#ScienceHug: An examination of Twitter science communication engagement

Sarah Thomas
200 Agricultural Administration Building
2120 Fyffe Road
Columbus, OH 43210
614-292-6909
thomas.4656@osu.edu

Joy Rumble
1680 Madison Avenue
119B Halterman Hall
Wooster, OH 44691
330-287-1368
rumble.6@osu.edu

Introduction

The conversation centered around biotechnology in agriculture is not always met with open arms. Social media is a place where biotechnology conversations occur, but the effectiveness of these conversations in communicating science is not well understood. The #ScienceHug movement was initiated by Kevin Folta, a horticultural scientist at the University of Florida and host of the Talking Biotech podcast, in August of 2021 to improve the reception of science communication on Twitter. This study aims to explore this hashtag and its engagement to understand how hashtag use elevates science communication.

Allen et al. (2010) suggests that those on Twitter want to be active participants in the conversation of agriculture and not an audience member. A 2015 study in Australia analyzed the hashtag, #agchatoz, on Twitter which was used for Australian farmers to virtually "meet up" (Burgess et al., 2015). The hashtag was also used to initiate discussions and establish frequent groups of contributors to the conversation. Furthermore, a business study examined the hashtag, #supplychain which notably received attention of stakeholders, manufacturers, and many more (Chae, 2015).

To understand the impact #Science Hug may be having on science communication, its engagement was compared to using #ScienceHug and #GMO, and posts using #GMO. This research contributes to research priority number one of the AAAE National Research Agenda.

Theoretical Framework

This study utilized the social information processing theory which helps to explain how people use technological communication to develop impressions and communication to build relationships over time (Walther, 2015). According to Fulk et al. (1987) attitude and behavior can come from information seen in a social context. A study by Lu et al. (2019) used social information processing theory to examine servant leadership and social environment. They found a positive effect on employee behavior between servant leadership and religious atmosphere while employee voice had a positive effect through servant leadership and housing prices.

In a study published by the *Journal of Agricultural Education* using Instagram to track state FFA association's promotion of diversity, it was found that there is a need to highlight more diversity in each state's membership (Lawson et al., 2021). Their research aimed to create a more positive, welcoming social media atmosphere. Similarly, Folta's #ScienceHug campaign attempted to do the same in creating a safe space for scientific conversation. Much of the research in our discipline has looked at perceptions, but this study aims to understand if different framing influences social relationships seen online.

Methodology

A quantitative content analysis was employed to evaluate Twitter and trends utilizing a combination of two hashtags: only #GMO, only #ScienceHug, and both #GMO and #ScienceHug. The analysis collected tweets from the beginning of August to the beginning of December in 2021. A population of 306 tweets was found during this time period for #ScienceHug. The combination of #ScienceHug and #GMO had a population of 158 tweets and #GMO had a population of 20,000 tweets. Initial Twitter data were gathered through Meltwater, a media monitoring and social listening platform. A random sample of 125 tweets (Watson,

2001) was then pulled for each hashtag combination (n = 375). Data were then collected on user; number of followers, retweets, comment, likes, and quote tweets; if the quote was a retweet and if Kevin Folta was the original creator of a quote that was retweeted. Two researchers coded 10% of the sample and then compared results to confirm intercoder-reliability. 100% agreement was observed between the two coders. Following data collection, an engagement rate was calculated for each tweet: Engagement rate = ((# of retweets + # of comments + # of likes + # of quote tweets)/ #followers) X 100) (Socialinsider, 2021). Descriptive statistics were used to compare the data for each hash tag.

Results/Findings

Tweets with #GMO had a higer average retweet rate than those using #ScienceHug or #ScienceHug and #GMO. Average number of likes was highest for those tweets with #ScienceHug and #GMO (See Table 1). The engagement rate was highest for the tweets using #GMO. 76 of the #ScienceHug tweets were retweets, with 61 of those originating with Kevin Folta. Similarly, 102 of the #ScienceHug and #GMO tweets were retweets, with 91 of those originating with Kevin Folta. Only, 5 of 81 retweets using #GMO originated with Kevin Folta.

Table 1

Average Frequency and engagement between hashtags

Hashtag	Retweet	Comments	Likes	Quote Tweets	Engagement Rate
	M(SD)	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*
#ScienceHug	7.17 (5.31)	.63(2.48)	37.88(32.95)	.66(.82)	28.50
#ScienceHug &#GMO	9.02(4.79)	.56(2.49)	45.31(24.57)	.55(.68)	24.65
#GMO	19.68(29.68)	.08(.58)	41.96(89.87)	1.47(2.67)	39.62

Discussion and Recommendations

This study found that #ScienceHug did not improve engagement with Twitter conversations about biotechnology. In a 2018 study (Mention Solutions, 2018) of more than 700 million tweets, the average tweet received a total engagement of 1,695 tweets and likes combined. This study found a much lower engagement rate. #ScienceHug primarily originated with Kevin Folta and the reach of the campaign was limited. Additionally, it is not reinforced that the hashtag increased the social processing of the tweets as there was little evidence of increased communication to build relationships (Walther, 2015). The premise of the #ScienceHug campaign to create a more positive science communication holds promise, but science communicators should be more intentional about its use and campaign planning. Strategic opinion leaders and social influencers should be utilized to elevate the campaign. Strategic messaging using the hashtag should also be planned. Once a campaign strategy is implemented further research could re-evaluate engagement as well as the effectiveness of the hashtag in elevating positive science communication. Who is engaging with the tweets utilizing the hashtag could also be assessed as was done by Chae (2015). Further research should examine the framing of the tweets using the different hashtags, to determine the quality and tone of the tweets analyzed in this study. The use of additional hashtag engagement should be explored and the way science communication can help in relationship development.

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