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A PORTRAIT OF THE RECTOR AS A TWEETING MAN

Paul Wouters, Zhichao Fang and Rodrigo Costas¹

FOREWORD

Dear Carel, this contribution to the *Liber Amicorum* in your honour is a kind of self-portrait. You probably had not realized that you had made it. Our role, compared to yours, is quite modest: Zhichao, Rodrigo and I are only making visible what you painted yourself. We are of course talking about one of your most characteristic modes of communication to the world: your incessant stream of tweets. Your followers will already have a good impression. Nevertheless, the overall picture does not emerge spontaneously if one just reads your tweets one after the other. This is where we come in: we collected most of your tweets (until July this year) and put them in our altmetric analytical engine. This was an interesting methodological exercise because it indicates new application possibilities for this type of scientometric analysis. So, we are grateful that you gave us this possibility. But for this *Liber Amicorum*, we do not emphasize the methodological issues (we will do this in another publication) but the substantive results. We hope that you will enjoy the mirror we hold up to you, and that you will be stimulated to further engage with the world through your mobile megaphone. Keep up the good job, keep painting!

Warmest regards, Paul, Zhichao, and Rodrigo

INTRODUCTION

Since the first tweet on August 24, 2012 (Figure 1), Carel Stolker, Rector of Leiden University, has posted a total of 11,601 tweets up to July 15, 2020. Based on the collected tweet data, we depict this Twitter portrait of Carel Stolker from three distinctive perspectives. The first perspective presents his general tweet-

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ing behaviour in different time scales; the second one focuses on the engagement behaviour of readers and followers with respect to his tweets; the last perspective tracks the contents over time. In this way a three-dimensional portrait of the tweeting Rector is made visible.



Figure 1 The first tweet of Carel Stolker.

Table 1 lists the categories of tweets and their presence in Stolker's Twitter landscape. Original tweets, reply tweets and quote tweets are the three types in which Twitter users use their own words, while the retweet is the category generated by clicking the retweet button directly without original contents added. The table shows that the majority of Stolker's tweets are those with his original opinions, and these 7,463 tweets (accounting for 64.3%) are analyzed in the following sections. A first conclusion can already be drawn: Stolker uses the Twitter medium mainly to express his own views, not primarily to applaud and distribute other people's opinions.

Table 1 Categories of Carel Stolker's tweets.

Category	Concept	Number	proportion
Original tweet	A tweet originally posted by a Twitter user.	4,874	42.0%
Reply tweet	A reply tweet is a response to a tweet.	1,747	15.1%
Quote tweet	A quote tweet is a re-posting of a tweet by using Twitter's native retweet functionality with original comments attached.	842	7.3%
Retweet	A retweet is a re-posting of a tweet by simply using Twitter's native retweet functionality without comments attached.	4,138	35.6%

TEMPORAL DISTRIBUTION ANALYSIS

Figure 2 shows the temporal distribution of Stolker's tweets on four different time scales: by year, by month, by day of the week, and by hour of the day. Over the years the number of tweets from Carel Stolker has been rising (Figure 2A). We can expect that the number of tweets for 2020 will also be higher than for 2019 since the last column only measures the first half of 2020. Figure 2B shows the distribution by month (for all years taken together). September and October are his busiest tweeting times in a year; he posted the most tweets in these two months.² By comparison, in July and August, the two months that are mostly

² Since the tweet data were collected in the middle of July 2020, only tweets posted between 2013 and 2019 are considered in the month-level analysis to avoid bias.

used for holiday, he posted less tweets. If we look at the week level (Figure 2C), Stolker tweeted more frequently on weekdays. Especially on Friday he tends to spend more time on tweeting. It is obvious that on Sunday, Carel Stolker always takes a break, thus leading to less tweets on that day. In this sense, the Rector lives the good example in the current debate about the working climate at Dutch universities. This looks different, though, if we look at the hours of the day during which Stolker is active on the Twitter channel (Figure 2D). Our Rector turns out to be a “nightbird”. Except for the time period between 1:00 AM and 8:00 AM (for sleeping?), Carel Stolker tweets at any moment, and around midnight seems to be his most productive period on Twitter. This raises the question whether our Stolker sees tweeting as work or as a nice hobby. But this question can only be answered by the social science technology of an interview which is beyond the scope of a *Liber Amicorum* chapter.

To what extent is Stolker’s tweeting different from that of the average Twitter user? To answer this question, we selected a sample consisting of 41,074 Twitter users in the Netherlands who were involved in the dissemination of scientific publications on Twitter, to explore the temporal distribution of their tweets. Similar to Carel Stolker, Dutch users tweeted more frequently on workdays but less on the weekend. However, different from the nightowl way of tweeting by Carel Stolker, more Dutch users choose to spend their time on Twitter in the morning.

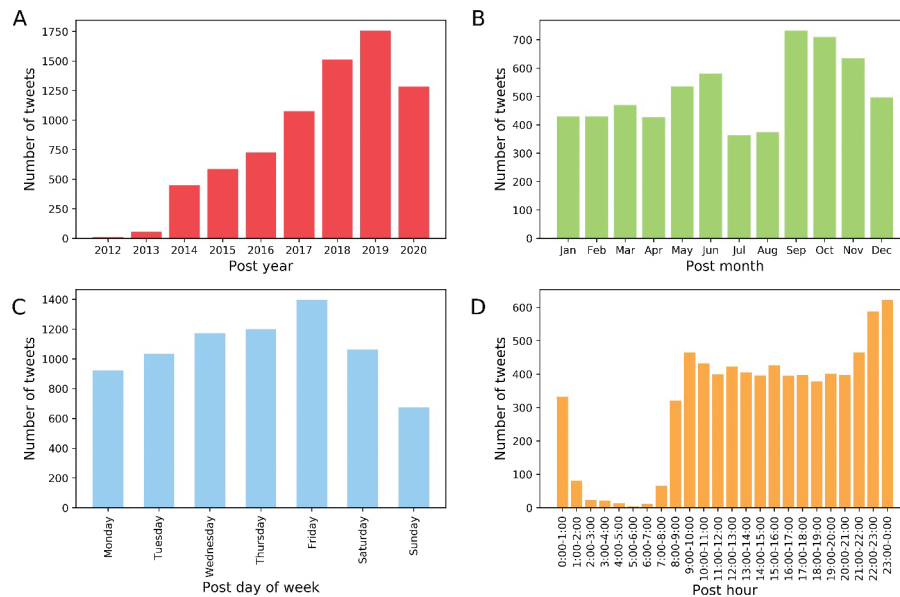


Figure 2 Temporal distribution of tweets: (A) tweets in different years; (B) tweets in different months; (C) tweets in different days of week; (D) tweets in different hours of day.

Also, an interesting question is which technology is used for tweets. As shown in Figure 3, Stolker mainly used four tweet sources for surfing the Twitter world: Twitter for iPad, Twitter for iPhone, Echofon, and Hootsuite, among which Twitter for iPad is his most used tweet source, followed by Twitter for iPhone. At the early stages of Carel Stolker's Twitter life, he only used Echofon and Hootsuite to manage his Twitter account. However, in 2017 his preferred tweeting tools transferred to mobile devices. This may be seen as an indication of further integration of twittering in Stolker's daily routines.

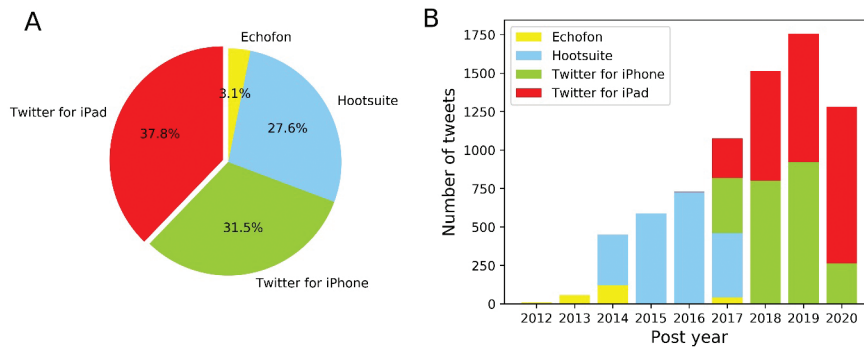


Figure 3 Usage of different tweet sources: (A) percentage of used tweet sources; (B) temporal distribution of the usage of tweet sources over the post years.

ENGAGEMENT BEHAVIOUR ANALYSIS

As presented in Table 2, the 7,463 tweets posted by Carel Stolker received 3.1 retweets and 8.4 likes on average per tweet. The most retweeted tweet got 277 retweets, and the most liked tweet accumulated 612 likes. We compared the engagement degree of Carel Stolker's tweets with that of Dutch users' tweets as well. In general, Dutch users' tweets about scientific publications attracted 1.4 retweets and 2.7 likes on average. This means that Stolker is very popular in the Twitter universe: he has more than twice as much retweets and more than three times more likes.

Table 2 Descriptive statistics of retweet counts and like counts.

Engagement	Average	Median	Mode	Min.	Max.	STD.ev
Retweet counts	3.1	1	0	0	277	7.8
Like counts	8.4	3	0	0	612	21.3

Figure 4 shows the most retweeted tweet and the most liked tweet, respectively. The most retweeted tweet is a call during the COVID-19 crisis on students to fight the pandemic together, while the most liked tweet is about the measures taken by Leiden to take in orphaned refugee children from Greece. Since both tweets reflect important values of Leiden University, Carel Stolker is apparently not alone in his appeals for these values.



Figure 4 (A) the most retweeted tweet; and (B) the most liked tweet.

Figure 5 shows the distribution of the number of retweets and likes received by tweets posted in different days of week. In general, the numbers of these two types of engagements of tweets in different days do not differ much. By comparison, tweets posted from Wednesday to Friday seem to get relatively less engagements, while tweets on weekends and Monday are more likely to attract engagements.

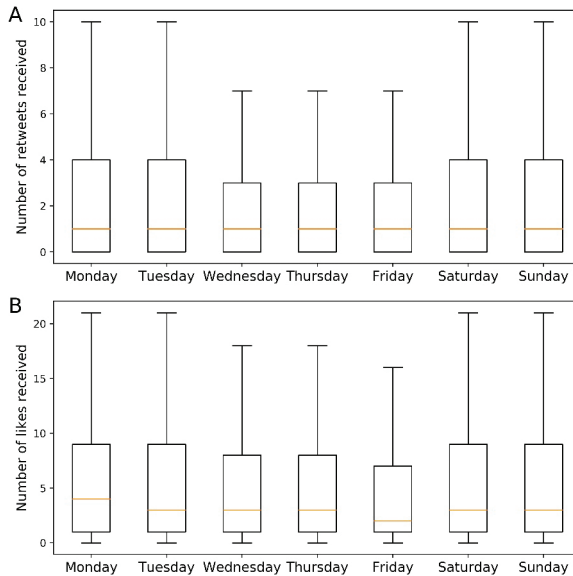


Figure 5 Boxplot of (A) number of retweets received by tweets in different days of week; (B) number of likes received by received by tweets in different days of week.

TWEET CONTENT ANALYSIS

This brings us to the third dimension: what is Carel Stolker tweeting about? We first look at *who* Stolker mentions in his tweets. In total, he has mentioned (by the @ symbol) 1,726 unique Twitter users in his tweets. The top-10 most mentioned users are listed in Table 3, as well as the official Twitter accounts of the seven faculties of Leiden University (highlighted in bold). Twitter accounts of Leiden University and her affiliated faculties are most frequently mentioned by Carel Stolker. The role of Stolker as Rector and voice of all faculties of Leiden University and his political role are clearly reflected in his tweeting priorities.

Table 3 The top-10 most mentioned Twitter users and the seven faculties in Carel Stolker's tweets.

Rank	Twitter username	Frequency
1	Universiteit Leiden	2,181
2	Leiden Law School	343
3	Leiden Science	313
4	LUMC Leiden	263
5	Leiden University – Faculty of Humanities	231
6	Ver. Universiteiten	196
7	TU Delft	169
8	Leiden Alumni	139
9	Leiden-Delft-Erasmus	134
10	Ingrid van Engelshoven	129
15	Leiden SocialScience	111
24	UniLeiden FGGA	66
31	Leiden Archaeology	57

Another question is how Stolker relates to the network of social relations among the other actors in the Twitter universe. To draw this map, we make use of the way users are linked via tweets. Once two users are mentioned in a tweet at the same time, there exists a “co-mention relationship” between these two users. Figure 6 shows the co-mention network of the 63 most relevant Twitter users who have been mentioned by Carel Stolker. These 63 Twitter users turn out to be clustered into four related but different communities. These are: Leiden University and faculties (blue cluster), organizations and internal actors in Leiden University (green cluster), the Leiden-Delft-Rotterdam collaboration (yellow cluster), and the other Dutch universities and organizations (red cluster). Again, it is clearly a profile fitting for a University Rector.

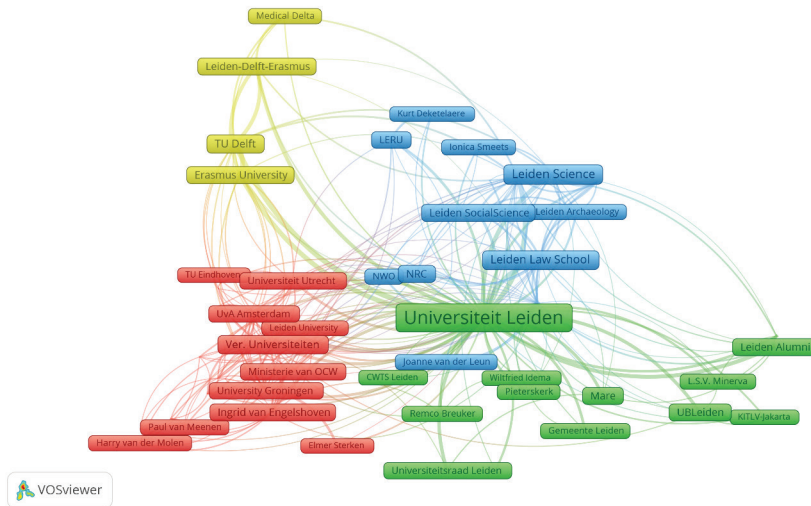


Figure 6 Co-mention network of Twitter users mentioned in Carel Stolker's tweets.

Lastly, we are of course also interested in the substantive topics that Carel Stolker touches upon in his tweets. This can be analyzed based both on the hashtags (the symbol #) that Stolker adds to his tweets and the full text of the tweets.

First, we analyzed the hashtags of his tweets and the extent to which they occur together in a tweet. Stolker has used 808 unique hashtags in total. Figure 7 shows the co-occurrence network of hashtags that have been used by Carel Stolker. The size of node is proportional to the frequency of appearance, while the color is determined by the average post year. The position in the network is based on the extent of co-occurrence (the closer together, the more frequently used together).

