

Connecting Programmatic Research with Social Media: Using Data from Twitter to Inform Programmatic Decisions

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Abstract. Traditional data sources provide technical communication programs with a variety of useful decision-making metrics. However, many of these data sources are constrained by a variety of factors such as misalignment of institutional and programmatic goals and the summative nature of programmatic data and its subsequent application. Therefore, we argue for the use of data from Twitter to inform decisions about curriculum, assessment, and long-term programmatic vision. In this article, we outline relevant research questions related to programmatic decision making and then describe how to collect, analyze, and apply Twitter data to answer those questions.

Keywords: social media, Twitter, curriculum, assessment, data analysis

Academic programs are dynamic entities. Over time programs morph and mutate due to a variety of reasons, including institutional changes, economic or political pressures, student and alumni feedback, or faculty research. The goal for program administrators and faculty is to create academic programs that meet both short-term and long-term goals of the various programmatic stakeholders. One mechanism that has perhaps been underutilized by program administrators and faculty in the ongoing modifications of academic programs is data collected from social media. In this article, we argue that program administrators should use social

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media data, specifically data collected from Twitter, in tandem with traditional academic decision-making metrics, such as enrollment, revenue generation, graduation rates, and job placement rates. While traditional metrics are helpful, they also are constrained by factors like institutional goals (which may not match discipline-specific goals), turnover in program administration that occurs with many academic service positions, and the summative nature of these types of metrics in that they often are analyzed annually or even less often. In contrast, the method we propose in this article allows for a more iterative programmatic decision-making process. Because the method can archive data from Twitter in real-time as well as data that goes further back in time, program administrators can use this data for a variety of programmatic decisions.

The use of Twitter within technical communication isn't a new discussion. For example, Alice Daer and Liza Potts (2014) argue that social media should be integrated into the technical communication educational curriculum. Other research in technical communication has examined how social media's timeliness and community building influence, affirm, and challenge long-standing technical communication frameworks. What has yet to be established is a way to harness data from Twitter to affect change at the programmatic and curricular level.

Ultimately, we argue that specific applications of Twitter data can equip program administrators with unique, data-driven arguments to aid in several types of programmatic decisions including decisions regarding curriculum, assessment, and programmatic vision. Here, we first provide a broad overview of the literature on social media in technical communication scholarship and discuss ways in which social media might be well-suited for programmatic contexts. After reviewing the prior literature, we describe a method for collecting and analyzing language data from Twitter. Finally, we'll end the article by applying this approach to three common types of programmatic decisions.

Social Media in Technical Communication Research

As a communication tool, social media has received much attention from technical communication scholars. Daer & Potts (2014) note that between 2009 and 2014 more than 50 articles were published on topics like how technical communicators' use social media tools; the role of social media applications in gathering, measuring, and distributing information; and the benefits of social media engagement for technical communicators such as career enhancement, gathering and analyzing large data sets, and building relationships with products and customers. In this section, we examine

literature about social media's two unique characteristics: 1) its ability to share and archive timely and relevant information and 2) its capacity to develop deep insights about communities. We then examine literature about scholars' efforts to account for social media pedagogically in light of these unique characteristics. Lastly, we review how technical and professional communication programs historically have conducted programmatic research.

Social Media's Capacity to Share and Archive Timely Information

One valuable aspect of social media has been its ability for users to share timely information and for that information to be archived. In technical communication, this has been studied primarily through the exploration of crisis response to events. For instance, Liza Potts (2013) explored social networking tools in disaster cases like Hurricane Katrina, the 2005 London bombings, and the 2008 Mumbai attacks. In her work, she found that in times of crisis, people tend to ignore specialized sites set up by aid workers and instead use available social networking tools to perform activities such as sharing breaking news; quickly connecting with friends, family and strangers; and coordinating complex work that requires collaboration. Similarly, Huiling Ding (2009) examined a medical crisis event and discovered how professionals and members of the public used alternative media to participate in unofficial risk communication during the 2002 SARS outbreak in China. Ding found that when official channels of risk communication were shut down due to economic and political considerations, people used alternative media to circumvent the communication barriers and quickly release risk messages to the public. Also in China, Juelin Yin, Jieyun Feng, and Yuyan Wang (2015) examined how the Chinese public responded to the Conoco Phillips oil spill. The authors examined Chinese social media websites between June 2011 and February 2013 to better understand the sentiment of the Chinese public following the oil spill that occurred on June 4, 2011. They found that, in general, a sentiment of anger and frustration was present in the social media posts during this time period.

These articles highlight social media's capacity for users to quickly and efficiently share relevant information with the public—with many people actually ignoring traditional channels of communication and using social media instead. They also highlight the democratization effect that social media affords in that the people often favor social media to get and share the "real" story as opposed to a curated story produced by traditional media outlets. Finally, the studies also show the archival value of social media in that it allows researchers to examine a set time period in order to

understand public sentiment during that particular time period. While these studies clearly articulate many unique and positive characteristics of social media, we see much potential for examining how the timeliness and archival nature of social media might be used to inform decisions regarding technical communication programs, which is an area that has yet to be studied.

Social Media's Capacity to Develop Insights About Communities

In addition to sharing timely information, technical communication scholars have also explored social media's ability to develop deep insights about communities to which they may have limited access.

One strand of research on social media in technical communication has focused on how various communities use social media to find technical information. For instance, Jordan Frith (2016) examined online forums to gain insights into several unique communities of practice including communities of do-it-yourselfers (DIYers). He found that moderators on DIY forums thoughtfully employed information architecture to sub-forums in order to better serve and engage their fellow DIY community members. On the other hand, Frith also discovered that DIYers who were part of a flooring community found sub-forums to often be overly specialized and unhelpful. Overall, this study shows the value in examining social media to understand distinct characteristics of a particular community. That is, because social media provides communities of practice with a shared online space, knowledge sharing that would typically occur in private meetings or job sites is now openly shared. Similarly, Jo Mackiewicz (2010) examined a community of product reviewers on *epinions.com* and found, among other things, that the reviewers asserted expertise in product reviews using ten distinct strategies. In a related study, Mackiewicz (2011) found that *epinions* amateur editors exhibited similar skillsets to that of technical editors by using linguistic politeness strategies to motivate reviewers to make comprehensive edits.

Outside of online forums, some research has examined how Twitter is used to better understand a community of technology users. Chris Lam and Mark A. Hannah (2016b) examined the dedicated Twitter help accounts of six technology companies to better understand the information seeking practices of users. They found that this particular population primarily used Twitter to complain about a brand rather than seek support for a specific technical problem, which provides new insights into how this particular community of users used Twitter as a help desk. In addition to Twitter, Facebook posts have been studied by Mark A. Hannah and Chris Lam (2015) to gain insights into the posting practices of

agribusinesses. The authors examined Facebook posts from a sample of sustainable agriculture companies over a 12-month period and found that the public tended to prefer entertainment posts, or posts that worked to specifically connect and engage audiences, over posts that tried to educate or market to the public. The findings provide insight into the preferences of a community of users when engaging with businesses on Facebook. To reiterate, these studies show how social media is useful in learning about particular communities of practice. The shared nature of social media further provides researchers with access to communities who would otherwise might be difficult to access. Additionally, Mackiewicz (2011), Lam and Hannah (2016b), and Hannah and Lam (2015) all examine language data within the social media they are studying, which as we'll describe later in this article, directly relates to the type of data analysis we are proposing.

Finally, some research on social media has specifically examined communities of technical communicators. Michael J. Faris and Kristen R. Moore (2016) recently explored the role of social media in the professional lives of writing studies scholars. They surveyed and interviewed emergent scholars to understand more clearly how and why scholars approach social media for professional purposes. Among other important findings, the authors point out the inherent tension that social media poses when searching for a tenure-track job or applying for a promotion. Mark A. Hannah and Chris Lam (2016) examined the blogging practices of a community of technical communication practitioners and found that practitioners were primarily interested in blog posts discussing technology as it relates to the profession. These two studies provide the basis for the present article in that they show how social media can be used to understand communities of technical communicators, which we argue, should be directly applicable to programmatic issues.

To briefly summarize, it's clear that social media enables outsiders of communities to better understand practices, cultures, and even language patterns that are unique to those communities. However, no research has yet examined how social media can be used to specifically inform programmatic decisions. Therefore, we believe there's a clear opportunity to applying social media data to inform issues related to technical communication programs.

Social Media and Technical Communication Pedagogy

While we've pointed out the lack of research on social media as it relates directly to technical communication programs, there has been some work that examines social media in the context of the technical communication

classroom. For instance, some scholars worked to broaden the field's pedagogical practices in light of social media's influence on technical communicators' work. Melody Bowdon (2014) worked with a group of students to collaboratively code tweets created by the American Red Cross, the Centers for Disease Control and Prevention, and CNN in their response efforts to Hurricane Sandy in 2011. Bowdon's aim was to help students identify and better understand how organizations deploy specific rhetorical moves to cultivate an ethos about its work. To foster more critical awareness of social media, Elise Verzosa Hurley and Amy C. Kimme Hea (2014) sought to disrupt the notion that social media writing was careless or unprofessional by devising a pedagogy centered on Bob Pearson's (2011) concepts of reach—"the ability to form relationships, address user interests, and determine long-term effects of networking," and crowdsourcing—"the practice of tapping into the collective public intelligence to complete a task or gain insights that would traditionally have been assigned to a member of or consultant for an organization" (p. 57). Through this pedagogy, students came to understand how traditional markers of effective writing such as organization, conciseness, and clarity were present in much of the writing they published on Instructables.

Finally, Daer and Potts (2014) have started to bridge the gap between the application of social media and programmatic implications, at least on a curricular level. They offer best practices for incorporating social media into curriculum design including a belief that "social media can be used, adopted, and implemented best when its champions are thinking strategically, not just tactically" (22). To support such strategic thinking, Daer and Potts offer program administrators eleven suggestions for beginning conversations that will inform best practices for incorporating social media in a program's curricula. These recommendations emphasize a need for flexibility and adaptability when accounting for social media in curricular strategies. More importantly for our purposes in this article, Daer and Potts provide an entry point for program administrators to begin considering the opportunities afforded by social media's unique characteristics for programmatic decisions.

Directions for Moving Forward

We conclude this literature review by discussing how social media potentially connects with programmatic research questions. We present a broad overview of the main strands of programmatic research in technical communication, which has sought to answer a wide variety of research questions; however, the most prevalent concerns stem from three areas:

- **Curricular decisions:** (Balzhiser et al., 2015; Bay et al., 2010; Bemer, Moeller, & Ball, 2009; Carrington, 2015; Christensen, Gibson, & Vernon, 2010; Daer & Potts, 2014; Lam, 2014; Malone & Wright, 2012; McDaniel, 2015; Rehling & Lindeman, 2010). This scholarship investigates how to enhance student learning as well as align curricula to emerging trends in industry and technology. Examples of research questions that drive this area of inquiry include 1) do our current course offerings for majors align with the skills employers want in an entry-level technical communicator? and 2) what specific topics or courses will better align our curriculum with industry needs? Twitter data gathered from practitioners about the profession offer program administrators a timely and relevant resource for answering such questions.
- **Programmatic assessment and learning outcomes:** (Barker, 2012; Brumberger, Lauer, & Northcut, 2013; Charlton, 2012; Henschel & Meloncon, 2014; Johnson & Elliot, 2010; Reamer, 2012; Salvo & Ren, 2007; Vealey & Hyde, 2015; Yu, 2010). This area of research acknowledges the variety and limitations of assessment protocols and advocates for methodologies that support best assessment practices and innovate on the ways that programs partner with external shareholders to align their assessment practices with contemporary industry needs. Examples of research questions in this programmatic area include 1) how authentic are program outcomes and assessment methods? and 2) what competencies and genres should be addressed in an authentic, terminal deliverable? Twitter data gathered from practitioners, administrative colleagues, and students can be leveraged by program administrators to address such questions.
- **Long-term disciplinary and programmatic vision:** (Ford & Lanier, 2011; Gordon, 2009; Hall, 2015; Lanier, 2009; Lauer, 2013; Leslie & Northcut, 2013; Rude & Cargile Cook, 2004). At the core of this research strand is a concern with program visibility, specifically how programs present themselves to the world. Examples of research questions related to visibility include 1) should programs specialize in a specific sub-discipline of technical communication? If yes, what specialty should we focus on? and 2) what constitutes or makes up a good programmatic research partner? Data gathered on Twitter from industry professionals or prospective research partners can help program administrators tailor the ways they articulate and

present their programs' work capacities to the world.

Overall, studies in these three areas have relied on a variety of data sources to inform their research including surveys and interviews of practicing technical communicators and academics, archives of job postings in technical communication, and academic and non-academic publications in technical communication. While these data sources have provided valuable insights into the programmatic areas of assessment, programmatic vision, and curriculum, we argue that there is much promise for the integration of Twitter data to factor into these areas of programmatic research and decision-making. We've previously outlined in the literature review how social media's unique capacity to produce timely and archival data as well as to help researchers deeply understand communities make social media a rich data source for technical communication. In the remainder of this article, we'll further articulate how and why program administrators can use data from Twitter to answer such programmatic questions. We'll first describe the method of collecting archival Twitter data and then describe results from a sample data set as they apply to three areas of programmatic research: assessment, vision, and curriculum.

Methodological Description for Archival Twitter Research

As shown in the literature review, the incorporation of social media as a mechanism for informing specific programmatic decisions has yet to be researched. In this section, we will describe a way to begin to bring social media data to bear on programmatic decision-making. First, we present an archival methodology for collecting and analyzing data on Twitter. Following this methodological explanation, we'll briefly provide an overview of a specific sample data set of archival Twitter data. Then, we'll finish the article by applying some sample results from our data set to three common programmatic questions.

Rationale for Twitter as a Research Site

As described in Daer and Potts (2014), social media plays "a significant role in gathering, measuring and/or distributing information among technical and professional communicators" (Daer & Potts, 2014, p. 21). In that same article, the authors argue that Twitter is especially useful for program leaders as a means to connect with other academics. To extend this line of thinking, we believe that Twitter also provides a means for program leaders to connect with industry professionals. In fact, there exists a

thriving online community of professional and technical communicators on Twitter where community members share information about best practices, trends in the field, technical tutorials, and other discipline-specific content (Hannah & Lam, 2016). Finally, while many other social media sites like Facebook or Instagram rely on one-to-one "friendships" to view and share content, Twitter allows strangers to follow each other and form networks based on shared interests (Daer & Potts, 2014). Therefore, we believe Twitter provides a fertile ground for insights and knowledge about the field.

Collecting Twitter Data

To collect tweets, we used an application developed by Martin Hawksey called the Twitter Archiving Google Spreadsheet (TAGS). TAGS allows any user who has a Twitter Developer's account and a Google account (both of which are free) to automatically archive tweets. This application allows you to create spreadsheets that archive hashtags, Twitter handles, or any other keyword. In this article, we'll briefly describe TAGS, but for a comprehensive treatment of TAGS, see Lam and Hannah (2016a).

When collecting data via TAGS, it's important to consider whether an existing Twitter community or hashtag exists for the question you are attempting to answer. That is, social media allows researchers to gain insights into communities only if those communities in fact have a presence on Twitter. For instance, a program administrator would likely be interested in student retention for technical communication programs. But, it's probably unlikely that there is a community of Twitter users who have rallied around the topic of student retention solely. Therefore, instead of creating an archive that stores the term "student retention," we recommend performing an exploratory search on Twitter to see if there is a relevant conversation and robust community present. To determine if a search term is worth archiving, it's important to examine:

- Quantity of tweets related to your search term (i.e., more tweets on a search the better)
- Frequency of tweets (i.e., if there are multiple tweets for a single date, the search term is probably more viable)
- Related search terms and how the terms are adopted (i.e., look for search terms that are widely adopted by a community of users)
- Sociality of tweets (i.e., look to see if certain terms are generating more replies, retweets, or quotes)

Once you have determined viable search terms, you can set up your

TAGS spreadsheet. Figure 1 below is a screenshot of the front page of the TAGS archival spreadsheet, which can be accessed at <http://tags.hawksey.info>. In text box 4, you will notice the use of Boolean operators to search multiple search terms in one spreadsheet. Alternatively, however, we suggest creating separate spreadsheets for different search terms so that your data is clearly separated once it is time to analyze the data.

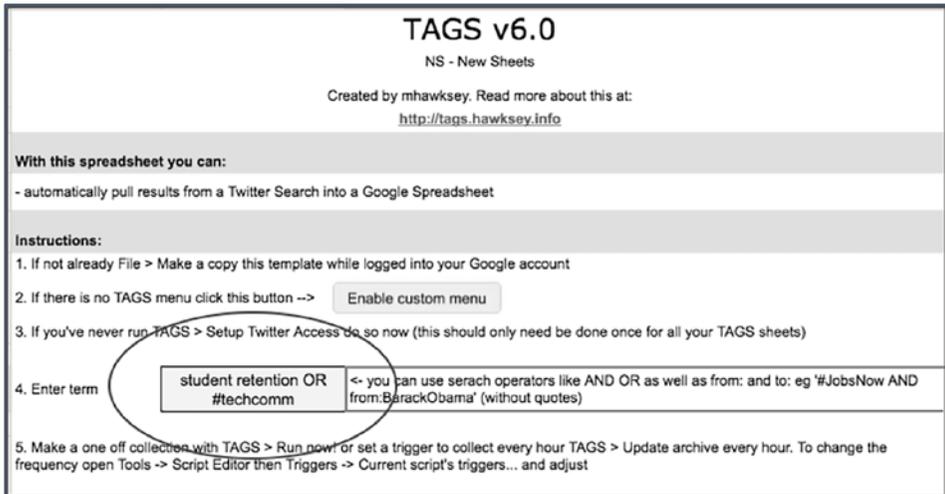


Figure 1. Screenshot of TAGS front screen

Once you have set up TAGS and the application has begun archiving tweets, the tweets will be stored in another tab within the spreadsheet labeled "Archive." Figure 2 shows a screenshot of this archival sheet, which shows just an excerpt of the entire archival sheet. As can be seen, the sheet collects information like the username of the individual who tweeted, the text of the tweet itself, and time stamp information. For the purpose of this article, we are primarily interested in analyzing the data within the column labeled "text."

from_user	text	created_at	time
scottabel	2014 IndieReader Discovery Awards name @MarciaRJohnston's "Word Up!" #3 for nonfiction overall. http://t.co/V/OG141JgB #writing #techcomm	Wed Jun 18 18:11:01 +0000 2014	18/06/2014 1:
WritingTechDocs	12 questions interviewers want you to ask them http://t.co/gWT3BEbI5A #techcomm	Wed Jun 18 20:25:14 +0000 2014	18/06/2014 2
NewSmashWords	RT @kmdk: I enjoyed perusing the transcript. RT @MattiasSander: "Anne Curzan: What makes a word "real"?" http://t.co/YWry1C9cfz #language #...	Wed Jun 18 16:53:47 +0000 2014	18/06/2014 1
cfidurauk	RT @robocolumn: 11 of top 15 US Retailers in #Global500 trust #Adobe #TechComm applications. #AdmiredBrandsAdmireAdobe http://t.co/S0Dgt8Xn...	Wed Jun 18 15:05:32 +0000 2014	18/06/2014 1:
ywsanchez	This article isn't about #techcomm, but the main idea is something writers will appreciate: In search of meaningful http://t.co/mNR8chOaUB	Wed Jun 18 18:09:25 +0000 2014	18/06/2014 1:
ywsanchez	Tips for Writing for E-Learning http://t.co/l5t9llRgCS (RT @elearning) http://t.co/HMPGnybL7H #edtech #elearning #techcomm	Wed Jun 18 16:08:34 +0000 2014	18/06/2014 1
odhran25	Not more content! Better editing! Death to content: long live the editor Econsultancy https://t.co/L3c3fy3he #techcomm #cms	Wed Jun 18 19:59:58 +0000 2014	18/06/2014 2:
maxwellhoffmann	Adobe #techcomm webinar @RayGallon "Internet of Things: Luxury for the Rich or Sustainable Equity for All?" 10July http://t.co/WxiW8tFdJ	Wed Jun 18 20:30:01 +0000 2014	18/06/2014 2
maxwellhoffmann	Discover "how to capture usable content for #techcomm via webcam" from @mattsullivan #Adobe WEBINAR June 20 http://t.co/EuBq6CR4ZJ	Wed Jun 18 18:10:00 +0000 2014	18/06/2014 1:
MarciaRJohnston	RT @scottabel: 2014 IndieReader Discovery Awards name @MarciaRJohnston's "Word Up!" #3 for nonfiction overall. http://t.co/V/OG141JgB #writ...	Wed Jun 18 18:58:09 +0000 2014	18/06/2014 1:
saibalb79	6 of TOP 10 companies based out of Switzerland in #Global500 trust Adobe TechComm. #AdmiredBrandsAdmireAdobe http://t.co/EyAajfZnJ	Wed Jun 18 13:37:37 +0000 2014	18/06/2014 1:

Figure 2. TAGS screenshot of archival sheet

There are two limitations of TAGS to consider when conducting your own programmatic research—both of which have bearing on the timeliness characteristic of social media. First, TAGS only allows you to go back ten days to archive old tweets due to restrictions that Twitter places on their database (you can go further back than ten days by purchasing the data through a third-party vendor, however). Therefore, if you are interested in an ongoing, longitudinal analysis of data, which we argue that you should be, you can set up your spreadsheet to automatically archive tweets as they happen and essentially collect the data in “real time.” A second limitation is the number of Tweets a single archive can store. Currently, TAGS can handle 20,000 tweets per spreadsheet. If your search term is extremely popular, an archive can fill up relatively quickly. Therefore, it’s important to check the progress of the archive every few days, and once the archive reaches the 20,000 tweet limit, set up a new spreadsheet with the same search terms.

Data Analysis

Once you have collected tweets, there are many potential methods for analyzing the data. Here, we walk through some basic methods for analysis that stem primarily from corpus linguistics. While it is outside of the scope of this article to provide a full treatment of corpus linguistic methodology, our intention is to provide program administrators of technical communication, who may not have any background in linguistics, with an entry point for examining patterns in language data and extracting meaning from this data. For a more comprehensive treatment of corpus linguistic methods, see Bennet (2010), which provides an in-depth look at using corpora in the classroom.

To analyze the data extracted from Twitter, we use AntConc, a free text analysis tool created by Laurence Anthony. AntConc is relatively easy to use and is very well supported by a wealth of user documentation and video tutorials. AntConc allows a user to complete a variety of textual analyses, but we will walk through three simple analyses: word frequency analysis, concordance analysis, and collocation analysis.

Word frequency analysis. The AntConc software has a keyword list function that presents the frequency of each word in the corpus from largest to smallest. This analysis provides a logical starting point for basic patterns in the data. Generally speaking, a higher frequency indicates that the particular keyword can provide some meaningful insight simply due to the prominence of the word in the corpus. The word frequency analysis has inherent limitations because a simple frequency list does not provide any context for each keyword. Therefore, additional analyses must be completed including concordance analysis and a collocation analysis.

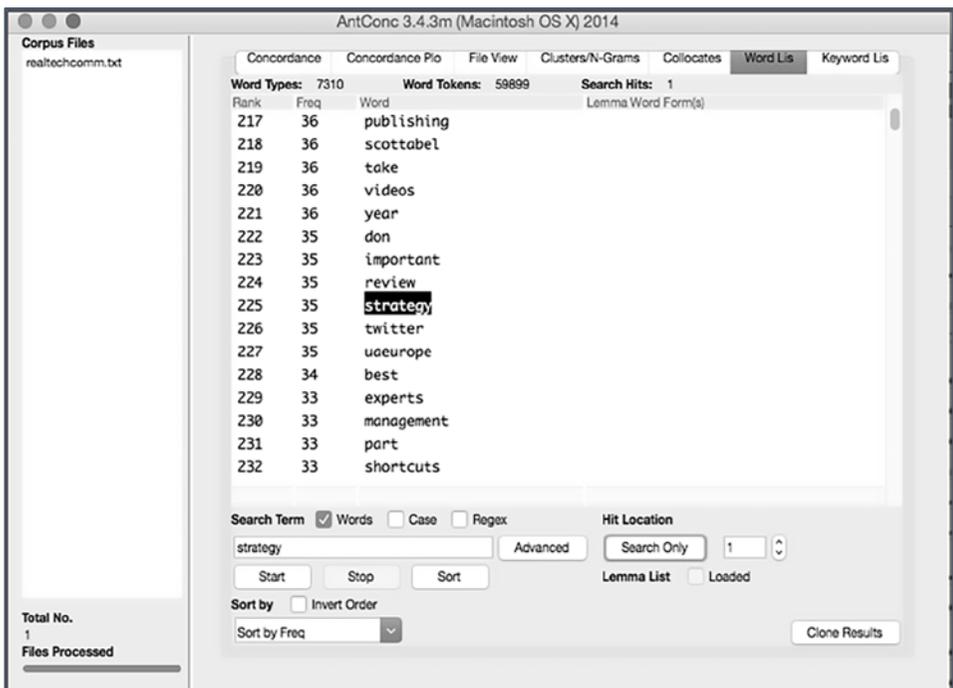


Figure 3. Screenshot of Word Frequency List in AntConc 3.4.3m

Concordance analysis. The concordance analysis allows a researcher to examine keywords in the context in which they occur. In AntConc, the concordance feature allows a user to highlight and sort words to the left and the right of any keyword in question, which provides a visualization

word “strategy.” The finding is essentially the same as revealed by the concordance analysis, but the collocation provides additional statistical support. Figure 5 below shows that the word “content” co-occurs with “strategy” more frequently than any other word.

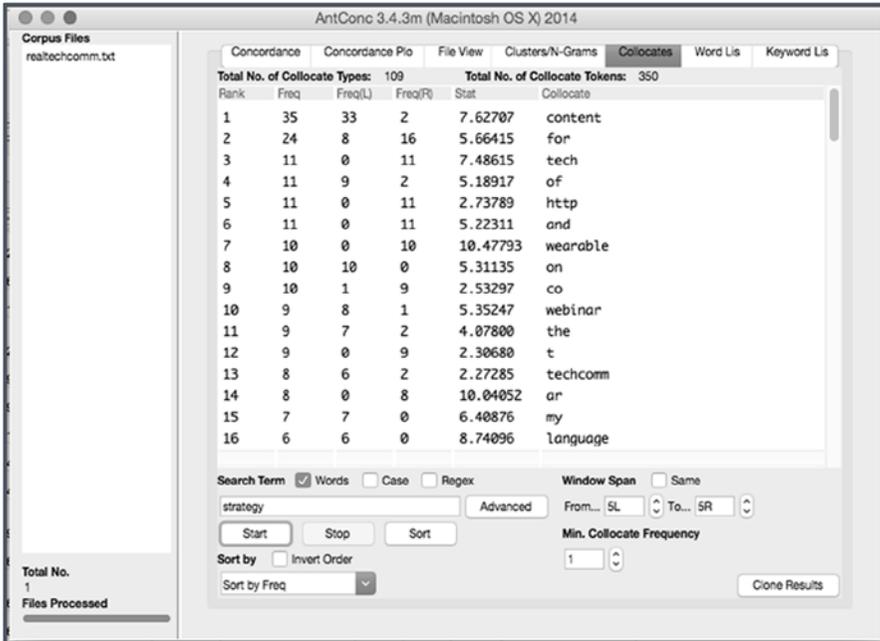


Figure 5. Collocate screen on AntConc 3.4.3m

Describing a Sample Archival Dataset

We created a sample archival data set using TAGS and collected tweets marked with the hashtag #techcomm from the time period of February 27, 2014 to June 18, 2014, which represented four full months of data. During this time period, TAGS archived 13,434 unique tweets. A variety of industry professionals, academics, and corporations actively use this hashtag to denote tweets related to technical communication including tweets on topics like job advertisements, educational resources, best practices, and commentaries about the future of the field. We chose to archive this general hashtag as opposed to a more targeted search term because we feel it provides the largest quantity of data as well as the most relevant data.

Finally, we want to briefly discuss the ethical implications of collecting and analyzing data from Twitter. First, because our application of this data examines textual data in aggregate, the actual data itself is anonymous. Therefore, the application of such data places no risk on the individuals who tweeted using the hashtag #techcomm because their usernames are

not included in the analysis. However, if program administrators are interested in analyzing and attributing decisions to specific individuals, ethical guidelines relating to the use of social media data should be considered (see AoIR ethics guidelines (Markham & Buchanan, 2012) for a broad overview on the topic).

Answering Three Potential Programmatic Questions Using the Archival Method

As we outlined in the literature review, programmatic research in technical communication has focused on questions about curriculum development, assessment, and long-term vision. In this section, we'll examine how archival Twitter data might speak to these three common programmatic questions.

Answering Curriculum-based Questions with Archival Twitter Data

As outlined in the literature review, programs are interested in decisions about curriculum. This could include decisions about individual courses, course rotations, new certificates, or degree offerings. As described previously, some relevant research questions include

- Do our current course offerings for majors align with the skills employers want in an entry-level technical communicator?
- What specific topics or courses will better align our curriculum with industry needs?

While comparing course offerings to other programs is a helpful and necessary starting place, we argue that examining archival data on Twitter might provide a program administrator with complementary insight. To determine whether a program's curriculum aligns with industry job trends, a natural place to start is by analyzing the word "job" within our sample data set.

As described previously, we can use AntConc's word frequency feature to search for the word "job." Based on this search, "job" ($n = 1,051$) ranked as the 27th most-used word in the data set, which makes it highly prevalent in the sample. We then examined the word "job" using a concordance analysis and found that "job" was unsurprisingly used in the context of job advertisements. That is, individuals or companies were sharing job advertisements for technical communication jobs on Twitter, which further legitimizes Twitter as a valid data source for contemporary news and trends regarding technical communication. That is, if people or companies are posting jobs (over 1,000 jobs were mentioned in a four-

month span), there is an assumed audience for those advertisements in the technical communication Twitterverse. After examining the word “job” in context, we conducted a collocate analysis, which revealed several interesting findings in regards to words that were significantly collocated with the word “job.” Table 1 displays the top five collocated words with the word “job.” As seen in Table 1, the word “editor” is the most frequently associated word alongside “job.” This is particularly interesting as it indicates that the core competency of editing continues to be extremely important for those seeking technical communication jobs. However, another interesting finding stems from the next two most frequently collocated words, “API” ($n = 235$) and “XML” ($n = 128$). The high frequency of these technical words also illustrate how technical communication continues to progress. Finally, the words “senior” ($n = 107$) and “junior” ($n = 78$) seem to indicate a slight preference for senior-level hires.

Table 1. Words significantly collocated with “Job”

Word	Frequency	Stat
Editor	367	7.18
API	235	7.76
XML	128	6.06
senior	107	7.41
junior	78	7.87

Therefore, the results of the data analysis might affirm or challenge a program’s current curriculum. First, the data shows that the important core competencies of technical communication, namely editing, are still essential skills in a contemporary job market. As a majority of programs likely already offer specific courses on editing, this finding should affirm the program’s current course offerings. On the other hand, the findings could push program administrators to consider educating students in more contemporary genres (e.g., API) or in technical markup (e.g., XML). We see several avenues for incorporating this finding into curricular decisions. The first option, which has the lowest barrier to entry, is to offer students extra-curricular workshops on technical topics like API writing or XML markup. Secondly, programs could work to integrate these technologies into current course offerings. Finally, programs could create

new courses that focus on teaching these newer genres and/or technologies if they had the staff to do so. Regardless of the approach, all three of these options could help programs better provide their students with instruction on relevant and contemporary topics in technical communication.

Answering Assessment-related Questions with Archival Twitter Data

Prior research shows that assessment, both at the curricular and programmatic level, is a vital component of program administration. To this end, relevant programmatic research questions about assessment might relate to what Han Yu (2010) calls authentic assessment:

- How authentic are program outcomes and assessment methods?
- What competencies and genres should be addressed in an authentic, terminal deliverable?

Two of the authors of this article recently had to answer both of these questions when we replaced our existing terminal deliverable—a comprehensive written exam. This exam included traditional written questions on style, editing, design, and a design memo. We determined as a committee that such a deliverable did not represent an authentic representation of competencies needed to be a technical communicator. Therefore, we decided to replace the exam with a more authentic assessment—a print and digital technical communication portfolio. However, what remained unclear were the types of deliverables required for such a portfolio.

To answer the question of what genres or competencies should be represented in the final portfolio, we searched our sample dataset for several genre-related terms. Table 2 shows the frequencies of these searched terms. Of particular interest is the overwhelming use of the word “content” in the data set. While “content” is not genre-specific, it is indeed related to a variety of genres. To better understand the context of this finding, we examined the concordance plot and collocates of the word “content” and found that the word “strategy,” “strategist,” and “content strategy” significantly co-occurred with the word “content” 326 times. Content strategy, while not solely for web-based content, is often associated with the genres of web authoring (Halvorson & Rach, 2012). Therefore, it’s relatively safe to assume that “content” in the context of this data set refers to web-based content. Additionally, there were other web-related terms that significantly co-occurred (387 times) with “content,” including “structured,” “management,” “dita,” “xml,” “reusable,” “metadata,” and “intelligent.” To add to this finding, Table 2 also reveals a

relatively low frequency of more traditional print-based genres like manuals, reports, brochures, and flyers. Also of interest is the prevalence of the word “video,” which recent scholarship suggests is an emerging technical communication genre.

Therefore, based on this data set, a portfolio used to assess student work should almost certainly include some non-print-based genres such as structured or modular web-based writing. It might even be relevant to have students include video tutorials or other web-based training materials.

Table 2: Frequency of Genre-Related Terms

Genre or Genre-related Term	Frequency
Content	1410
Documentation	312
Video	254
Elearning	199
Presentation	155
Proposal	71
Instructions	70
Manual	69
Website	58
Report	18
Brochure	0
Flyer	0

Answering Questions Related to Long-term Vision with Archival Twitter Data

Finally, technical communication programs grapple with establishing and communicating a long-term vision for a program to ensure relevancy in future years. As previously described, some relevant research questions might include

- Should our program specialize in a specific sub-discipline of technical communication? If yes, what specialty should we focus on?
- What skills or research interests should we look for in a new hire in order to shape our program's long-term vision?

While data from Twitter shouldn't replace research of other similar regional and national programs, Twitter data can reveal trends that may complement the research program administrators are already conducting. When considering long-term vision, program administrators must also differentiate fads from trends when considering and communicating a programmatic vision. This task, of course, requires insider knowledge and experience within the field—something that Twitter can't provide on its own. However, over time, a program could use longitudinal Twitter data to see how trends shift from one year to the next.

To address the question of specialization, we examined our sample data set for keywords that point to related sub-disciplines or specialized areas of expertise. For example, we searched for specific disciplinary keywords and found that “UX ($n = 658$), “design” ($n = 251$), and “marketing” ($n = 224$) were highly prevalent in the data set. There were also 700 instances of words related to the web including “elearning” ($n = 199$), “web” ($n = 169$), “html” ($n = 167$), and “mobile” ($n = 165$). Additionally, one could argue that “ux” is also closely related to the web. Furthermore, the word “design” was significantly collocated with the words “web” ($n = 33$) and “responsive” ($n = 33$), which seems to indicate that the design in this data set is more associated with web design as opposed to visual design or graphic design, which co-occurs with “design” only three and four times respectively. Therefore, there seems to be a strong trend towards the web within technical communication, which also seems to support the results of our previous analysis of genres in the data set.

Based on these findings, a program might consider some area of web or UX specialty in its long-term vision—perhaps in a minor, certificate offering, or even a programmatic rebranding. Of course, analyzing how these trends evolve over the next year, or five years, or ten years, is essential to truly differentiating a fad from a trend. Furthermore, considering current and future resources should be important factors in the decision as well. However, contextual knowledge certainly supports the rise of the web and UX as an integral part of technical communication.

Reiterating the Value of Twitter Data for Program Administrators

Before concluding this article, we want to briefly rearticulate the value of this data collection and analysis methodology we've presented for

program administrators. As program administrators, we often look to data in order to craft our programs, our courses, and our pedagogies in ways that are reflective of ideas and concerns beyond the perhaps insular opinions of the faculty. Data collected by universities on behalf of programs (such as graduation rates, retention rates, major change rates, etc.), while perhaps "better than nothing," often hold within them their own challenges. Such data are often context-free, thus the data becomes un-actionable, as administrators can't determine what modifications to the program resulted in data variations. Some data collected simply aren't relevant to the programmatic nature of administrator concerns. Further, such data is "dropped" on administrators at regular intervals, which provides administrators with summative evaluations of the program but prevents formative evaluations. Beyond institutional data, when programs collect data for programmatic purposes themselves from employers and students in the form of surveys or interviews, we often run into small response rates as well as self-reporting problems.

All data collection comes with limitations, and data from Twitter is no different. Only those technical communicators who self-select to tweet (and tweet with specific hashtags) are part of the data set; therefore, it may only be representative of a smaller (but influential and vocal) subset of the field. In the system presented here, the data set can always be both formative, in that it can aid in immediate decision making and forecast future discipline behaviors, and summative, in that the longitudinal nature of the dataset can provide a longer term assessment of where predictions of future field endeavors went accordingly or astray. It provides immediate context for various applications and processes, while also allowing a longitudinal view of the field.

We propose that Twitter-based data (along with other social media data) should be another tool to be used in concert with university-collected data, department-collected data, and expert opinion in making programmatic decisions. We believe that with its focus firmly affixed to the practitioners and experts who shape the constructs of the field, Twitter-collected data can enable program administrators to more reliably reflect the workplace actions and needs of the field in programmatic decision-making.

Conclusion

In this paper, we have laid the groundwork for accessing, collecting, analyzing, and ultimately applying Twitter data to programmatic decision making. The approaches presented in this paper represent just a fraction of

the potential that social media presents for programs in technical communication. For example, one way to use social media would be to incorporate it into a freshman or sophomore level technical communication course. Students in these courses could be encouraged (through instructor enthusiasm, extra credit, or course requirements) to tweet in response to course topics with a dedicated hashtag. The program administrator could then analyze this data in a multitude of ways, including determining student mastery of certain topics, ascertaining the students' attitude of the course, and finding out what other hashtags students associate with the course. Furthermore, analysis of this data may allow administrators to better tailor classroom instruction and potentially improve overall recruitment and retention for both the program and the university.

While the examples presented in this article will not be perfectly applicable for every program, we do believe that the general underlying principles of data driven decision-making and argumentation do apply to all programs. Additionally, we also realize that programs must consider other sources of data when making decisions (e.g., academic metrics like graduation and retention rates), but we hope that this article encourages and enables readers to use Twitter as a viable and realistic data source. Finally, many of the examples and anecdotes in this article are hypotheticals drawn from sample data sets. However, we do want to reiterate the fact that one of the authors has used specific findings from the sample data described in this article to make specific and actionable curricular changes to the graduate program. Ultimately, we believe that Twitter data can be a valuable mechanism for collecting data about the field, and we believe that this data could be a critical tool in helping administrators craft their technical communication programs.

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