

“Spread is like wildfire”: Attracting and retaining attention in COVID19 science tweektorials

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Abstract

Digital spaces offer scientists new ways to share scientific knowledge with a broad public audience, in some cases leading to the emergence of new genres. This paper examines one new genre intended to inform a non-expert audience about scientific content: the informational tweet thread, or tweektorial. More specifically, the paper explores the rhetorical structure of 50 tweektorials on COVID19 content, focusing on how writers use rhetorical moves to share scientific information and to attract and retain readers' attention in the content-saturated space of social media. The analysis identifies eight rhetorical moves that regularly appear in these COVID19 tweektorial introduction and body posts. The moves emphasize urgency through their focus on immediate exigencies and their repetition and recirculation throughout a thread. The study's findings contribute to a growing body of research on public science genres and how they support the goals of Open Science.

Keywords: digital genres, rhetorical move analysis, tweektorial, genre analysis, public science genres

Resumen

Se propaga como el fuego: Atracción y retención de la atención en tweektorials científicos de la COVID19

Los espacios digitales ofrecen a los científicos nuevas formas de compartir su conocimiento con una amplia audiencia pública, lo que en algunos casos conduce a la aparición de nuevos géneros. Este artículo examina un nuevo género destinado a informar a una audiencia considerada como no experta sobre

contenido científico: el hilo de tuit informativo o tweektorial. Más específicamente, este documento explora la estructura retórica de 50 tuits sobre COVID19, centrándose en cómo los escritores usan movimientos retóricos para compartir información científica y atraer y retener la atención de los lectores en esta red social saturada de contenido. El análisis identifica ocho movimientos retóricos que aparecen regularmente en publicaciones de la introducción y del cuerpo de estos tweektorials sobre COVID19. Los movimientos enfatizan la urgencia a través de su enfoque en las exigencias inmediatas y su repetición y recirculación a lo largo de un hilo. Los hallazgos del estudio contribuyen a la creciente investigación sobre géneros de ciencia públicos y sobre cómo estos géneros respaldan los objetivos de la Ciencia Abierta.

Palabras clave: géneros digitales, análisis de movimientos retóricos, tweektorial, análisis de género, géneros de ciencia públicos

1. Introduction

Digital forums have given rise to new genres for sharing science with the public. These “public science genres” seem to be constantly expanding and evolving: podcasts, video explainers, and science blogs are just a few examples. In this paper, I examine a genre that has emerged on microblogs like Twitter: the informational tweet thread or “tweektorial” (Breu, 2020; Graham, 2020). Microblogs are known for their space constraints, limiting the number of characters per post; yet, users have found ways to exploit these restrictions by replying to their own posts to create “threads.” By threading together a series of posts, writers can share more detailed and complex texts, a practice that is well tailored to spreading scientific information to a broad audience. Tweektorials are gaining attention amongst scientists and medical professionals (Breu, 2019, 2020) though genre analyses of tweektorials remain rare, despite a growing number of studies (e.g., Luzón & Albero-Posac, 2020; Luzón, 2023) into the use of social media for science communication. Exploring tweektorials can contribute to our understanding of how scientists successfully communicate knowledge to non-specialists. For example, such analysis can help reveal the rhetorical strategies that may be unique to science writing in public fora, including the use of multimodal and digital features afforded by social media.

This paper specifically explores the rhetorical structure of tweektorials, with an eye toward how writers use rhetorical moves to achieve their goals of sharing scientific information with a broad public, and attracting and

retaining readers in the content-saturated space of Twitter. I begin by outlining how new digital genres respond and contribute to principles of Open Science and then by detailing the rhetorical features of the tweetorial and the need to better understand how scientists achieve their aims in the genre. Next, I share the results of a move analysis of 50 tweetorials, identifying common moves in the introduction and body posts of these texts. Finally, I consider the implications of this research for understanding how public science genres help fulfil the goals of Open Science.

2. Open science and digital genres

In the world of scholarly communication, digital affordances have opened up possibilities for how and with whom experts can interact and share their work. While the research article remains (for now) central to the work of knowledge production and dissemination, other genres have emerged alongside it. Some of these new genres are characterized by their expanded and diverse readership and are described by Kelly and Miller (2016), drawing on Kaplan and Radin (2011), as *parascientific*, meaning that they “do not fit clearly into the more traditional internal/external binary” (Kelly & Miller, 2016, p. 224) of communication lying either within or outside of the scientific community. Parascientific genres, instead, interact with both spheres simultaneously. Gero et al. (2021) also use the term “post-normal science communication” to describe communication that no longer assumes “a linear handoff from scientists to media to public” (p. 19) but rather participates in contextualized interpretation, transparency, and even advocacy. In aiming to transcend more traditional audience boundaries for scientific work, parascientific genres or post-normal science communication can also contribute to the goals of Open Science.

Open Science emphasizes transparency, accessibility, sharedness, and collaborative development of scientific work (Luzón & Pérez-Llantada, 2022). In the spirit of this openness, researchers are encouraged to share data online, to publish in open access forums, and to address social concerns through their work (Pérez-Llantada & Luzón, 2022). Digital communication complements the goals of Open Science by affording “multimodal, hypertextual, and interactivity functionalities that enable user content generation and dialogic exchange between scientists and citizens using a single electronic platform” (Pérez-Llantada & Luzón, 2022, pp. 4–5). In this

way, Open Science “accounts for and is facilitated by” emerging digital genres (Luzón & Pérez-Llantada, 2022, p. 32).

Social media offer digital spaces that are well suited to the democratization of science because of their uniquely interactive and highly shareable nature, allowing scientists the rare opportunity to engage with public audiences and to disseminate scientific knowledge to people who will not encounter the latest publications. Social media platforms are often likened to town squares, where people can discuss the latest issues in an informal setting. Microblogs are especially suited to responding to breaking news, often acting as social spaces that “create public knowledge about complex, unfolding events” (Kelly & Miller, 2016, p. 226). Given the highly social, interactive, and often personal nature of these spaces, much communication on social media may resemble casual conversation more than formal written texts. In his early discussions of genre, Swales (1990) described such conversation as “pre-generic ‘form of life’” (p. 59), which also seems an apt term for much of social media communication. Yet, some of the ways of communicating in these spaces have evolved into more stable-*ish* and recognizable categories of social action. Tweetorials, I believe, are one of those emerging genre categories that have become at least somewhat recurrent and recognizable.

3. The tweetorial as an emerging digital genre

Tweetorials are defined by Gero et al. (2021) as “a series of tweets that display sequentially on the Twitter platform and explain a technical concept” (p. 2) (see Figure 1). They may also be considered a parascientific genre (Kelly & Miller, 2016) and a kind of post-normal science communication (Gero et al., 2021), as they are often written for and interact directly with scientific *and* public audiences simultaneously. Much has been written about tweetorials in the area of medical education (e.g., Breu, 2019, 2020; Albin & Berkowitz, 2021), though they are by no means limited to this domain. A primary goal is to teach or share expertise, and as such tweetorials resemble several other educational or informational genres, such as tutorials, academic research articles, academic lectures or talks, science news reports, science blogs, stories, and news-sharing social media posts. Emerging out of social media, however, tweetorials can be more interactive and more personal than many of these genres. Heyd (2016) notes that digital genres lie on a kind of continuum from those that migrate from print to digital spaces more or less

intact (such as academic genres) to those that develop as new genres in digital spaces; tweetorials would seem to fall closer to this latter end, with their high capacity for hypertextuality and interactivity. An additional and important feature of tweetorials is that their readership can be extremely diverse, from a person with no understanding of the core scientific concepts to a professional peer.

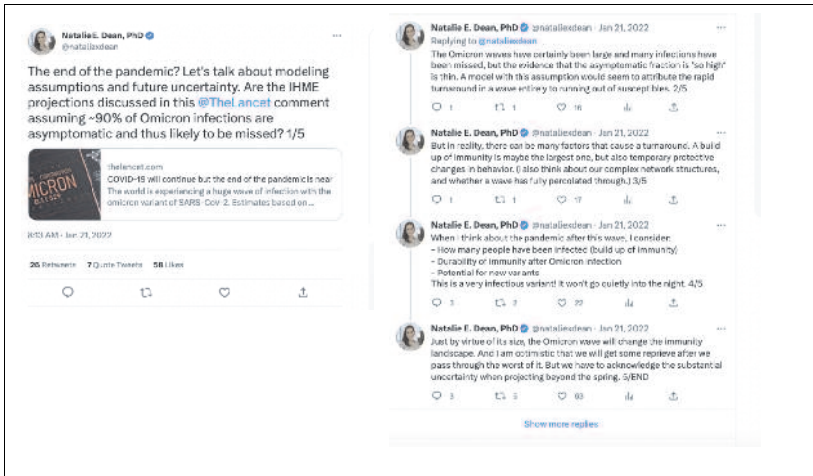


Figure 1. Covid19 tweetorial example (Thread 33)

Science-related tweetorials respond to several exigencies. First, they offer accessible content to a general audience, contributing to the democratization of science. Additionally, they can counter misinformation and disinformation (Graham, 2021), an increasing public concern. As urgent issues like climate change and public health emergencies plague the planet, the public is perhaps more than ever in need of up-to-date and accurate scientific information; tweetorials are uniquely suited to satisfy this need.

The tweetorial genre—in both its practices and forms—is also heavily shaped by the many contextual features of microblogs, where tweetorials are shared. Microblogs are crowded virtual spaces, where readers face a never-ending stream of constantly updated content. They are especially well suited to responding to situations characterized by a “lack of information, lack of comprehension, uncertainty, and confusion” (Kelly & Miller, 2016, p. 234), such as natural disasters, political crises, or health emergencies. Most people read microblogs on a mobile device with a relatively small screen and in short

spurts of time (often on public transit, in a queue, or perhaps while carrying out other tasks), meaning that they are generally scrolling through the content and making quick decisions on what to pause on and what to swipe past. The posts that appear in a user's feed are also likely to cover a wide spread of content, from news to entertainment to specialized interests. In this environment, all posts—including tweetorials—are vying for readers' attention, hoping to pause their scrolling and draw them in.

The ways in which readers encounter tweetorials in their feed also impact the genre. Although tweetorials are made up of threaded (sequenced and linked) tweets, microblog feeds display only single posts. Therefore, if a post is part of a longer thread, readers must click on "Show this thread" below the post, taking them to a page that expands the thread to its entirety. Clicking to view the thread is a quick action but one that many readers will forgo in this fast-paced and attention-dispersed digital space. Importantly, readers may first encounter the thread from *any* post within it. Within this textual environment, single posts must quickly grab and hold readers' attention, and they ideally can do so from multiple points of entry within the thread.

These contextual features (crowded informational space, small screen, quick and often distracted reading or skimming, and multiple thread entry points) have tremendous influence on the forms that tweetorials tend to take. For example, to deal with the constraints of space and time, tweetorials are likely to simplify content, like many digital genres in science (Belcher, 2023). Even with the option to write an extensive number of posts in any given thread, tweetorials authors are often advised to keep posts and threads short to maintain readers' attention (see Breu, 2020). To maximize engagement and reach, tweetorials use features like hyperlinks to in-depth content (often scientific articles), hashtags (allowing the post to be found in hashtag searches), @mentions (tagging other users), and images like graphs or charts. To appeal to a generalist audience, tweetorials often minimize specialized language, while colloquial language and personal content may be prevalent (Gero et al., 2021).

There have been some attempts to describe the macro-structure of tweets and tweetorials by rhetoricians and applied linguists (e.g., Orpin, 2019; Graham, 2020, 2021; Luzón, 2023), specialists in human-computer interaction (e.g., Gero et al., 2021), and scientists who use and advocate for tweetorials (e.g., Breu, 2020; Albin & Berkowitz, 2021); some of these descriptions are summarized in Figure 2.

<p>Moves in report-sharing single tweets (Orpin, 2019)</p> <ul style="list-style-type: none"> • Situation • Problem • Solution and possibly evaluation • Hyperlink to the scientific report 	<p>Moves in “literacy support tweetorials” (Graham, 2020, 2021)</p> <ul style="list-style-type: none"> • Invitational opening, assuming burden of proof and often establishing a dispute of ideas • Data dump • Closing metacommentary
<p>Common structure in tweetorials (Albin & Berkowitz, 2021)</p> <ul style="list-style-type: none"> • Hook/introduction • Overview/objectives • Teaching • Summary • Hashtags and user tags 	<p>Techniques in tweetorials across scholarly domains (Gero et al., 2021)</p> <p>Lede <i>Techniques used:</i> Refers to recent event that motivates thread (often personal); refers to view they will correct; shows authority; poses intriguing question; notes counterintuitive or unexpected subject</p> <p>Body <i>Techniques used:</i> Narrative; signposting; analogies; subjectivity (author’s personal experience); engaging conversationally; establishing credibility; media use; informal language and humor</p> <p>Conclusion <i>Techniques used:</i> significance statement; summary of information; call to action; where to learn more; reference to the lede</p>

Figure 2. Structures and techniques identified in analyses of educational tweets and tweetorials

In general, researchers note the presence of an eye-catching introduction post, a multi-tweet body that shares informational content, and a summary or conclusion. For the most part, however, these descriptions focus on a more general structural shape (introduction, body, conclusion) rather than on the more precise rhetorical functions that authors carry out within a tweetorial. One exception includes Orpin’s (2019) identification of a situation-problem-solution move sequence in single tweets that share scientific reports. In addition, examining “literacy support tweetorials” (tweetorials intended to correct misinformation), Graham (2020) describes the use of an invitational opening “that assumes the burden of proof and frequently establishes a *dissoi logoi*,” or dispute of ideas (p. 108). To my knowledge, a detailed analysis of the rhetorical moves used within an introduction post and also throughout a tweetorial has not been carried out. Understanding the use of and options for such moves is valuable because it can help reveal how authors achieve their goals of attracting and retaining readers’ attention and how they communicate scientific content in the public sphere.

4. Context, corpus, and methodology

Context plays an important role in the content and rhetoric of tweetorials, because social media posts often respond to current events. As such, the corpus for this study was limited to tweetorials published on Twitter over a two-month period from December 1, 2021 through January 31, 2022. This

period spanned the height of the first COVID19 Omicron variant surge in the United States, overlapping with surges in many parts of the world. This context is particularly notable in light of the previous studies of tweetorials, most of which did not explore time-sensitive tweetorials written in response to ongoing and urgent current events.

Within this time period, I identified 50 tweetorials on COVID19. To be included in the corpus, the thread had to include at least four threaded posts that were primarily informational, focused on COVID19, and written by a public health or medical specialist (according to their user profile). As Gero et al. (2021) have also noted, compiling a corpus of tweetorials is not a straightforward process because it is not possible to search Twitter specifically for threads. I first amassed a list of over 70 relevant Twitter users who post in English on COVID19 and other science- or health-related research. This list was drawn from numerous directories of scientists on Twitter (Brown, 2020; Peikoff, 2020; Society for Epidemiologic Research, n.d.). I then searched each user's posts from December 1, 2021 through January 31, 2022, identifying any that met the inclusion criteria. Several users did not have posts that met the criteria and were thus eliminated. Some users had multiple posts that met the criteria; in these cases, the thread with the highest engagement in the first post was included in the corpus, making this corpus somewhat biased toward more viral (and thus successful) threads. (Engagement was calculated by adding together a post's likes, retweets, or quotes.) All users whose threads were included in the corpus were verified as experts in their field through their institutional links or, if needed, internet searches¹. The 50 tweetorials in the corpus varied in length, use of images and hyperlinks, and engagement with the initial post in the thread. Table 1 shares an overview of the threads' characteristics.

	Lowest	Highest	Average per thread	Total # in corpus
# of posts per thread	4	36	11	543 posts
# of words per thread	96	1,425	470	23,514 words
# of images per thread	0	17	2	101 images
# of external links per thread	0	7	1	70 links
# of engagement actions	11	43,841	7,262	363,108 actions

Table 1. Characteristics of tweetorials in the corpus

Identifying the rhetorical move structure of digital texts can be complicated. Rhetorical moves are defined by Swales (2004) as “a discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse...It is a functional, not a formal, unit” (p. 28). Hyon (2017) advises analysts to focus not on what a text part is saying, but on what it is *doing*, or the function that it is carrying out. Crucially, moves can be as short as a word or phrase or as long as multiple paragraphs. Some moves may be carried out through one or more sub-parts, typically referred to as steps. Print-based texts tend to realize rhetorical moves primarily through alphabetic text and in a linear manner, while moves in digital texts may be embodied in diverse semiotic modes and are often less (or non-) linear (Hiipala, 2014; Sancho Guinda, 2015; Xia, 2020).

To analyze the moves in the 50 tweetorials, a thread reader app was used to convert each tweetorial into an individual .pdf file with the full text and all hyperlinks and images. These files were labeled (T1, T2, etc.) and uploaded to NVivo for analysis. The coding of rhetorical moves was an iterative process, following Hyon’s (2017) guidelines. I began by analyzing only the moves in the first post of each thread, which serves as a kind of introduction and is typically the most retweeted or liked post in a thread. Initial move categories were identified after analyzing a subset of these introduction posts, then categories were refined as all 50 introduction posts were analyzed. Next, all introduction posts were re-analyzed using the final set of moves. When all introduction posts had been analyzed, the process was repeated for identifying moves in the thread bodies. In the next section, I first share the moves identified in the introduction post and then those identified in the full threads.

5. Moves in introduction posts

The context in which a tweet thread is encountered has a great impact on the rhetorical choices that writers make in composing a tweetorial introduction post. As noted previously, readers can encounter any post from a thread, though most often it is the introduction post that they initially see in their feed. Introduction posts are especially important for writers because they must capture readers’ attention and entice them to read through the full thread—an action that requires the reader to stop scrolling and to pause on a single set text.

All of the informational threads in the corpus used one or more of the following moves:

- Announcing the topic
- Establishing exigence
- Establishing credibility
- Building curiosity

These moves work together to attract readers' attention and draw them into the thread. Table 2 outlines the moves, common steps, and illustrative examples from the corpus.

Move	Common steps	Examples
<i>Announcing the topic</i>	<ul style="list-style-type: none"> • Announcing thread topic • Referencing or sharing research • Providing visual information • Sharing a link 	<ul style="list-style-type: none"> • <i>Let's talk about natural immunity (NI) versus vaccine-induced immunity (VI) to SARS2.</i> • <i>1. A thread on the CDC's recommendation to de-isolate five days after the onset of symptoms or positive test.</i>
<i>Establishing exigence</i>	<ul style="list-style-type: none"> • Stating a problem • Announcing an argument or position • Personalizing the content • Sharing emotion related to the content 	<ul style="list-style-type: none"> • <i>A big problem with our pandemic response: binary thinking.</i> • <i>I'm so tired of this but I'll say it once more:</i>
<i>Establishing credibility</i>	<ul style="list-style-type: none"> • Establishing author's expertise • Disclosing conflicts of interest 	<ul style="list-style-type: none"> • <i>I've been tweeting about Covid for nearly 2 years.</i> • <i>First, a disclosure:</i>
<i>Building curiosity</i>	<ul style="list-style-type: none"> • Indicating a thread • Raising a question • Stating purpose of the thread • Describing thread structure 	<ul style="list-style-type: none"> •  • <i>Some thoughts on the evolutionary trajectory of SARS-CoV-2 so far, how it compares to other viruses, and what might happen next</i>

Table 2. Moves in informational tweet thread introduction posts

The *announcing the topic* move tells readers what the tweetorial is about, helping them decide whether to read more. Information about the topic can be shared through written text and through visuals like graphs, images, or infographics. With 64% (n=31) of introduction posts in the corpus using this move, it was common though not obligatory. When writers did use this move, it was most often the first or second move in their introduction post. Six of the 31 posts that included the *announcing the topic* move carried it out partly (never solely) through a visual.

The most common move in the introduction posts was *establishing exigence*, appearing in 74% (n=37) of posts. This move allows writers to communicate the importance, need, and/or urgency of a topic or issue. It taps into the unique microblog environment in which users are engaging with news as it

breaks, and authors are vying for readers. By demonstrating that an issue is in need of attention, authors can draw readers in.

Exigence can be established in tweets verbally or visually. Verbally, authors make note of a dire situation, often raising alarm bells for readers, as in these examples:

- (1) Spread is like wildfire. We all risk bringing infections from the community into hospitals — from staff, visitors, & patients in whom initial screening is missing early incubation (T22, 8 January 2022)
- (2) Omicron is causing a TSUNAMI, not a wave, of infections in the US. (T28, 14 January 2022)

These concerns can also be amplified through visuals, with three posts in my corpus using graphs to illustrate and highlight concerning trends, as in Figure 3.

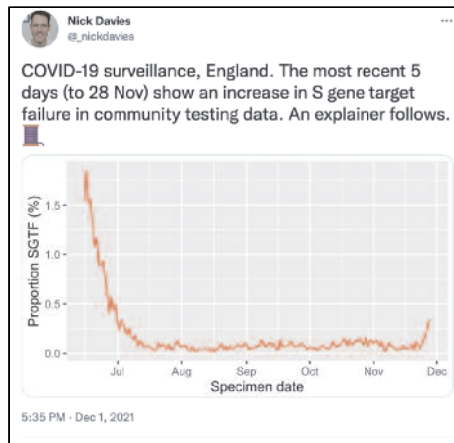


Figure 3. Establishing exigence move, realized through visual modality (T1, 1 December 2021)

Within this move, authors may express urgency by personalizing the content, focusing not only on scientific data but also on more relatable circumstances:

- (3) Well, I got 2 messages before 9am from friends telling me they have #COVID19 in their households. And in the 12 mins since, I've just heard about 4 more. So Merry Exponential Growth #Omicron #Christmas. 🎄😞 (T10, 25 December 2022)

Sharing personal circumstances, expressing emotion, or adopting a position shows the author as a human, not simply an objective scientist, potentially broadening public engagement with the tweet (see also Luzón, 2023; Tardy, 2023).

All introduction posts in the corpus included either the *announcing the topic* or *establishing exigence* move, with 36% (n=18) of the posts including both. These two moves, independently or in coordination, work to alert readers to the post's content and its importance, so using at least one of these moves is necessary for achieving authors' goal of attracting readers.

The least common move—found in just 10% of the posts—was *establishing credibility*, used to demonstrate authors' expertise and trustworthiness. Given the large amount of misinformation and disinformation spread on social media, it is unsurprising that some authors integrate references to their background, publications, or authority. Sometimes references to the author's expertise was direct (“I’ve been tweeting about Covid for nearly 2 years”), while in other cases it was more subtle (e.g., “It does make sense to shorten the recommended isolation period (**as others and I have been calling for** e.g. 🍌 ”). Authors also used disclosures of potential conflicts of interest as a means of sharing their expertise:

- (4) First, a disclosure: I was paid as a consultant for this work, done in collaboration with @Color Health, which provides COVID testing services and vaccination logistics. (T21, 8 January 2022)

By relaying their experience and knowledge, authors assure readers that the thread to come can be trusted, hopefully increasing the likelihood that readers will read more. Interestingly, four of the five instances of this move appeared at the start of the introduction post, immediately demonstrating authority to readers. At the same time, this move is likely less common than the other introductory moves because Twitter authors also establish their credibility through their usernames and bio and in more subtle ways such as their use of field-specific content.

Building curiosity was the second most common move in the introductions, included in 70% (n=35) of the posts. Here, writers serve out small teasers, indicating that more information of importance will be found in the full thread. One of the simplest ways to realize the *building curiosity* move is to indicate that a post is part of a thread—that is, that there is more to come. Writers signal this in several ways. Twenty-two of these posts included the

word *thread*, an emoji of a spool of thread (🧵), numbers, or ellipses (...) to indicate that the content continues:

- (5) An explainer follows. 🧵 (T1, 1 December 2021)
- (6) Full 🧵👉 (T19, 31 January 2022)
- (7) a thread, with nuance 1/n (T3, 4 December 2021)

Authors also build curiosity by raising questions (a strategy also found in three minute theses [Carter-Thomas & Rowley-Jolivet, 2020] and academic blogs [Luzón, 2013; Zou & Hyland, 2020]) or explicitly stating their aim or previewing the thread content, enticing users to read on:

- (8) You'll see headlines about reduced severity, but full story more complicated. My thoughts. (T7, 22 December 2021)
- (9) How do you do that? TL;DR - #BetterMasks, ventilation, and filtration 🧵 (T11, 26 December 2021)
- (10) A central, and perhaps the most avoided question is: How many COVID deaths, (mostly of old people) is a price worth paying for a return to normality? (T27, 14 January 2022)

These signpostings and teasers bear some resemblance to *Move 3: Occupying the niche* in Swales' (1990) Create a Research Space model, offering readers some structure and guidance for what is to come. These strategies are also part of what Hiipala (2014) calls a multimodal text's *navigational layer*, which guides users through the artefact. In contrast to research articles, the *building curiosity* move in tweetorials is typically realized through informal language, sometimes speaking directly to readers and other times using the vernacular language of social media. Because of its informality and teaser quality, the move is somewhat reminiscent of internet clickbait, enticing users to read on.

While move sequences usually have some variability, digital and multimodal genres seem to be even less predictable in move sequencing than print-based genres (Hiipala, 2014; Sancho Guinda, 2015; Xia, 2020). Sancho Guinda (2015), for example, examined 154 teaser-abstracts (very short abstracts, detached from the article) and found a "huge dispersion of move sequences" (p. 79). The introduction post moves in this corpus similarly showed little typification in sequencing. The most common sequences (with just 6 instances each) were:

- *Establishing exigence* (used as the sole move of the introduction post)
- *Establishing exigence* → *Building curiosity*
- *Announcing the topic* → *Establishing exigence* → *Building curiosity*

Yet 22 different sequences were identified in total, some including repeated use of certain moves (especially *establishing exigence* and *building curiosity*).

6. Moves in full threads

Once readers click on the introduction post to view the entire tweetorial, only part of the author's rhetorical work is done; now readers' attention must be retained through several more posts. The tweetorials in this corpus averaged 11 posts, so they typically would require some sustained attention. To retain their readers, authors use a range of rhetorical moves. Three introduction post moves—*establishing exigence*, *establishing credibility*, and *building curiosity*—are found with some frequency in the remaining “body” posts, and four additional moves are also used: *expanding on the issue*, *proposing actions or solutions*, *closing the thread*, and *promoting the thread*. Table 3 shares the frequency of moves in both the introduction posts and the body posts, demonstrating both their repeated and distinct usage in these different parts of the text. Table 4 describes the moves that appear only in the thread bodies.

Move	% of introduction posts with this move	% of post-introduction threads with this move
<i>Announcing the topic</i>	62% (n=31)	2% (n=1)
<i>Establishing exigence</i>	74% (n=37)	82% (n=41)
<i>Establishing credibility</i>	10% (n=5)	18% (n=9)
<i>Building curiosity</i>	70% (n=35)	62% (n=28)
<i>Expanding on the issue</i>	n/a	96% (n=48)
<i>Proposing actions or solutions</i>	n/a	62% (n=31)
<i>Closing the thread</i>	n/a	24% (n=12)
<i>Promoting the thread</i>	n/a	6% (n=3)

Table 3. Frequency of moves in introduction posts and thread body

Move	Common steps	Example
<i>Expanding on the issue</i>	<ul style="list-style-type: none"> • Sharing findings • Raising possibilities (counterfactuals; hypotheticals) • Expanding on a(n established) problem • Offering caveats/disclaimers 	<ul style="list-style-type: none"> • <i>But before I go on, I will remind my scientific and media readers that SGTF is only a proxy for Omicron, and is also found in other SARS-CoV-2 lineages. Lineage identity can only be confirmed by sequencing, and longer-term surveillance is required to establish any trend.</i>
<i>Proposing actions or solutions</i>	<ul style="list-style-type: none"> • Proposing actions • Proposing solutions 	<ul style="list-style-type: none"> • <i>There's still things we can do. [...] vaxed and boosted folks are in the best place to ride this out. And other stuff like masks will help control spikes.</i>
<i>Closing the thread</i>	<ul style="list-style-type: none"> • Indicating the thread has finished • Inviting responses 	<ul style="list-style-type: none"> • <i>/20 So, those are my thoughts for now. Probably incomplete--hit me up with what I missed in the comments.</i>
<i>Promoting the thread</i>	<ul style="list-style-type: none"> • @mentions 	<ul style="list-style-type: none"> • @IcahnMountSinai

Table 4. Additional moves in informational tweet threads

Among the four introduction moves, *establishing exigency* is the one most frequently used in the thread body, included in 82% of all thread bodies. By invoking exigency throughout the thread (not just in the introduction), authors establish and re-establish the importance, even urgency, of the information that they are sharing:

- (11) 2/ Hospitals are completely overwhelmed in terms of testing (T22, 8 January 2022)
- (12) I am particularly concerned about the short and long term impacts of our current situation on kids. (T30, 18 January 2022)

Although the *building curiosity* move is especially important in the introduction post, many authors also recirculate this move throughout the thread, likely to keep readers reading and possibly also to help structure the text. This move was used in 68% of the thread bodies. One common device in this move is the use of questions to draw readers in. Questions were used at the start or end of 28% (n=14) of all threads, as in these examples:

- (13) 4. **First, how much can #BetterMasks help?** There are countless KF94/KN95/N95 that get filtration above 99%. 99% would reduce your dose by a factor of 100. If everyone had an equivalent mask on, that's a factor of 10,000. Pretty good start, I'd say... <https://www.armbrustusa.com/pages/mask-testing> (T12, 27 December 2021)
- (14) And when the next pandemic comes, do we just add that disease to our repertoire after a period of mass death? What when diseases like malaria move north through climate change? What about rest of the world? We're moving backwards. 3\5 (T24, 9 January 2022)

Here authors simultaneously build curiosity and allow each post to speak directly to the reader and potentially lure them into the thread—a strategy that also considers the disjointed nature in which readers may encounter a thread (e.g., from the introduction post, the third post, or the 20th post).

An additional strategy for building curiosity is to end posts mid-idea with ellipses (...), indicating that the thought will continue in the next post, or (as in the introduction posts) to include numbers to indicate the post's placement in the thread. These sequencing markers, which may entice users to keep reading, are included in 27 of the 28 threads that use the *building curiosity* move.

The *establishing credibility* move, like *establishing exigence*, was used more frequently in the body posts than introduction posts, appearing in nearly one-fifth of all thread bodies. The need to establish an author's credibility is, again, likely related to the prevalence of untrustworthy information on social media. By overtly signaling their expertise, authors demonstrate to and remind readers that their information is reliable. This move can appear in many places in a thread, and writers carry it out in numerous ways, such as citing their own work or noting that reputable organizations view them as an expert:

- (15) I am 100% for getting people to drop isolation early. **Heck, I formally recommended it to CDC in May 2020 and Published the recommendation in J of Clin Infectious Diseases in April 2020.** But it was always with a negative test. What the heck are we doing here? (T13, 27 December 2021)
- (16) Disclosure: even though I am involved only in providing reagents and expertise in neutralization screen, this entire project was undertaken pro-bono during a difficult time for my lab. (T40, 25 January 2022)

I coded only explicit markers of credibility, but authors also establish credibility in more subtle ways, such as through linking to reputable academic journals or by adding scientific visuals (Xia, 2023). Coding these strategies as part of the *establishing credibility* move would have increased its overall prevalence, perhaps bringing it more in line with Gero et al.'s (2021) finding that 72% of the tweetorials in their corpus included this technique.

The most common move in the thread bodies was *expanding on the issue*, a move that helps authors achieve their goal of relaying scientific content to readers. The issue or problem is typically identified in the introduction post (through *announcing the topic* or *establishing exigence*) and is then elaborated on

throughout the multi-post thread. Authors may carry out this move by sharing research from publications or pre-prints (often with visual data displays), raising possibilities about the outcomes (often through counterfactuals or counter-arguments), or offering caveats or disclaimers (serving to temper any assertions, given the uncertainty of how a virus will evolve). As the foundation of the thread body, this move is so common that it appears in nearly every thread multiple times. In this corpus, the move accounted for, on average, more than a quarter (28.5 %) of a thread's total words. The only two threads that did not include this move were both relatively short (just four and seven posts each) and focused entirely on establishing a problem and proposing solutions.

Expanding on the issue may be the most challenging move for writers in terms of appealing to a broad public audience. Sharing specialized content could demonstrate credibility and appeal to other specialists; yet, highly specialized content can be less accessible and thus less engaging to non-experts, limiting the likelihood that the posts will be shared widely and that they will provide the kind of information that the public craves and needs. Often, authors mediate their diverse readership by blending specialized language with lay explanations, and by offering data visualizations and links to more detailed explanations.

Another important move, found in 62% of the thread bodies, is *proposing actions or solutions*. This move works in tandem with *establishing exigence* and *expanding on the issue*, offering recommended steps to take in light of the problem established in the thread. It resembles the move of drawing social implications found in three minute thesis talks (Hu & Liu, 2018; Carter-Thomas & Rowley-Jolivet, 2020) and science blogs (Luzón, 2013); it also appears in research group tweets (Luzón, 2023). For example, after establishing that Omicron is rapidly spreading, this post offers readers several actions:

- (17) 6/ Plan to bundle up if you're in a 🌪️ climate, because you're going to need to leave 🪟 & 🚪 open enough for air exchange, esp for next 5d or so, & a cross draft. If you have a fresh HVAC filter, change it. If a hardware place is open, get a MERV13 HVAC filter. (Amazon has too.) (T10, 25 December 2021)

By coordinating these moves, tweetorials often take on a kind of problem-solution structure, in which the thread opener identifies an urgent problem

and the body expands on it and offers readers actions to address it (a pattern similarly found in the tweets explored by Graham [2020, 2021] and Orpin [2019]). In doing so, the *proposing actions or solutions* move allows authors to go beyond sharing information; they can also show readers how to respond to that information.

The final two moves that appear in the thread bodies of this corpus, though with less frequency than the others, are *closing the thread* and *promoting the thread*. Unlike a research article, explicit closure is optional in a tweetorial. In fact, 76% of the threads I examined lacked any clear closure, though of course the absence of a subsequent post in the thread is an indicator that the thread is complete. In the majority of instances, the *closing* move is carried out only through navigational signs like “/END” or “9/fin”. Only three instances of the *closing* move included any kind of summary or concluding comments, though this strategy is often found in tips for tweetorial writing (see, for example, Breu, 2020). The limited use of these kinds of concluding strategies may be related to the openness of this digital genre, where authors may continue to add posts to a thread at any time, and thread responses continue the conversation. It may also be that summary-style conclusions were less common in this corpus because of its time-sensitive nature (responding directly to unfolding events), as compared to tweetorials that are less context-sensitive and may be more formally composed.

One move that is unique to the genre’s digital medium is *promoting the thread*. Social media offers numerous features for writers to expand a thread’s reach, such as hashtags (e.g., #Covid19) and @mentions (e.g., @CDCgov). When another user is tagged through an @mention, that user will be alerted to the thread’s publication, prompting them to read it and possibly even retweet it. At the same time, @mentions can also increase the likelihood that followers of the mentioned user will also see the post, further expanding the thread’s reach. The decision of whether to consider these features as moves was not straightforward. In most cases, the features seem to be similar to the rhetorical strategies of engagement identified by Luzón (2013) in science blogs or to functions of “findability.” Typically, these features are simply integrated into sentences, using hypertext elements to link out to hashtags or other users. For example:

- (18) Broadly acting Mabs effective against **#Omicron** & Omicron+R346K are in development including STI-9167 from Sorrento (now in Phase 2) licensed from **@IcahnMountSinai**. (T40, 25 January 2022)

In these cases, indicated in boldface, the features are part of the larger text, with the author taking advantage of hypertext capabilities.

However, one use of @mentions struck me as distinct and more move-like in its use and function. In three instances in my corpus, writers tag others not because they are mentioned in the post's content (as in excerpt 18) but rather to ensure that tagged users (and presumably their followers) see their thread. In two of the three examples, this move appears at the very end of the thread (see Figure 4); in the third case, the move appears at the end of a post, separated by a line break. This move takes advantage of Twitter's algorithm for extending a post's reach without having to weave others' names into the post's content; in this way, it somewhat resembles a *α* line in a memo, letter, or email.



Figure 4. Example of promoting the thread move (T22, 8 January 2022)

As in the introduction posts, the moves in the thread bodies show little regularity in their sequencing. Instead we see a blending and recirculating of moves, as writers repeatedly share information, demonstrate the urgency of the situation, and offer readers actions, all while building curiosity to lead readers through the thread. Figure 5 identifies moves in three sequential threaded posts, demonstrating this recirculation.

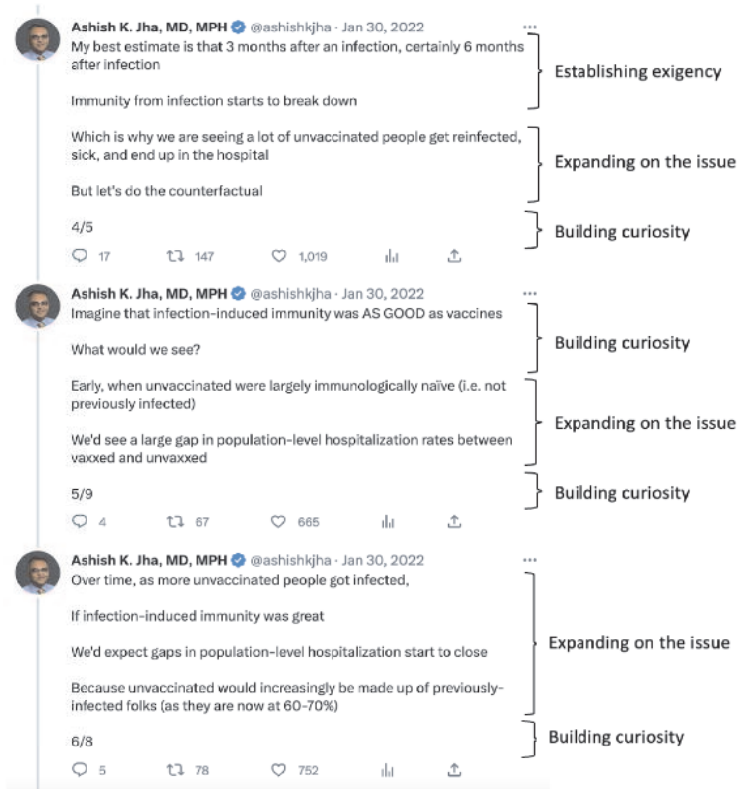


Figure 5. Recirculation of moves in three sequential thread posts (T50, 30 January 2022)

7. Discussion

This analysis of the rhetorical move structure in 50 COVID19 tweetorials suggests that the threads display some typification, though with a high tolerance for flexibility. Like Graham’s (2020) literacy support tweetorials and Orpin’s (2019) single report-sharing tweets, these COVID19 tweetorials commonly begin by identifying a problem or exigence in need of addressing. Several moves or steps suggested by other explorations of tweetorials (Figure 2) also appeared in this corpus, though with variation. For example, Gero et al. (2021) found signposting to be a common technique in tweetorial body posts, while signposting was rarely found after the introductory post in the present study. These COVID19 tweetorials also made little use of conclusion or summary moves, a practice that others found to be relatively prominent (e.g., Graham, 2020; Albin & Berkowitz, 2021; Gero et al., 2021).

The general problem-solution structure of many tweetorials may help to secure readers' attention, but it does not appear to supersede the educational goal of the threads, which are still dominated by informational content in the repeated *expanding on the issue* move. Further, the social media environment requires writers to attract and maintain readers' attention in a highly competitive, potentially untrustworthy, and often disjointed discursive environment. Moves like *establishing credibility*, *building curiosity*, or *promoting the thread* respond to Twitter's unique context, in which readers may encounter just one part of a thread, be inclined to scroll past a post, or question the veracity of a thread's content.

Writers also elevate the perception of their thread's importance by emphasizing urgency and action. The rhetorical moves that help create a sense of urgency—*establishing exigence* and *proposing actions or solutions*—are marked by their repeated (even persistent) use throughout a thread. Rather than simply stating a problem, authors state, re-state, and re-frame the issue as one that must be addressed. This rhetorical construction of urgency is also highly contextual. The tweetorials in this corpus are time-sensitive, responding to unfolding events in real time; in contrast, the tweetorials described by Breu (2020), Alpin and Berkowitz (2021), and Gero et al. (2021) appear not to be tied to a pressing situation. The notion of *kairos*—a complex concept that might be simplified as “the opportune moment, the right measure, and the fitting or appropriate” (Carter, 1988, p. 98)—is valuable here in understanding the rhetorical context of COVID19 tweetorials specifically and the role that urgency seems to play in shaping their rhetorical structure. These tweetorials feed readers' desire for content that helps them understand surrounding events; in doing so, the tweetorials also reinforce the immediate and dire nature of the situation. By proposing multiple actions or solutions, they additionally provide readers with a sense of agency through tangible steps that can be taken toward personal or community protection. Notably, then, these COVID19 tweetorials differ rather markedly from less contextualized tweetorials, whose primary purpose is to educate. Here, the authors aim not just to inform or teach readers but to share information in order to prompt particular actions.

Two features of the rhetorical moves in this corpus are especially noteworthy: their recycling and relatively flexible sequencing. The recycling or re-circulation of moves within a generally fluid structure has also been found in suicide notes, and may be characteristic of spoken genres and of written genres that are not codified (Samraj & Gawron, 2015). With

tweetorials, the digital environment likely also influences this flexibility, as non-linear (often digital) texts often lack a typical move sequence (e.g., Hiipala, 2014; Sancho Guinda, 2015; Xia, 2020). The potentially disconnected nature of tweetorials (which may be encountered through any post in the thread) may make a stable move sequence less important than it might be in, for example, a research article or a blog. Furthermore, because moves can be realized through text and/or visual elements, the position of visual elements (always appearing at the bottom of a tweet) may also serve to break up moves, contributing to their variable sequencing.

Finally, several of the moves commonly found in these COVID19 tweetorials allow room for the writers to personalize content, sharing information not simply as neutral, scientific observers but as fellow humans who are experiencing the fears and frustrations of the pandemic along with their readers (see also Luzón, 2013; Carter-Thomas & Rowley-Jolivet, 2020; Gero et al., 2021; Tardy, 2023). In *establishing exigence*, for example, writers often show their own emotions about a situation's urgency through emojis, use of capital letters, or by divulging personal information. Similarly, in *proposing actions or solutions*, writers typically offer measures that can be taken by everyday people rather than by policymakers or scientists.

8. Conclusion

The uses and affordances of microblogs have created new possibilities for communicating science to broad audiences in real-time. Previous research suggests that scientists may underutilize microblogs' potential by often just sharing links to publications (Luzón & Pérez-Llantada, 2022), but tweetorials go further, repackaging such information in accessible ways. This analysis of COVID19 tweetorials contributes to our understanding of how scientists shape this new genre to carry out their aims of sharing scientific content widely. Its findings suggest that tweetorials share some common rhetorical moves, though they may be employed with flexibility and in non-predictable sequences. The study also suggests that tweetorials that respond to unfolding events may be unique in their use of moves to highlight urgency, facilitating the attraction and retention of readers while also advocating for particular actions. In identifying variation and flexibility in how writers compose tweetorials, this study also demonstrates that while the design features of microblogs do influence the genre, these features do

not entirely constrain it—writers still assert agency in their individual texts (see also Squires, 2020).

Additionally, exploring the rhetorical moves of COVID19 tweetorials contributes to our understanding of how digital genres may support Open Science, most particularly the values of accessibility and sharedness, as well as the goal of addressing social concerns. Common moves in tweetorials (such as *establishing exigence*, *expanding on the issue*, and *proposing actions or solutions*) work together to make scientific knowledge relevant and understandable to a broad public. Further, writers often personalize their tweetorial content and, in the specific case of COVID19 tweetorials, respond to pressing social issues. In this way, the tweetorials address the public's desire for information and scientists' desire to educate, while creating proximity between readers and writers. They therefore join other science popularizations (such as science blogs or video explainers) as part of an evolving genre ecology of science communication (Pérez-Llantada, 2016). These public science genres seem to share some rhetorical strategies, such as using a hook, interacting with readers, personalizing content, and drawing social implications (Luzón, 2013; Carter-Thomas & Rowley-Jolivet, 2020; Zou & Hyland, 2020). Understanding the rhetorical strategies in more depth, including how writers use them across public science genres and in different rhetorical circumstances can also help support Open Science communication.

Finally, this study has implications for languages for specific purposes (LSP) instruction. Although the research article will likely continue to be the top priority for science researchers and thus for LSP classrooms, public science genres like tweetorials may have value for writing development as well. For example, by learning to write for different audiences and to explain complex scientific knowledge in an accessible way, scientists can develop their rhetorical flexibility and learn strategies that can also be adapted to genres like scientific petitions, open letters, or research group websites. At the same time, writing a tweetorial may not be straightforward for science communicators. In a tweetorial workshop, PhD students faced challenges in assessing audience knowledge, using a casual tone, simplifying information, writing an engaging opener, and maintaining a structure (Gero et al., 2021). The moves identified in this study of COVID19 tweetorials could benefit such instruction by providing possible structural elements for writers to adapt. Inclusion of tweetorials as a low-stakes writing activity in advanced academic writing instruction can help writers develop a wide repertoire of rhetorical strategies for sharing their work with diverse audiences.

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NOTES

¹ All tweets included in the corpus were publicly available at the time of data collection. Since that time, some authors have left Twitter or made their accounts private.

