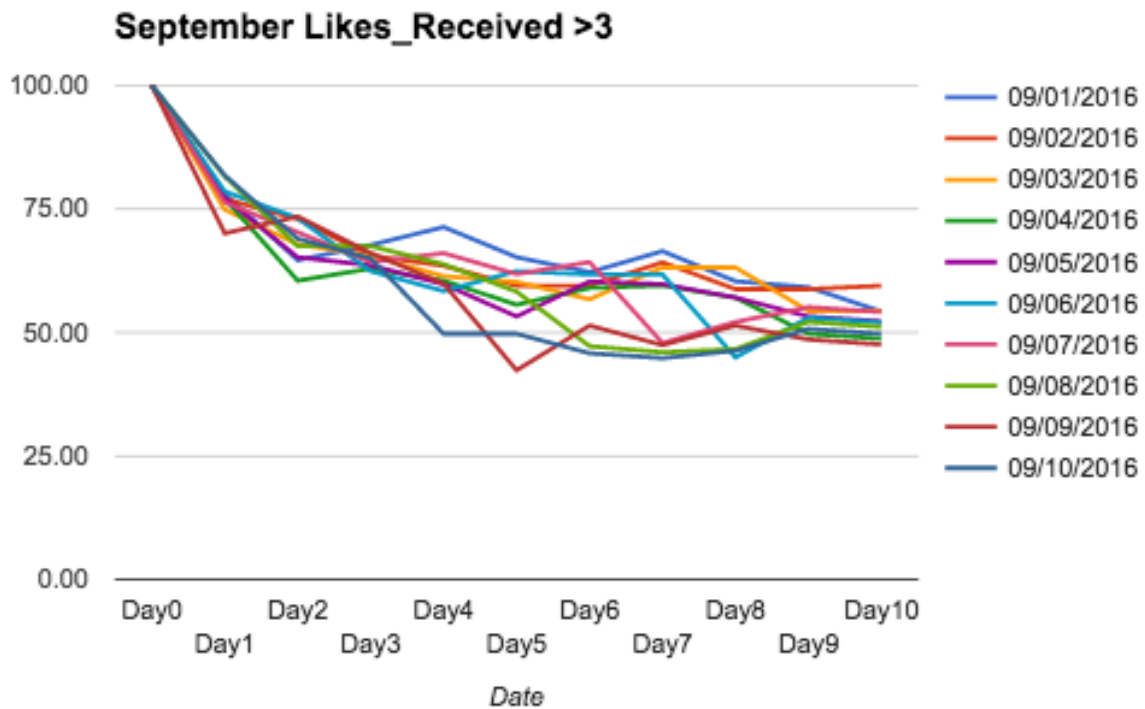
Appendix 20: September Comments_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
67	09/01/2016	100	68.66	50.75	47.76	59.7	53.73	58.21	58.21	52.24	50.75	55.22
67	09/02/2016	100	77.61	70.15	68.66	52.24	56.72	61.19	55.22	52.24	55.22	55.22
69	09/03/2016	100	71.01	56.52	59.42	55.07	56.52	52.17	59.42	59.42	50.72	50.72
79	09/04/2016	100	73.42	59.49	62.03	58.23	54.43	54.43	59.49	58.23	51.9	50.9
77	09/05/2016	100	62.34	58.44	61.04	58.44	63.64	54.55	53.25	51.95	45.45	44.45
53	09/06/2016	100	73.58	66.04	58.49	58.49	62.26	60.38	52.83	37.74	45.28	44.28
57	09/07/2016	100	78.95	66.67	54.39	61.4	54.39	50.88	40.35	42.11	42.11	41.11
79	09/08/2016	100	78.48	74.68	65.82	65.82	54.43	48.1	54.43	48.1	48.1	47.1
66	09/09/2016	100	74.24	68.18	65.15	68.18	37.88	51.52	43.94	54.55	50	49
56	09/10/2016	100	73.21	53.57	51.79	39.29	35.71	32.14	28.57	33.93	41.07	40.07

Appendix 21: Average September Comments_Received >= 1 and <= 3 from day

1 to 10
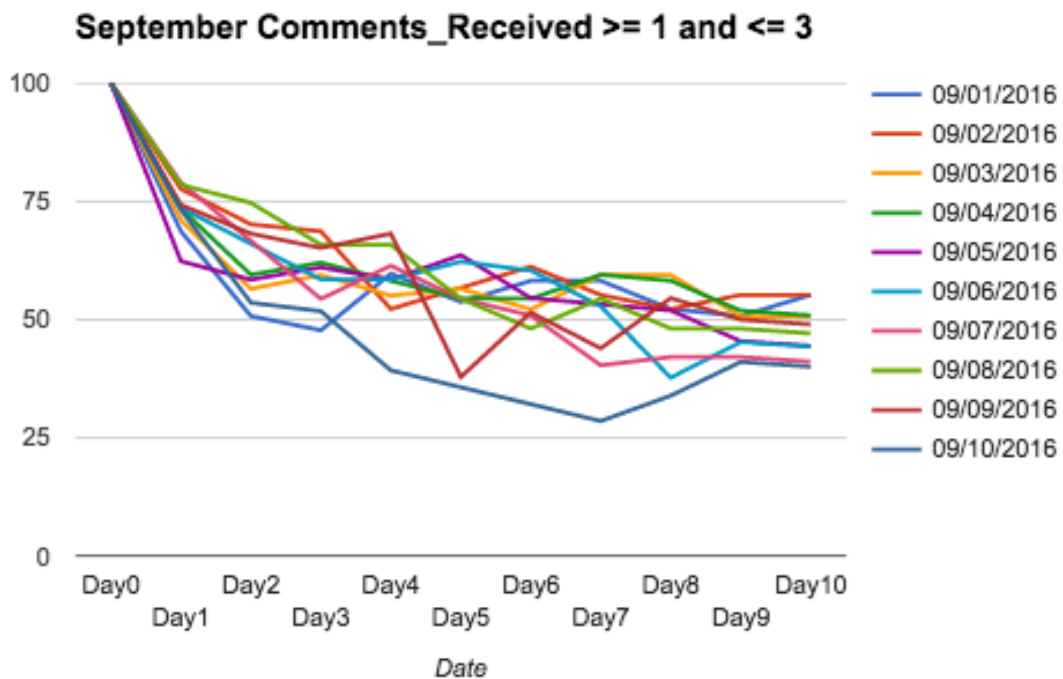
Appendix 22: September Comments_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
40	09/01/2016	100.00	82.50	80.00	87.50	85.00	75.00	82.50	82.50	72.50	62.50	62.50
47	09/02/2016	100.00	80.85	85.11	76.60	74.47	82.98	80.85	76.60	72.34	76.60	74.47
43	09/03/2016	100.00	86.05	88.37	88.37	76.74	79.07	76.74	74.42	76.74	74.42	69.77
56	09/04/2016	100.00	87.50	80.36	85.71	80.36	71.43	82.14	75.00	75.00	78.57	77.57
52	09/05/2016	100.00	86.54	80.77	84.62	78.85	65.38	75.00	76.92	78.85	71.15	70.15
41	09/06/2016	100.00	92.68	78.05	73.17	68.29	75.61	73.17	75.61	68.29	70.73	69.73
41	09/07/2016	100.00	82.93	82.93	73.17	75.61	70.73	70.73	73.17	73.17	73.17	72.17
42	09/08/2016	100.00	88.10	73.81	78.57	76.19	83.33	69.05	66.67	64.29	83.33	82.33
46	09/09/2016	100.00	82.61	84.78	80.43	76.09	69.57	71.74	78.26	78.26	78.26	77.26
55	09/10/2016	100.00	96.36	83.64	81.82	80.00	74.55	76.36	76.36	81.82	80.00	79.00

Appendix 23: Average September Comments_Received >3from day 1 to 10
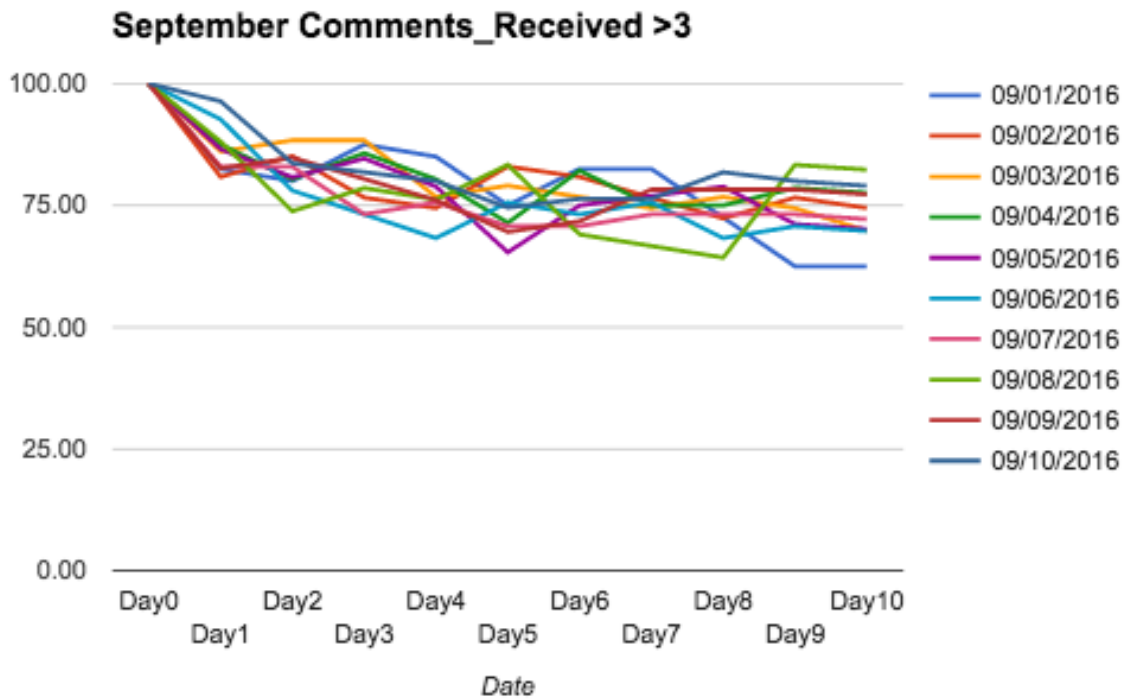
Appendix 24: September Followers>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
1684	09/01/2016	100	58.73	49.82	47.57	47.03	44.3	42.99	44.06	42.46	43.23	45.9
1403	09/02/2016	100	54.88	53.88	53.03	48.68	46.69	47.26	46.97	47.18	50.82	45.26
1415	09/03/2016	100	56.04	53.64	49.05	48.9	48.13	47.28	47.84	50.04	45.09	45.02
1670	09/04/2016	100	55.75	52.04	47.43	48.56	46.29	47.6	51.08	44.79	42.87	42.87
1793	09/05/2016	100	53.32	48.97	45.06	46.35	42.94	47.02	42.83	41.44	40.99	39.38
1563	09/06/2016	100	54.32	50.67	49.07	49.71	50.99	45.75	48.24	45.55	43.25	41.91
1607	09/07/2016	100	54.2	52.4	48.79	52.08	45.92	44.99	46.67	42.69	41.26	49.04
1574	09/08/2016	100	56.93	52.8	52.92	49.36	45.81	48.03	46.32	44.47	49.56	42.82
1676	09/09/2016	100	57.7	59.73	52.03	50.6	47.2	45.94	46.72	51.19	44.09	41.59
1898	09/10/2016	100	61.54	52.21	48.68	48.79	44.2	44.05	53	42.04	37.25	38.57

Appendix 25: Average September Followers>= 1 and <= 3 from day 1 to 10
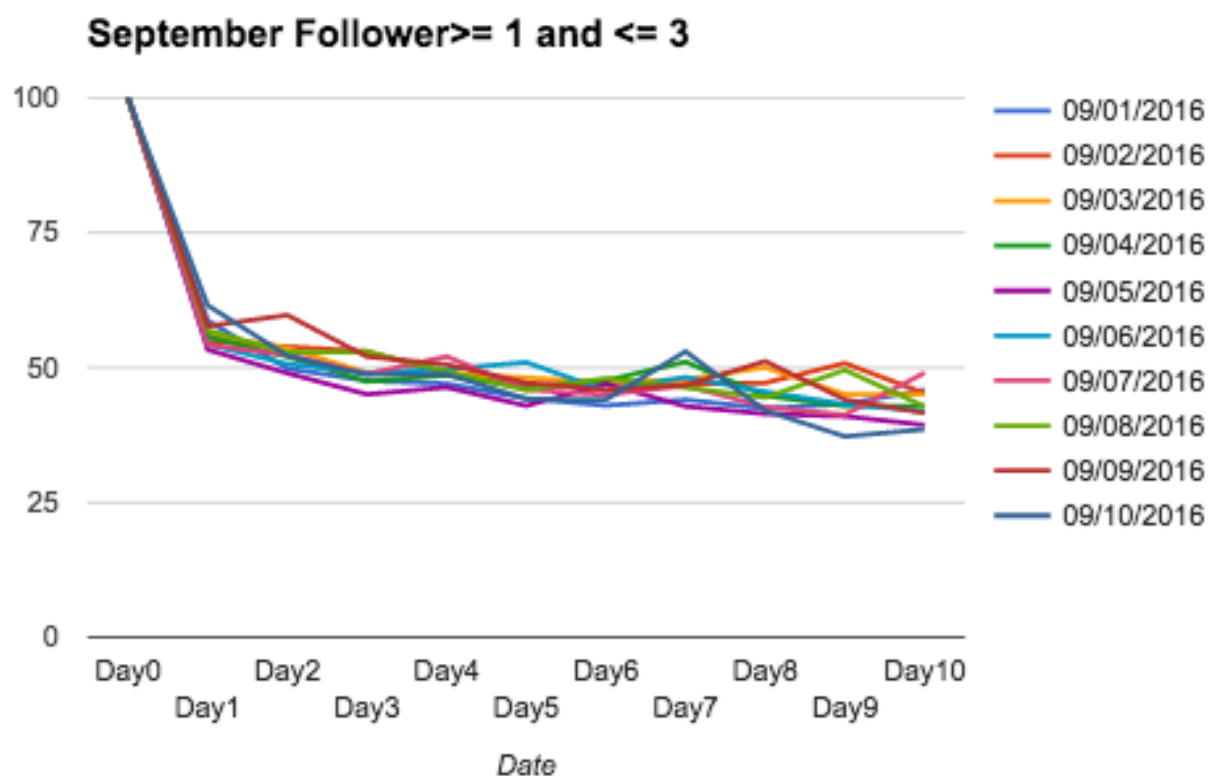
Appendix 26: September Followers >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
356	09/01/2016	100	85.96	82.58	83.15	85.96	82.58	81.74	81.74	78.37	75.56	79.49
346	09/02/2016	100	82.66	80.92	83.82	83.82	80.64	81.5	76.3	75.14	79.19	78.03
288	09/03/2016	100	86.81	86.11	84.38	82.64	83.68	76.74	77.08	78.47	80.21	77.43
387	09/04/2016	100	85.27	82.43	79.33	81.4	77.52	75.19	78.55	75.45	74.68	73.64
368	09/05/2016	100	85.6	82.88	84.24	79.89	76.36	79.35	80.98	79.35	78.53	80.43
338	09/06/2016	100	85.21	84.32	80.77	76.63	80.18	79.29	78.4	77.22	78.11	77.22
337	09/07/2016	100	84.87	80.71	76.85	79.82	80.71	78.64	79.53	77.45	75.07	75.37
341	09/08/2016	100	84.75	78.89	82.4	83.58	80.94	78.59	80.06	75.95	74.49	72.14
358	09/09/2016	100	83.52	83.52	83.52	80.45	79.05	81.84	79.89	77.09	76.26	74.86
372	09/10/2016	100	86.83	85.22	82.8	83.06	82.53	81.18	79.84	79.3	79.03	77.15

Appendix 27: Average September Followers >3 from day 1 to 10

September Follower >3
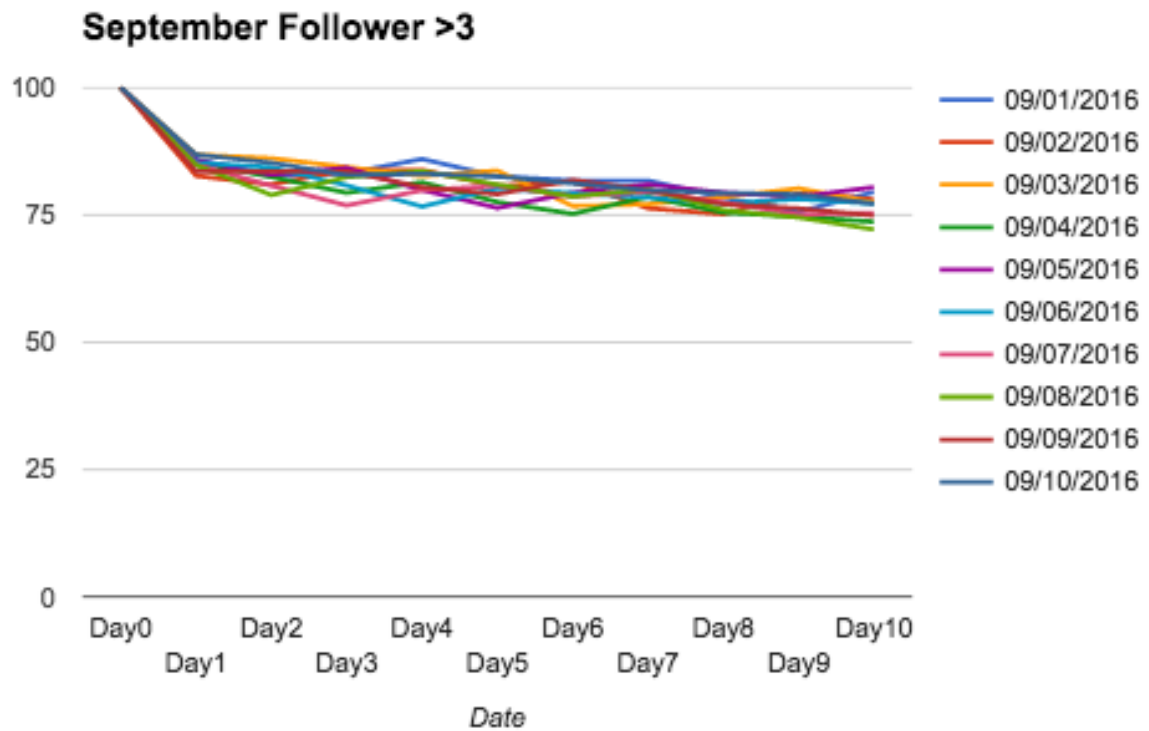
Appendix 28: September Uploads>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
2110	09/01/2016	100	70.76	60.19	55.55	55.78	51.8	50.95	51.42	49.72	50.05	51.52
2228	09/02/2016	100	66.56	60.1	55.12	51.93	49.64	48.88	49.37	49.1	52.92	45.69
2575	09/03/2016	100	67.22	59.73	54.06	51.92	49.71	49.51	51.15	53.4	44.82	46.68
2800	09/04/2016	100	65.5	57.14	54.61	50.39	49.39	50.75	54.57	43.89	43.93	44.39
2602	09/05/2016	100	64.99	57.65	52.77	51.65	49.12	56.23	47.04	44.81	43.24	43.24
2445	09/06/2016	100	66.95	57.83	53.7	52.47	55.54	49	49.86	46.91	45.44	43.8
2406	09/07/2016	100	65.25	60.31	56.28	60.02	51.75	51.62	51.16	48.63	47.05	55.11
2551	09/08/2016	100	68.99	61.66	61.7	54.17	52.92	51.47	50.45	47.08	55.43	45.86
2708	09/09/2016	100	66.47	65.69	55.91	54.69	52.18	49.19	49.19	53.77	46.27	40.47
3360	09/10/2016	100	68.99	53.3	51.1	51.93	48.39	46.37	51.96	43.27	38.45	38.54

Appendix 29:Average September Uploads>= 1 and <= 3 from day 1 to 10

September Uploads>= 1 and <= 3
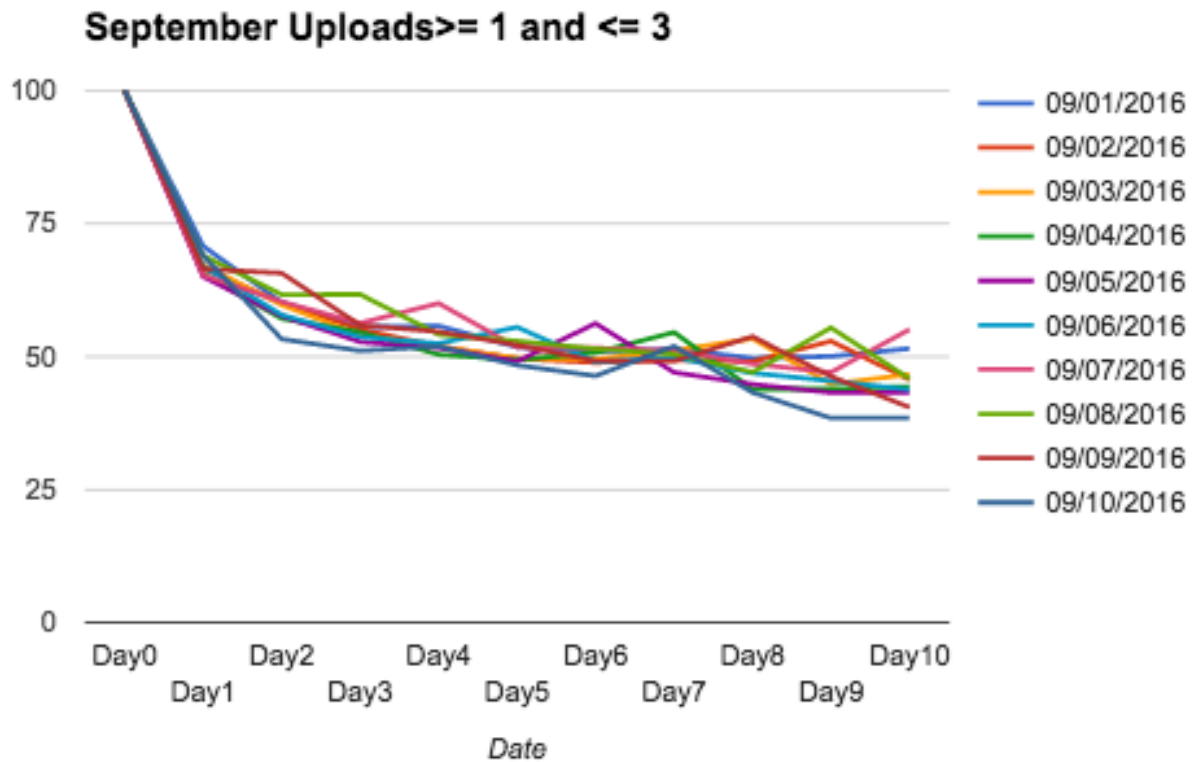
Appendix 30: September Uploads >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
353	09/01/2016	100	86.4	79.6	79.04	80.74	75.07	70.25	74.79	71.1	71.1	70.25
356	09/02/2016	100	87.64	79.49	77.25	72.75	69.94	69.38	71.07	67.7	69.38	67.42
417	09/03/2016	100	84.41	77.7	70.98	69.54	70.02	68.35	69.78	70.26	63.31	63.55
469	09/04/2016	100	82.94	72.07	69.3	70.15	66.74	66.1	66.52	61.83	61.19	59.06
435	09/05/2016	100	86.67	80.23	77.47	75.63	70.57	72.41	68.51	68.51	65.98	64.83
399	09/06/2016	100	86.47	83.46	78.2	73.93	76.44	70.93	70.18	68.42	69.42	65.41
378	09/07/2016	100	85.19	79.37	74.34	73.28	70.37	73.81	69.31	67.72	64.02	68.52
401	09/08/2016	100	85.79	77.81	77.06	70.82	71.07	68.58	70.32	67.83	70.32	65.84
409	09/09/2016	100	86.55	84.84	79.71	75.79	73.59	74.08	73.59	73.59	68.7	67.97
523	09/10/2016	100	87	76.86	72.85	72.28	70.17	68.45	66.73	62.14	58.89	59.08

Appendix 31: Average September Uploads >3 from day 1 to 10

September Uploads >3

Appendix 32: Complete data collected from October 1 to 10

October Likes_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
932	10/01/2016	100	62.12	47.32	38.41	38.3	34.98	33.8	32.73	38.41	29.18	30.58
853	10/02/2016	100	57.56	47.95	41.03	39.74	34.35	32.47	41.62	30.48	31.3	27.43
664	10/03/2016	100	57.38	51.05	45.33	43.52	35.39	44.88	37.5	34.79	32.08	37.05
582	10/04/2016	100	61	48.45	40.38	37.8	43.3	33.33	38.83	32.47	37.8	36.78
690	10/05/2016	100	58.12	46.52	34.49	44.64	33.19	33.62	32.9	36.81	20.43	19.41
710	10/06/2016	100	56.62	42.39	48.59	37.18	35.49	33.24	41.13	20.28	20.85	19.83
646	10/07/2016	100	54.8	52.94	37.31	39.94	34.37	37.46	16.41	17.03	16.56	15.54
784	10/08/2016	100	64.03	41.84	35.46	33.55	40.43	10.2	11.22	12.12	14.41	13.39
825	10/09/2016	100	52.61	45.09	36.85	40.73	12.12	11.88	12.36	12.73	13.94	12.92
609	10/10/2016	100	55.67	43.51	44.5	14.29	13.63	14.45	15.44	14.78	17.24	16.22

Appendix 33: Average October Likes_Received >= 1 and <= 3 from day 1 to 10

October Likes_Received >= 1 and <= 3

Appendix 34: October Likes_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
242	10/01/2016	100	82.64	70.66	69.83	62.81	65.29	61.16	58.26	61.57	53.31	52.07
197	10/02/2016	100	80.71	74.62	68.53	62.44	58.88	64.97	66.5	61.93	59.39	57.36
172	10/03/2016	100	76.16	72.09	62.79	62.79	54.65	62.21	55.81	59.3	52.33	54.65
169	10/04/2016	100	84.02	84.02	75.15	63.31	72.19	69.82	65.68	63.31	67.46	66.44
198	10/05/2016	100	83.33	75.25	67.17	67.17	65.66	62.12	64.14	62.12	54.04	53.02
191	10/06/2016	100	80.63	69.63	72.77	70.68	59.16	61.26	61.26	52.88	56.02	55
200	10/07/2016	100	82.5	77.5	71	70.5	63.5	68	54	53.5	57	55.98
213	10/08/2016	100	84.51	69.95	66.2	64.32	68.54	41.31	45.07	43.66	46.01	44.99
211	10/09/2016	100	80.57	70.14	68.25	68.25	38.86	39.81	43.13	43.6	41.71	40.69
174	10/10/2016	100	78.16	70.69	74.71	43.1	45.98	47.13	44.25	48.85	54.02	53

Appendix 35: Average October Likes_Received >3 from day 1 to 10

October Likes_Received >3
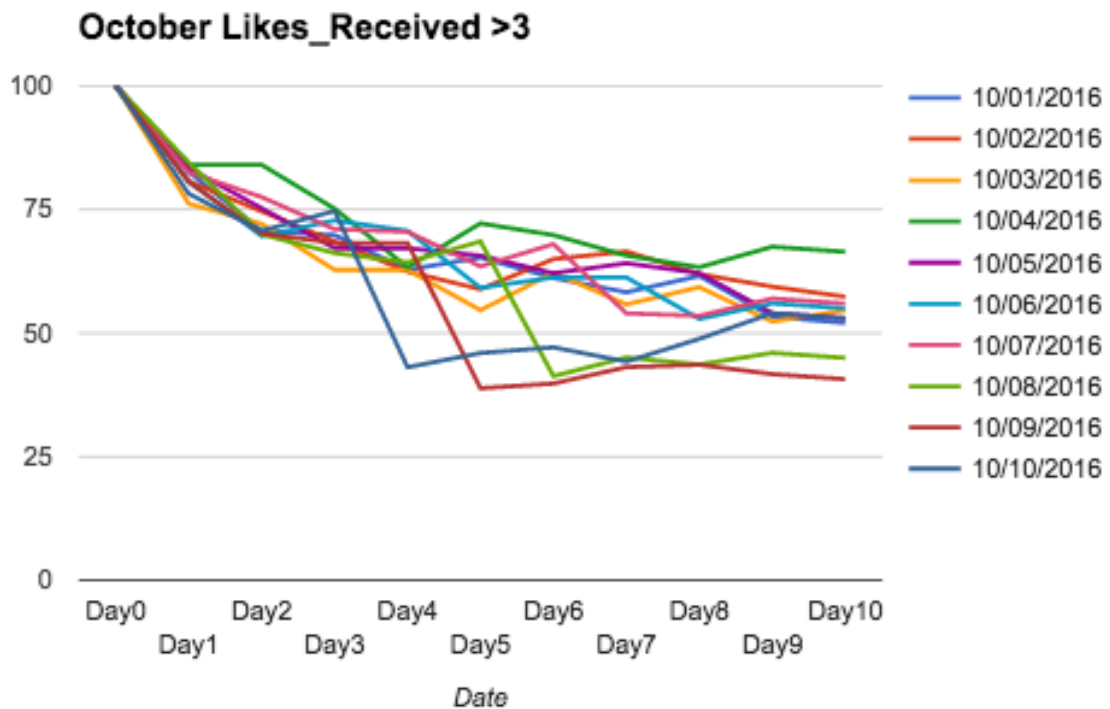
Appendix 36: October Comments_Received >= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
125	10/01/2016	100	67.2	55.2	48.8	52.8	45.6	43.2	41.6	49.6	40	43.2
116	10/02/2016	100	62.93	62.07	49.14	47.41	48.28	41.38	51.72	43.1	44.83	37.93
116	10/03/2016	100	73.28	66.38	66.38	55.17	53.45	63.79	58.62	58.62	47.41	50.86
102	10/04/2016	100	71.57	60.78	54.9	49.02	58.82	50.98	50.98	48.04	50	48.98
117	10/05/2016	100	68.38	61.54	55.56	61.54	48.72	48.72	52.14	52.99	44.44	43.42
115	10/06/2016	100	68.7	64.35	69.57	55.65	53.04	47.83	60	34.78	40	38.98
104	10/07/2016	100	71.15	65.38	58.65	57.69	52.88	57.69	44.23	47.12	50	48.98
128	10/08/2016	100	71.88	55.47	50	51.56	54.69	31.25	30.47	30.47	30.47	29.45
92	10/09/2016	100	79.35	65.22	63.04	65.22	28.26	26.09	32.61	30.43	31.52	30.5
94	10/10/2016	100	58.51	52.13	56.38	34.04	30.85	35.11	32.98	29.79	26.6	25.58

Appendix 37: Average October Comments_Received >= 1 and <= 3 from day 1
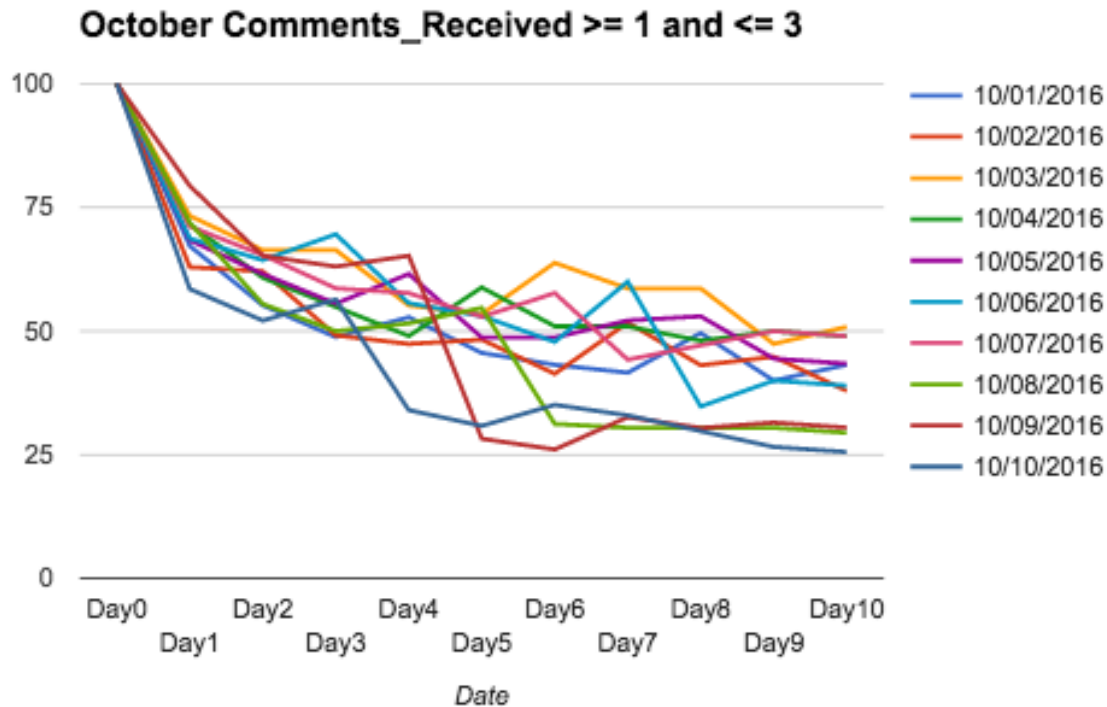

to 10

Appendix 38: October Comments_Received >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
69	10/01/2016	100	92.75	85.51	88.41	88.41	85.51	79.71	79.71	75.36	72.46	72.46
55	10/02/2016	100	83.64	80	80	74.55	69.09	80	81.82	76.36	67.27	72.73
43	10/03/2016	100	88.37	79.07	76.74	74.42	72.09	72.09	72.09	69.77	69.77	65.12
54	10/04/2016	100	87.04	88.89	87.04	72.22	75.93	83.33	77.78	74.07	74.07	73.05
50	10/05/2016	100	94	90	82	80	80	74	76	70	82	80.98
60	10/06/2016	100	91.67	78.33	68.33	80	71.67	70	66.67	73.33	71.67	70.65
61	10/07/2016	100	90.16	83.61	75.41	73.77	68.85	68.85	63.93	57.38	70.49	69.47
57	10/08/2016	100	91.23	82.46	82.46	75.44	80.7	66.67	66.67	66.67	75.44	74.42
62	10/09/2016	100	83.87	83.87	85.48	75.81	72.58	74.19	77.42	74.19	69.35	68.33
50	10/10/2016	100	84	74	72	58	66	58	62	70	72	70.98

Appendix 39: Average October Comments_Received >3 from day 1 to 10

October Comments_Received >3
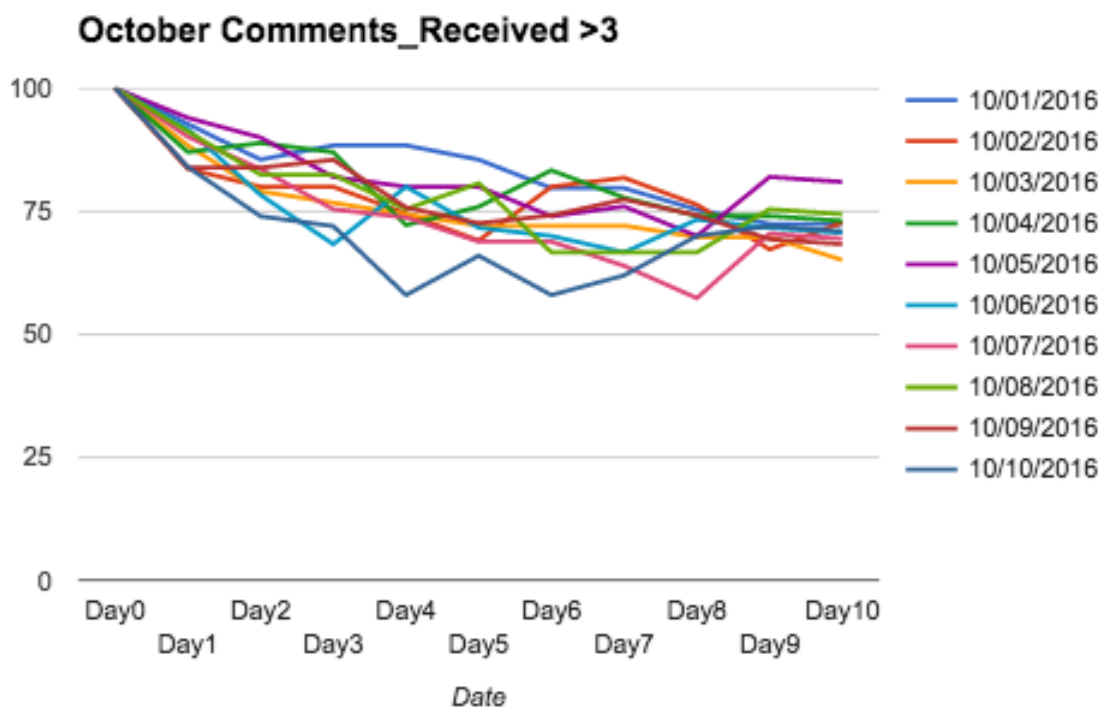
Appendix 40: October Followers>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
887	10/01/2016	100	46.11	36.19	24.69	31.34	25.7	23	26.72	31.45	20.07	20.74
995	10/02/2016	100	41.11	34.57	29.45	28.94	24.02	25.13	32.46	20.7	19.9	18.79
971	10/03/2016	100	41.09	35.43	29.04	29.45	21.73	33.16	25.64	22.86	19.98	25.44
804	10/04/2016	100	47.51	39.18	28.73	28.48	35.45	24.5	28.48	21.27	27.11	26.09
973	10/05/2016	100	42.34	35.77	26.1	35.25	24.15	25.39	24.77	27.85	9.46	8.44
925	10/06/2016	100	40.11	32.32	36.86	26.59	26.59	23.46	28.11	8.86	8.76	7.74
812	10/07/2016	100	43.35	42.61	30.17	31.77	26.23	28.94	10.96	11.95	11.21	10.19
757	10/08/2016	100	56.14	38.71	31.44	32.5	36.06	8.85	9.11	8.72	9.64	8.62
1428	10/09/2016	100	36.48	29.27	25.35	28.43	4.48	4.83	4.69	4.62	4.13	3.11
704	10/10/2016	100	43.32	36.79	35.51	6.68	7.53	7.24	7.39	7.95	9.52	8.5

Appendix 41: Average October Followers>= 1 and <= 3 from day 1 to 10

October Followers>= 1 and <= 3
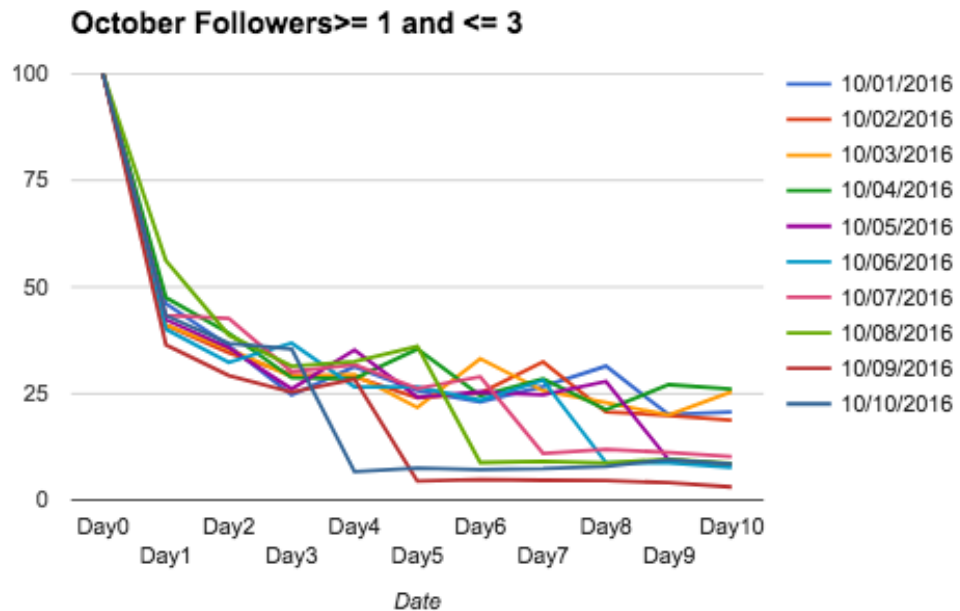
Appendix 42: October Followers >3

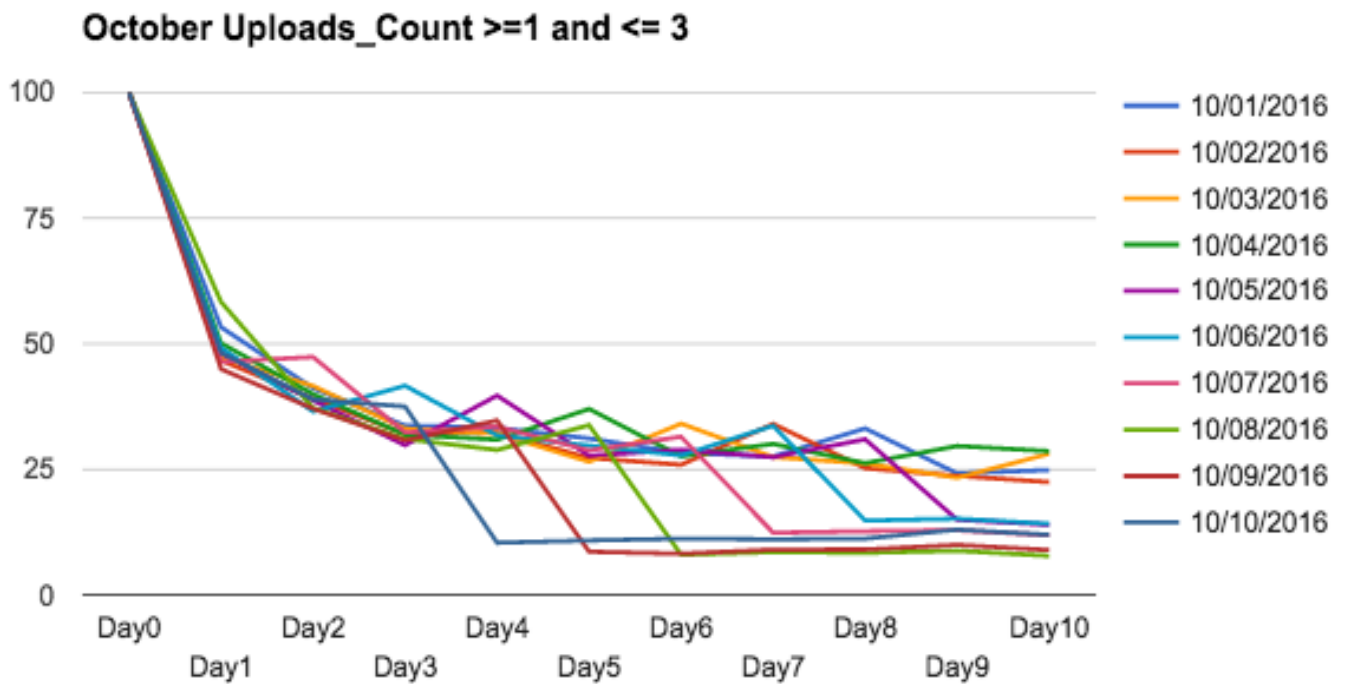| Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
43	10/01/2016	100	83.72	81.4	76.74	74.42	72.09	65.12	62.79	67.44	62.79	62.79
33	10/02/2016	100	87.88	81.82	78.79	60.61	66.67	66.67	63.64	60.61	60.61	60.61
47	10/03/2016	100	80.85	80.85	70.21	65.96	57.45	72.34	61.7	63.83	53.19	48.94
46	10/04/2016	100	91.3	86.96	82.61	80.43	86.96	80.43	84.78	84.78	76.09	75.07
60	10/05/2016	100	86.67	78.33	78.33	73.33	68.33	68.33	66.67	68.33	65	63.98
41	10/06/2016	100	85.37	73.17	75.61	80.49	68.29	65.85	60.98	63.41	75.61	74.59
47	10/07/2016	100	85.11	76.6	63.83	72.34	78.72	78.72	65.96	65.96	72.34	71.32
57	10/08/2016	100	87.72	91.23	73.68	78.95	78.95	57.89	64.91	64.91	68.42	67.4
50	10/09/2016	100	86	82	82	76	66	60	66	64	70	68.98
47	10/10/2016	100	82.98	70.21	76.6	48.94	57.45	53.19	53.19	55.32	59.57	58.55

Appendix 43: Average October Followers >3 from day 1 to 10
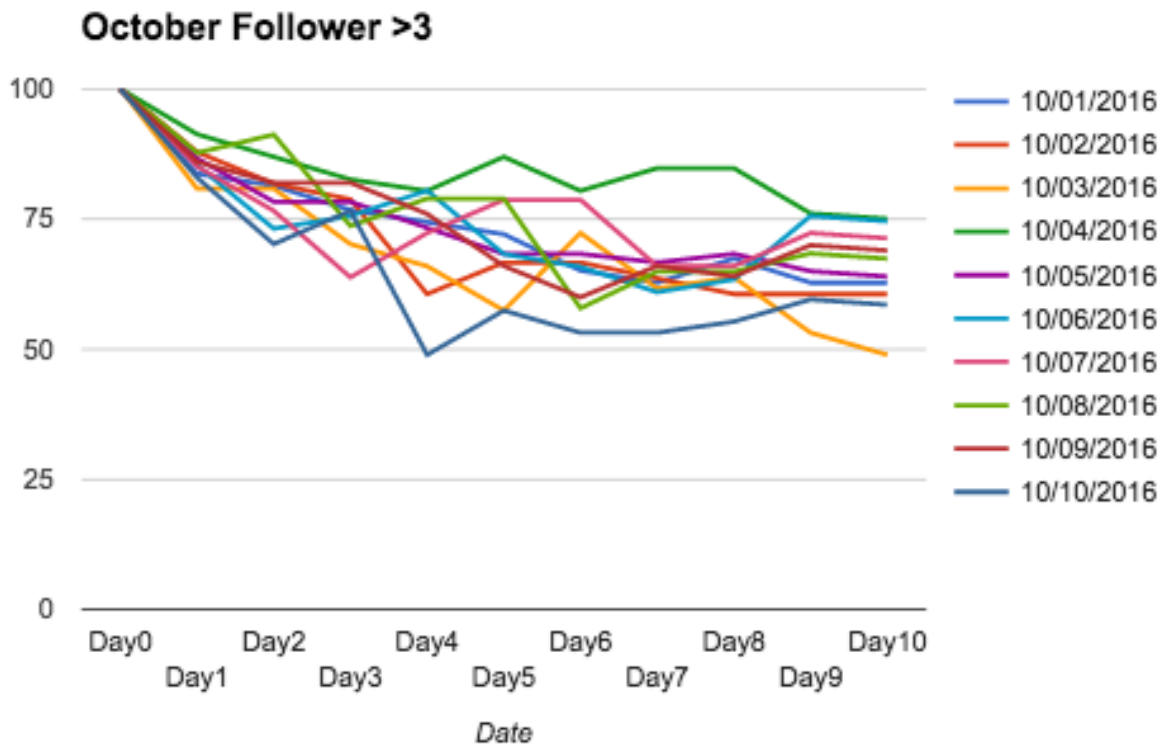
Appendix 44: October Uploads>= 1 and <= 3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
3000	10/01/2016	100	53.3	41.17	33.73	33.27	31.17	28.3	27.6	33.17	24.2	24.9
3034	10/02/2016	100	46.7	39.12	32.04	32.4	27.29	25.94	34.05	25.25	23.73	22.48
2570	10/03/2016	100	47.28	41.6	33.11	32.14	26.54	34.12	27.47	26.19	23.35	28.13
2373	10/04/2016	100	50.11	39.99	31.94	30.93	37.04	27.6	30.09	26.25	29.67	28.65
2445	10/05/2016	100	48.14	38.73	29.82	39.71	27.73	28.92	27.44	31	15.01	13.99
2590	10/06/2016	100	49.23	36.53	41.66	31.78	29.73	27.8	33.71	14.83	15.21	14.19
2392	10/07/2016	100	46.4	47.37	32.36	33.53	28.8	31.52	12.42	12.71	12.92	11.9
2649	10/08/2016	100	58.32	37.22	31.07	28.88	33.82	8.04	8.57	8.42	8.83	7.81
2973	10/09/2016	100	44.97	37.1	30.78	34.75	8.64	8.24	9.05	9.08	9.99	8.97
2188	10/10/2016	100	48.22	38.94	37.52	10.42	10.88	11.24	11.11	11.24	13.03	12.01

Appendix 45: Average October Uploads>= 1 and <= 3 from day 1 to 10

Appendix 46: October Uploads >3

Day0(abs)	Date	Day0	Day1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10
392	10/01/2016	100	75.77	60.97	51.53	49.49	46.17	42.35	45.15	51.28	39.8	38.27
392	10/02/2016	100	64.54	57.65	48.72	46.68	45.15	44.9	51.02	42.09	41.33	40.56
274	10/03/2016	100	67.88	58.39	54.38	53.28	47.45	52.92	47.81	41.97	38.69	42.7
257	10/04/2016	100	71.98	63.42	52.53	45.91	58.75	51.75	49.42	45.91	47.08	46.06
261	10/05/2016	100	77.39	60.54	51.72	56.32	51.72	46.74	50.19	49.04	32.18	31.16
297	10/06/2016	100	72.05	55.22	58.92	53.2	45.79	43.1	49.16	30.3	34.68	33.66
278	10/07/2016	100	70.5	65.83	53.6	51.44	45.68	50	28.06	27.34	29.86	28.84
345	10/08/2016	100	77.97	56.52	51.3	48.7	50.14	15.65	15.07	19.13	20.58	19.56
398	10/09/2016	100	68.09	55.03	48.49	51.76	15.83	16.33	19.85	17.84	20.1	19.08
269	10/10/2016	100	60.22	54.28	52.42	20.45	20.07	21.56	20.45	22.3	28.62	27.6

Appendix 47: Average October Uploads >3 from day 1 to 10

October Uploads_Count > 3