

Public Engagement with Science via Social Media: A Case of Communicating the Pandemic on Twitter

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ABSTRACT

The poster describes a project which analyzes interactions between laypeople and experts via social media. Our aim is to understand how experts and the general public interact with each other on social media, and how we can use current data to improve these interactions in the future. We created a Twitter bot to obtain data from 15 COVID-19 experts and 7 federal government-sponsored public health organizations from English-speaking countries. The data were analyzed in R to investigate the relationships among Followers, Favorites, Retweets, and Hashtag Count per tweet. The preliminary analysis indicated statistically significant differences between various variables including: Number of Favorites, Number of Retweets, Number of Hashtags, and Number of Followers; the results shed light on the current relationship between the public and experts on social media.

KEYWORDS

Social media; online public engagement with science; Twitter; science communication.

INTRODUCTION

Effective communication of scientific knowledge encourages the public to take a greater interest in science, place increased value in the contributions of scientists, and help foster public support for the funding of scientific research (Dudo & Besley, 2016). Traditionally, scientific knowledge has been largely disseminated in a linear fashion—from the scientist to the general public via mediators like journalists—limiting participation in discussion, interpretation, and production of knowledge on the part of the general public (Callon, 1999). However, due to the prevalence of social media platforms like Twitter and Facebook, it is now much easier for the public to engage in the production of knowledge. This affordance has helped shape the presentation of scientific knowledge on online social media platforms (National Science Board, 2018), as well as provided opportunities in which the public can easily process facts in relation to their values (Feenberg, 2017).

The recent pandemic, COVID-19, created dire needs among scientists and public health organizations to communicate directly to the general public swiftly (Rufai & Bunce, 2020). We investigate the factors that affect greater engagement among the public on social media by investigating Twitter posts by 15 renowned scientists (i.e., Aaron Carroll, Jeremy Faust, Tom Frieden, Atul Gawande, Tedros Adhanom Ghebreyesus, Scott Gottlieb, Syra Madad, Vivek Murthy, Angela Rasmussen, Caitlin Rivers, Andy Slavitt, Craig Spencer, Devi Sridhar, Eric Topol, Rochelle Walensky), as well as governmental health organizations from 7 countries (i.e., Australia, Canada, Ireland, New Zealand, South Africa, United Kingdom, United States).

METHODS

First, we conducted multiple searches to identify the names of as many renowned scientists and researchers as possible. We surveyed various articles from trustworthy sources, such as Nature and BBC, and identified researchers and scientists who had direct connections to COVID-19 research, COVID-19/Pandemic discourse and discussion, and vaccine research/production. We then examined their individual Twitter accounts to evaluate if they had enough followers (approximately over 20,000) to receive active engagement (Wadhwa, Latimer, Chatterjee, McCarty, & Fitzgerald, 2017). Our previous observations showed that this number of followers generally correlates with active engagement rates on almost every post. We also confirmed that these accounts had enough posts from which to obtain relevant data (i.e., a post at least once every other day). We then narrowed down the selection to individuals with the highest number of followers. From that group, 20 were chosen based on the frequency of posts, engagement numbers, and the ratio between unique posts and retweets. We also added Dr. Aaron Carroll's account, given his recent New York Times op-ed articles and active Twitter involvement, even though he was not mentioned in any of these lists.

For the country selections, we first searched for “majority English-speaking countries” by comparing various lists publicly available on the internet from online encyclopedias (e.g., Wikipedia) and academic institutions (e.g., University of Northampton, University of Sheffield). From these lists, we chose 7 of the largest nations considered to be in the “Anglosphere” because they are comparable with government structure, as well as the quality of life.

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Then we identified each country's largest government-sponsored public health organization with a substantial social media presence.

Once we had the list of the 20 top scientists and 7 countries, we harvested the 100 most recent tweets from each individual as of June 1, 2021, which we then analyzed by calculating correlation coefficients to identify relationships between the numbers of favorites, retweets, hashtags, and followers.

FINDINGS

The results of linear regression of the scientists and their total combined values (labeled as *All Individuals*) are presented in Table 1. We examined the relationships between the numbers of favorites, retweets, hashtags, and followers. We found statistically significant correlation coefficients between the numbers of favorites and retweets among 9 of the 15 individual Twitter accounts and *All Individuals*. Similarly, 4 out of 7 public health governmental organizations' Twitter accounts, as well *All Countries*, had a positive correlation between the number of favorites and retweets that were statistically significant. This means that with regard to these 13 Twitter accounts, the higher number of retweets, the higher the number of favorites—and vice versa. In addition, two individual Twitter accounts had statistically significant, yet moderate correlations, between individual accounts with the number of hashtags and favorites, and numbers of hashtags and retweets. In terms of hashtags, the numbers of hashtags and followers had a statistically significant correlation for *All Individuals*.

Twitter Account	Favorites / Retweets	Hashtags / Retweets	Hashtags / Favorites	Followers / Favorites	Followers / Retweets	Followers / Hashtags
All Individuals	0.1459421*	-0.0289164	-0.0204321	-0.0015537	0.005994603	0.3004851*
All Countries	0.6276162*	0.1344761*	0.1778187*	0.3497*	0.17782*	0.21853

Table 1. Correlations For Individuals and Countries Twitter Accounts Total

Table 1 also shows that 5 of the 6 relationships examined had a statistically significant positive correlation for the combined data extracted from these public health organizations' Twitter accounts (labeled as *All Countries*). In particular, the numbers of retweets and followers had strong correlations, while the numbers of favorites and followers had moderate correlations. This indicates that organizations which tend to employ social media managers, compared to individuals, have more variables that are statistically significant positive correlations. Obviously, social media managers are likely to have more sophisticated understandings of how Twitter and user engagement work. As such, they appeared to use hashtags more effectively. Surprisingly, the Institute of Public Health in Ireland's Twitter account (publichealthie) had a negative correlation between the numbers of hashtags and favorites. Further investigation of the data is necessary. The United States' Center for Disease Control's Twitter account (CDCgov) had shown a very strong correlation between the numbers of hashtags and retweets, possibly indicating that the audiences in the U.S. are more familiar with the use of hashtags, therefore employing them more effectively than the other accounts. The New Zealand's Ministry of Health Twitter account (minhealthnz) had three relationships (i.e., favorites and retweets; hashtags and retweets; hashtags and favorites) that were statistically significant. It is uncertain why this was the case, but one speculation is that New Zealand's Ministry of Health had a savvy Twitter account manager. Further investigations including interviews with these organizations will be useful.

CONCLUSION

These preliminary results provided an understanding of social media interactions between experts and laypeople via social media like Twitter. Just being an expert in a particular field may not be enough to make a noteworthy impact on social media; the knowledge of how to increase user engagement on Twitter may be necessary as well. We plan to expand the data set for further analysis. This will hopefully help scientists and public health organizations to effectively communicate with the general public, thus increasing their engagement on social media platforms. Information professionals who work in scholarly communication fields will likely benefit from the research. As noted by Collins, Shiffman, & Rock (2016), scientists have begun to take advantage of social media in order to communicate directly with the general public. As such, we need to unbox the dynamics of online public engagement with science in order to develop effective communication strategies.

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