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Communication Design Quarterly

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Communication Design Quarterly

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EDITORIAL: UPDATES FROM SIGDOC AND CDQ

On behalf of SIGDOC and CDQ, we wanted to reach out to all of you and thank you for all you do in this difficult time. Our organization’s greatest strength is in its members, and we hope you are all staying as safe and sane as possible while COVID-19 changes the way we work and play.

SIGDOC has yet to reach an official decision on the viability or nature of our 2020 Conference in Denton, TX, but the Executive Committee along with this year’s Conference Committee, lead by Stacey Pigg, are in consistent contact and weighing options. Above all else, our decision will be informed by the values that we have articulated as an organization, which are: valuing human well-being; engaging in financial stewardship; respecting labor; foregrounding accessibility; supporting early-career scholars; establishing continuity; managing community and network-building; supporting innovation; valuing industry practices; and maintaining and facilitating interorganizational and international relationships. The option for SIGDOC 2020 that best addresses these core values will be the option we select. For now, we have confirmation that the proceedings publications will be moving forward and supported by ACM and included in the Digital Library regardless of the decision we make on the conference. This is great news, and fulfills our values in supporting scholarship and valuing the labor done by our authors, reviewers, and our program co-chairs, Josephine Walwema and Daniel Hocutt, who have worked diligently in the midst of the pandemic.

CDQ will continue to publish as often as we are able. We understand that our workflows have changed, dramatically for some of us. So while it may be that extra time is occasionally needed for a review, we remain committed to providing you as rapid turnaround as we can, and publishing cutting-edge research on communication design through our original articles, experience reports, and book reviews. In this issue, for example, we are pleased to share with you Sonia Stephens and Dan Richards’ “Story mapping and sea level rise: Listening to global risks at street level,” and Jennifer Roth Miller, Brandy Dieterle, Jennifer deWinter, and Stephanie Vie’s “Social media in professional, technical, and scientific communication programs: A heuristic to guide future use.” These two excellent articles are accompanied by reviews of Jonanna Boehnert’s Design, ecology politics: Towards the ecocene, reviewed by Ryan Cheek, and Christa Teston’s Bodies in flux: Scientific methods for negotiating medical uncertainty, reviewed by Ella Browning.

Take care and stay safe,

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Story Mapping and Sea Level Rise: Listening to Global Risks at Street Level

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ABSTRACT
While interactive maps are important tools for risk communication, most maps omit the lived experiences and personal stories of the community members who are most at risk. We describe a project to develop an interactive tool that juxtaposes coastal residents' video-recorded stories about sea level rise and coastal flooding with an interactive map that shows future sea level rise projections. We outline project development including digital platform selection, project design, participant recruitment, and narrative framing, and tie our design decisions to rhetorical and ethical considerations of interest for others developing interactive tools with community participation.

CCS Concepts
Human-centered computing → Collaborative and social computing

Keywords
Narrative, risk communication, sea level rise, story maps

INTRODUCTION
Those tasked with communicating environmental risks have long grappled with how to most effectively engage public audiences on risks that have global, national, or local consequences. The traditional information deficit model of science communication, which posits that public audiences do not understand science data simply because they do not have enough scientific training, has been recognized as insufficient for communicating complex subjects, including environmental risk (Bucchi, 2008). Moreover, where risk has traditionally been defined by experts as the probability of a hazard’s occurrence times the size of its impact (Okrent, 1980), contemporary research shows that public perception of risk is multidimensional (Slovic, 2010) and includes a risk’s impact, an individual’s confidence in scientific understanding of the risk, and perceived dread (Fischhoff, 2009). Peter Sandman (1993) captures this complexity succinctly in his definition: risk = hazard + outrage. In light of this movement towards public inclusion in risk assessment and rhetorical framing of risk perceptions, the challenges of risk communication have become more clear: the data need not only merely be accessible and available but need to matter in a way that relates to people and their mental schemas (Lakoff, 2010), their environmental frames (Nisbet, 2009), their worldviews (Akerlof et al., 2016), and their sense of place (Scannell & Gifford, 2013)—in essence, their lived experiences.

The shift from the information deficit model to more direct, critical, rhetorical public engagement models (Grable & Simmons, 1998) has spurred a considerable number of on-the-ground studies and projects with residents in vulnerable areas, often taking form through ethnographies, case studies, interviews, and surveys (e.g., Covi & Kain, 2016; DeLorme et al., 2018). These productive studies then iterate back and inform communication strategies in more tailored, localized ways. The limitations of more on-the-
ground, conversational research projects are that they are resource-intensive and difficult to generalize beyond the local scene, given the need to attend to rhetorical contexts. In part because of these limitations, deficit models are still a part of science communication strategies (Suldovsky, 2016).

Resource limitations also help explain, in part, the excitement and optimism around advances in interactive technologies that let communicators engage more actively with audiences with whom they are not having a conversation in person. Technology has advanced to the point where those tasked with communicating risks have the available technological means to meet people where they live, often literally, without themselves going there. Smartphones have enabled significant progress in citizen science initiatives, including image collections of affected areas; modeling and simulation technology has enabled people to envision future scenarios of their neighborhoods; and GIS software has enabled computer users the opportunity to explore data in their own way through layered visualizations, allowing residents to overlay a data set onto a region, neighborhood, or even residence of their own choosing. The presumption driving these advances is that equipping vulnerable residents with varying degrees of scientific agency will translate into a sense of political agency, driven by a resident-user’s newfound ability to intersect science, place, and a sense of investment.

What we see, however, is that such advances in technology do not automatically spur political action, do not necessarily engender a spirit of environmental urgency just by their very use (Richards, 2019). An increase in user agency does not necessarily lead to an increase in political agency, which we define here for our purposes as voluntary involvement in community-based, national, or global programs aimed at environmental resilience. Communication designers and technical communicators might theorize this disconnect as stemming from the continued technocratic design of the very risk communication technologies intended to engage (Stephens et al., 2015). A user might actively geolocate their picture of a flooded neighborhood, experience a dramatic projected visualization, or explore open data sets, but the main if not sole rhetorical interaction—facilitated as it is through impressive technology—is still with data. The rhetorical encounter with the technology might still be siloed from the greater social situation of the risk at hand, with the technology able to visualize risk scenarios but less able to contextualize which communities are most affected and what might be done about it. The technology may have changed shape from a one-dimensional message to a two-dimensional map or even a three-dimensional simulation, but the primacy of technology-driven data collection and distribution often remains. Despite the interactive, rhetorical potential imbued in twenty-first century risk communication technologies, technocratic design structures reminiscent of information deficit models of old still remain.

Given that levels of skepticism towards human factors in climate change continue to remain high (Marlon et al., 2018), and that at least some level of climate destabilization is now irreversible (IPCC, 2018), we are not arguing for the complete dismissal of public engagement of data but rather that such public engagement with data happens alongside the lives, stories, and communities being represented. What we are arguing is that advances in public-facing risk communication technologies cannot leave behind the advances in our understanding of the role of emotions, public perceptions, community, and story. The excitement and availability of profound technological advances should not preclude a situatedness in the lives and livelihoods of those most at risk. In other words, what is ironically missing from much interactive, engagement-driven risk communication technologies are people and their stories.

This paper describes a project that demonstrates how narratives—specifically experiential stories from those in vulnerable regions—can be combined with map-based sea level rise (SLR) risk visualizations to create an interactive, visual tool that gives more context or nuance to the risk. In essence, the project seeks to combine the interactive potential of GIS-based tools with the importance of using individual resident stories to help frame the messaging. Exposure to risk narratives in multimedia forms (e.g., interactive simulations) has been shown to increase audience engagement with complex environmental issues (Vervoort et al., 2010), and communication about the risks and uncertainty surrounding climate change via place-based scenarios has been shown to motivate concern and willingness to take mitigative actions (e.g., Shackley & Deanwood, 2002). As a complementary way to communicate about hazards, stories of individual experiences with environmental risks can also help develop and historicize the local risk experiences of a given community (Lejano et al., 2013), adding a significant level of detail and relatability to the larger risk narratives. In light of this research, we ask: What if data-centered interactive SLR maps could also provide access to community stories from long-term residents who have personally experienced the effects of water inundation? How do we design such tools, and what rhetorical and ethical considerations should be taken into account? And might this add a powerful layer of context and potentially persuasion to risk visualization technologies? This final question about persuasion, and potentially social action, is still speculative; more user experience research, such as the type conducted by Retchless (2018), is needed in exploring the relationship between rhetorical design choices made within the tool and the subsequent actions sought by users outside of use of the tool. For this project, we focus more modestly on the specific decisions made within a specific technological tool with the goal of merging map data with affected human voices.

This article begins by positioning interactive SLR visualizations as part of the larger communication genre of interactive risk maps. We then discuss narrative and its role in communication design, in part as a follow-up critique of the limitations of what we see in many technocratic interactive risk maps. From there, we then describe the origin and development of a story map project focusing on two regions along the east coast of the United States. We describe in detail the rhetorical design decisions (by which we mean the choices we made within the available means—affordances and constraints—of the story mapping application) in constructing a story map that combines the data exploration capabilities of an interactive risk map with visual stories of residents located on the map. We end with a discussion of the potential results and further directions of this approach of combining data with narrative on SLR risk maps.

**Interactive Risk Maps**

Interactive maps are widely used to communicate about complex environmental risks, such as SLR (e.g., the U.S. National Oceanic and Atmospheric Administration [NOAA]’s Sea Level Rise Viewer, https://coast.noaa.gov/slr/ and Climate Central’s Surging Seas Risk Zone Map, https://ss2.climatecentral.org), storm surge (e.g., NOAA’s National Storm Surge Hazard Maps, https://www.nhc.noaa.gov/nationalsurge/#/map), or wildfire (the Southern Group
of State Foresters’ Southern Wildfire Risk Assessment Portal, https://southernwildfirerisk.com/). Broadly, these visualizations project different risk scenarios onto a background map (Figure 1). Depending on specific functionality, users may select different scenario options, zoom to a desired location, and read explanatory text about the risk (Stephens et al., 2014). The information contained in risk maps tends to consist of quantifiable, georeferenced data, such as the probability that a specific area will flood at a particular sea level and the projected amount of inundation that would occur there, or locations of vulnerable public infrastructure such as hospitals or coastal vegetation zones.

Interactive SLR maps are both popular with the general public (Preston et al., 2011) and a powerful communication tool for understanding personal exposure to risk (Monmonier, 2008). Multiple actors produce SLR maps, including government agencies, non-governmental organizations, academics, and news organizations (e.g., Davidson & Miglarese, 2003; Wong-Parodi & Strauss, 2014; Stephens et al., 2015). Research has shown that maps can be more engaging than text alone for communicating risk (Retchless, 2014), and more familiar to novice users than graphs (Schnotz, 2002), but might not necessarily be more comprehensible (Covi & Kain, 2016; Richards, 2019). Given that the audiences for these tools are diverse, ranging from the general public to specialist users like community planners and land managers (Davidson & Miglarese, 2003; Monmonier, 2008; Kostelnick et al., 2013), designing maps that both engage users as well as clearly communicate a risk and its uncertainty to users with multiple levels of domain and cartographical expertise is a complex challenge (Kostelnick et al., 2013).

Our own research on and experience with interactive SLR viewers has led us to believe that these environmental risk communication technologies, despite their leaps in capabilities, may be subject to some traditional drawbacks of information-deficit models of communication. They might overload users with data, have high technical learning curves, or simply suffer from incomplete audience awareness and adequate user testing. Interactive risk maps can, from our standpoint, be read as microcosms of the ideological design conflicts described above in that they offer rich affordances in appeals to place and personal relevance but remain largely technocratic because they are often designed by experts for experts, with “the public” as a decidedly-untested upon and absent secondary audience. When lay users interact with such maps, they can have a “personalized” user experience in that they are able to interact with the data in a customized way. Nevertheless, interactive risk maps may still present risk in ways that are too complex for lay users (Richards, 2016; 2019) or lack humaneness.

One way to help lay audiences connect with mapped information is by adding qualitative information, such as narratives, that relate the lived experiences or concerns of affected communities. Our project draws inspiration from work in participatory GIS and critical cartography, which combine narrative and mapping in various ways that may facilitate a more dialogic process of science communication (Sieber, 2006). For example, participatory GIS is used to engage communities in mapping projects in order to support local knowledge-making and politically empower groups (Jelks et al., 2018). Critical cartography research points to the potential for participatory mapping projects to engage local communities (Lung-Amam & Dawkins, 2019) and empower them to, for example, re-envision natural resource management frameworks (Hayman et al., 2017).

The significance of our project lies within its expansion of the work of communicating complex, map-based SLR risk information to be more inclusive of human stories in a way that situates or localizes visualization tools by both geographic region and by narrative...
voices. To date, published research on interactive SLR risk visualizations has tended to focus on data exploration and the use of mapping and other simulations to engage users in exploring their own local communities (e.g., Davidson & Miglarese, 2003; Shaw et al., 2009; Stephens et al., 2015). While some organizations have developed narratives to communicate about environmental risks, these efforts often do not connect to the everyday lived experiences of audiences (Lejano et al., 2013), despite preliminary research revealing that there is a user preference for narrative within such tools (Richards, 2016). There are only a few examples of projects that incorporate both risk mapping and explicitly narrative elements (see Nettley et al., 2014).

While SLR maps afford users the opportunity to localize data to a neighborhood or even a specific building, such interactive maps are not fully “personalized” in that they exclude human subjects from the purview of visualization and engagement (Stephens et al., 2014)—an important consideration from both ethical and rhetorical design perspectives (Dragga & Voss, 2001). We thus approach this project as an opportunity to collect, curate, and share community stories about coastal risks to help contextualize impersonal map-based scientific information, and develop a more community-oriented, locally-focused narrative about SLR.

Narrative in Communication Design
Maps as a mode of visual communication have long been of interest to researchers in technical communication, with notable attention brought to the ideological (Barton & Barton, 2004), persuasive (Proppen, 2007), political, (Kimball, 2006), and public health (Welhausen, 2015) properties of cartographic design. As maps have become interactive, however, technical communication and communication design scholars face a new research challenge of building knowledge about maps in newer, more interactive contexts that focus on decision-making, personalization, and open data exploration. When it comes to thinking about interactive risk maps, we argue that emphasizing the narrative aspects and potential of risk maps can be a productive way forward. We also contend that the interactive nature of maps and visualizations present an exigency to take stock of how sufficient our extant theoretical and methodological approaches to thinking rhetorically about maps are for tackling these new advances and demands for interactivity and cartographic design.

Narrative is used in several ways in technical and scientific communication. It is often employed in an outward-facing sense for communication between experts and laypeople. Psychological research highlights the use of narrative in communication design to make complex information relatable to a lay audience, stimulate audience interest, and persuade laypeople to support specific policies or to change their behavior (Dahlstrom, 2014). Narrative can also be harnessed to demonstrate expertise of the speaker (Van Ittersum, 2014). In outward-facing narratives, there are ethical concerns about the appropriate level of accuracy, ends of persuasion versus comprehension, and whether the use of narrative by scientists is philosophically acceptable in a particular context (Dahlstrom & Ho, 2012). Nevertheless, the use of narrative has been explicitly encouraged in order to promote public engagement with climate change (van der Linden et al., 2015).

A different use of narrative in technical communication is within the context of a project or study as a method or tool to gather and analyze data. Ethnographic case study research in particular relies heavily on narrative as a technique for thick description and analysis. In ethnographic studies, researchers must choose to what extent to present their own interpretations of a situation versus presenting the individual narratives of the people who they are studying, as those narratives are described to them (Blyler, 1996). Relatedly, narrative can be a valuable method for sharing the individual and situated concerns of community members. For example, Lejano et al. (2013) use narrative analysis to understand the lived experiences of individuals as they grapple with the effects of climate change. Finally, Jones (2016) advocates for a process of narrative inquiry during participatory design projects to support the inclusion of marginalized users’ voices and support social justice aims.

In this project, our decision to gather street-level stories from affected individuals originated primarily from a gap both authors identified after studying and conducting testing on existing interactive risk maps, and secondarily from a commitment to environmental justice and interest in deep mapping. Despite the efforts of the creators of interactive risk maps to design a tool that engages the public in an effective and affective way, both authors have found that lay users were still by and large walking away from their use of the tool with an equal sense of confusion or disconnect. Therefore, the exigence for this project arose out of our own research and our wish to explore how narrative elements and interactive maps may be combined.

Story Maps
While narrative in the technical communication field has largely focused on verbal stories, other fields such as archaeology and digital history have explored the potential of map-based texts for conveying narrative (Ridge et al., 2013; Early-Spadoni, 2017). Thus, this project builds on the work of researchers who have explored mapping as an avenue for combining the perspectives of members of the general public with spatial data through “story mapping.” Story mapping, or spatial narrative, is a technique that introduces elements of “a specified point of departure, a particular pathway, and a known end point” to a map-based visualization in order to tell a story (Ridge et al., 2013; 178). Spatial narratives can potentially capture complexity in ways that linear narratives cannot, such as by helping communicators display social interactions with and within geography (Bodenhamer, 2015). Critical cartographers describe maps that incorporate the lived experiences of communities in a place—as opposed to simply rendering the physical features of a space—as “deep maps” (Harris, 2015). This project draws from the concept of a deep map to combine the recorded stories of community members with what we know about the rhetoric of maps and interactive risk visualization. Thus, we introduce story mapping into the conversation about communicating sea level rise risks to public audiences.

A story map is, in a way, profoundly simple: a map that tells a story; an interactive artifact that uses the affordances of cartography to guide the user through a narrative (see Figure 2). While not the proprietor of the term or concept, Esri, the builder of ArcGIS (which they themselves describe as “the world’s most powerful mapping and spatial analytics software”), has been a frontrunner in the development and popularity of story maps. Their highly-usable, template-driven story map tool is flexible enough to allow for a variety of stories but structured enough to make composition technically easy on the authors.

But a story map is, in another way, profoundly complex. While blending of stories and maps can increase user engagement with a
topic, issue, or region, the baggage that comes with both narrative and cartography as intellectual fields of study does not simply get left at the door. Blending maps with stories does not render maps less ideological or narratives less about power. There is still a person who gets to tell the story and a person who gets to decide how to represent space and place. While story maps have the potential to engage users in a specific topic—for example, to “inform, educate, and inspire decision-makers” (Wright, 2016)—they still also have the potential, if created without care, to replicate the same problems. As Harris (2016) argues, “The power of GIS lies in...its ability to reduce complex information to meaningful and understandable forms and yet this reductionism can also act against the multivalence of local knowledge and the need to maintain contradictions, arguments, and multiple perspectives” (p. 319).

While there have been ample numbers of story maps created, there has been less attention paid to the rhetorical considerations of the discrete, granular design decisions that go into composing a story map. Story maps have been used for outreach and education (Sinclair et al., 2018), to represent the history of marginalized communities within a landscape (Alemy et al., 2017), and to articulate residents’ visions for the future of their communities (Lung-Amam & Dawkins, 2019), among other purposes. Research on story mapping and related participatory mapping projects (e.g., Brennan, 2018; Jelks et al., 2018) largely focuses on the participatory process itself as a site of community engagement or empowerment. For example, Brennan (2018) positions a participatory mapping project as a mechanism to inform natural science-driven management of a marine protected area about residents’ lifestyle and cultural heritage concerns. While all worthy story maps playing vital roles in specific communities, none focus on how their specific design choices made within the application connect to their larger rhetorical goals. The design choices of these maps are black-boxed to a certain extent.

The fields of technical communication and communication design are well-equipped to pick up this mantle and theorize the rhetorical construction of story maps from a design standpoint, given our field’s history in attention to both maps and narrative as powerful and persuasive. As we make the transition from static to interactive maps, we must be sure to take Barton and Barton’s (1993) truism that all maps are ideological with us. The continued technocratic predilections of cartographic design in the context of risk maps and visualizations insist upon continued attention to representation, power, and bodies. The increasing interactivity of maps does not automatically mean they are democratic. What we present below, then, is a highly-reflexive example of the rhetorical decision points made by designers—us—of a story map right from the genesis of the project all the way to its public-facing stage. This reflexivity is done with the intention of highlighting the rhetorical decisions that can be made when designing story maps.

PROJECT DEVELOPMENT

The two main phases of this project were: (1) recruiting and interviewing coastal residents about their experiences with and concerns about coastal flooding and (2) building the risk map interface using the Esri Story Map platform. Both phases took place simultaneously and across two geographic regions: The Space Coast in eastern Florida, USA, and the Hampton Roads region in southeast Virginia, USA (Figure 3).

Projects that collect oral histories or experiences and that do not seek to develop generalizable research results are exempted from IRB review, according to U. S. federal guidelines (White, 2017). We collected narratives in order to illustrate residents’ concerns about SLR on the risk map interface, and our intent was not to generalize from their responses. Prior to beginning the project, we contacted an IRB coordinator at the first author’s institution to inquire whether our interpretation of the guidelines was appropriate. Based upon our description of this project, they agreed that it was appropriate to consider this use of personal narratives to be exempt from IRB review. We therefore followed best practices for ethical conduct in oral history projects as outlined by the Oral History Association (2009) for participant recruitment, video recording, and dissemination of results. Prior to interviews, participants were given a written description of the project; we discussed any questions they had about the project’s goals and how their interviews might be used; and each participant signed a release form giving us permission to use their recorded interviews and statements on the website and in other media such as this publication.

Recruitment and Interviewing

Our goal was to identify and interview at least three residents in each of the two study locations who could speak about their experiences of past coastal flooding and concerns about future SLR-related inundation. We ended up with nine total participants, resulting in nine separate videos (one participant did two videos and one video contained two participants). The number of participants was less important than the depth of content because (a) our main goals for testing the effect of including the narratives on users in the future do not relate to quantity, and (b) we envision
In general, the larger right panel contains either an interactive map the viewer can scroll vertically through along the left-hand side. We selected the “Journal” template, which divides the page into a pre-set overall narrative structure (Appendix A). In our project, we constructed the SLR visualization tool using Esri’s Story Map platform that enables users to combine interactive maps, text, videos, and static images into interactive templates that provide a pre-set overall narrative structure (Appendix A). In our project, we selected the “Journal” template, which divides the page into a left and right panel. Each page consists of a story segment that we had filmed them (Figure 6).

Building The Risk Map Interface

Participant recruitment was accomplished via snowball sampling. Each author contacted potential participants via a combination of: (1) direct contact with personally-known coastal residents who live in the study areas of interest, (2) reaching out to colleagues (e.g., researchers who have local contacts) who might know such individuals, and (3) contacting officers of environmental organizations to inquire whether any of their members might be such individuals. We explicitly tried to contact individuals who might have a diversity of perspectives on the issue, including retired contractors, naval officers, business owners, community planners, affected and concerned residents, and environmental activists.

Potential participants were initially contacted via email with follow-up phone conversations to discuss the project’s goals and scope and assess whether they were interested in participating. During these phone conversations, we discussed their specific experiences with and concerns for coastal flooding and described the purpose of the project as being to collect their individual stories. Most participants (five in Hampton Roads and four on the Space Coast) were interviewed in March 2018 with both authors present. Interviews lasted between 10 and 25 minutes per participant, and were conducted either at participants’ residences (in Hampton Roads) or at public parks or community centers near the coast (on the Space Coast). The goal was to have the background of each interview video reflect the nature of their concerns so as to help “localize” the stories. For example, one participant was filmed next to a boat launch destroyed by a hurricane—a result that would affect her restaurant business, located just down the road. Another participant was filmed in the space between her residence and the creek that floods and encroaches upon her property. At each interview, we prompted the participant by asking them to tell a personal story about their experiences with coastal flooding or sea level rise, as well as their concerns going forward. In some cases, we asked participants to expand on a point or prompted them to talk about an issue or concern that we had previously discussed on the phone. After the interviews, participants were given a gift card for an online retailer as a token of appreciation for their participation. After we completed the risk map interface, we emailed each participant the link to the project and requested that they let us know about any questions, comments, or concerns they had about the project and their representation. The participants who replied all had positive comments about the project, and no concerns were raised about their representation.

Due to the overall structure of the Story Maps template, the project has a narrative structure that was linear overall, with participants able to either scroll or jump between story segments or interact with videos or maps within segments. It consists of:

1. An introduction, with text explaining the project purpose and basic navigation and photos of the two study locations.
2. The Hampton Roads segment, with two parts: 1) a brief introduction to the region, instructions for using the interactive map, and an interactive map of SLR projections centered on the region (Figure 5); and 2) videos of the Hampton Roads project participants and a static map showing the location in which we had filmed them (Figure 6).
3. The Space Coast segment, with two parts as above.
4. A messaging page, with text suggesting actions users can take to understand and respond to SLR, and a landscape photo.
5. A concluding page with contact information and a second landscape photo.

![Figure 4. Initial wireframe sketch of the project design](image)

Text and images were uploaded directly to the Story Maps website, which hosts the project (readers can access the project by visiting https://tinyurl.com/slr-stories). The participants’ videos were edited for length and content and posted to YouTube, then were embedded into the project via linking. The interactive map, NOAA’s Sea Level Rise Viewer, was also embedded as a live (i.e., interactive) feature; the Hampton Roads segment begins with the map centered on Hampton Roads, and the Space Coast map begins with the map centered on that region.

Building The Risk Map Interface

We constructed the SLR visualization tool using Esri’s Story Map interface (https://storymaps.arcgis.com/en/), which is a free online platform that enables users to combine interactive maps, text, videos, and static images into interactive templates that provide a pre-set overall narrative structure (Appendix A). In our project, we selected the “Journal” template, which divides the page into a left and right panel. Each page consists of a story segment that the viewer can scroll vertically through along the left-hand side. In general, the larger right panel contains either an interactive map or a static image, and the smaller left panel contains text and the participant videos. Figure 4 shows our initial rough wireframe sketch of the overall project design. In the sketch, text and videos are on the left side of each panel pair, while photos or interactive maps are on the right. Each horizontal pair of panels corresponds to a story segment, which in this draft included: two introductory segments; the maps and videos for each location; and a concluding page orienting users towards action.
The participant videos were edited for time and also to create a single cohesive narrative for each video. This entailed making editorial decisions about including specific content, as well as cutting out long speaking pauses, street noise, loud bird calls, and the like. In the Discussion, we talk about our editorial decisions with regards to the videos, images, and text in the project, and make connections to the broader field of technical communication theory.

FIGURE 5. Screenshot of the introduction to the Hampton Roads segment. Left side: text introducing the region and explaining how to use the interactive map. Right side: interactive SLR map centered on Hampton Roads, with sea level set at 3 feet above current mean higher high water (MHHW; defined as the average height of the highest high tide in an area over several years [NOAA Tides and Currents, 2018]).

The pre-construction of Esri’s templates also played a considerable part in our decision of how to combine narrative with the map. Esri titles their template gallery (https://storymaps-classic.arcgis.com/en/app-list/) as such: “What Kind of Story Do You Want to Tell?” This title is invitational and undoubtedly motivates prospective creators to get started, but it also reveals a way of thinking about digital storytelling. The categories Esri has produced (Appendix A) are in our estimation dynamic and diverse enough to meet a variety of project needs, but also introduce constraints to the kinds of stories being told. As with any template-driven application, the designer is given the opportunity to either negotiate their intended design within the affordances of the application or use the template gallery as an inventive space to get ideas about how they wish to tell their story.

The notion of template-driven design will not be new to any communication designer, especially those doing audio digital storytelling (Hart, 2012). Templates have unburdened professionals in non-technical areas from the labor of coding for quite some time and all trends are pointing to their continued popularity. For us, the templates were convenient and sufficient for our adjusted goals; they unburdened us from doing high-level GIS work, and allowed us to spend more time contacting participants and curating and editing the videos. That said, the very presence of such savvy templates adjusted our goals by serving as a type of middleware, meaning software that organizes and presents information in a fashion that is invisible to the end-user (Drucker & Svensson, 2016). The convenience of templates, as is the case with genre (Bazerman, 1988), also brings about the potential of narrative calcification. Over time, as templates become more and more popular, and their dissemination extends further and further, our notions of what can constitute interactive digital storytelling might become overly-constrained, framed only within a preset number of narrative structures. Communication designers should always be aware of available templates at their disposal, and how they do or do not constrain the types of stories we see valuable for a given community, a given risk, or a given topic.

FIGURE 6. Screenshot showing the participant videos from Hampton Roads. Left side: personal videos. Right side: a non-interactive map with a circle around the approximate filming location. Users can switch to the interactive map using the “Back” button at the top of the map.

DISCUSSION

In this section, we discuss the larger implications for communication design and technical communication of the decisions we made when designing the risk map and conducting and editing the interviews.

The Stories We (and Esri) Wanted To Tell

The process of selecting a template involved an in-depth conversation, primarily focusing on how the affordances of the template would allow us to achieve our goal of combining narrative videos with SLR mapping. Our initial vision for the layout was to begin with a full-screen interactive SLR map, and then add links to the videos in the places that they had been recorded. In this vision, clicking on a given link would cause a video to “pop up” so that users could simultaneously explore the effects of SLR and flooding in a given region, establishing a more direct connection between the presence of flooding and the voices of residents. Essentially, we wanted to add stories on top of the existing exploratory tools. Our previous research on interactive SLR viewers led us to believe that adding personal stories directly to the map would be more effective than redirecting users to a separate page of stories, which would hinder usability. However, we learned that this design would require a more advanced understanding of ArcGIS than we possessed.

One strength of Esri’s Story Map application is that its template-based approach to narrative affords researchers, practitioners, and journalists with varying technical backgrounds to produce high-quality, engaging stories. While higher degrees of technical proficiency allow more opportunities for modification (e.g., designing your own tool from scratch from more tailored data sets), no GIS background is required, nor is previous experience with coding or web development. While we still believe that our initial vision for a co-located layout would be ideal, constraints of time, resources, and our technical backgrounds made it infeasible. Thus, we selected a two-columned as opposed to overlaid approach to the risk map interface (see our Figure 4 initial wireframe sketch).

The notion of template-driven design will not be new to any communication designer, especially those doing audio digital storytelling (Hart, 2012). Templates have unburdened professionals in non-technical areas from the labor of coding for quite some time and all trends are pointing to their continued popularity. For us, the templates were convenient and sufficient for our adjusted goals; they unburdened us from doing high-level GIS work, and allowed us to spend more time contacting participants and curating and editing the videos. That said, the very presence of such savvy templates adjusted our goals by serving as a type of middleware, meaning software that organizes and presents information in a fashion that is invisible to the end-user (Drucker & Svensson, 2016). The convenience of templates, as is the case with genre (Bazerman, 1988), also brings about the potential of narrative calcification. Over time, as templates become more and more popular, and their dissemination extends further and further, our notions of what can constitute interactive digital storytelling might become overly-constrained, framed only within a preset number of narrative structures. Communication designers should always be aware of available templates at their disposal, and how they do or do not constrain the types of stories we see valuable for a given community, a given risk, or a given topic.

Structuring the Story/Stories: Approaching the Great Divide

In the specific context of climate change communication, like with most global risks, there already exists a grand narrative (see...
Lytard, 1979) around the climate science: the world is getting warmer, we as humans caused much of it, and, if we don’t act soon, what we once deemed as progress will be the cause of our demise. The “stories” of individual residents experiencing flooding are tiles on the mosaic of the metanarrative of climate change. The stories of short-term local flooding, and thus long-term SLR inundation, and thus climate change, reveal the potential for intertextuality between the grand narrative of global climate change and the local narratives of not being able to get to work because a local road was flooded. Embedding visual stories of affected residents within the most up-to-date oceanographic projections offers a unique opportunity for communication designers to more closely align our shared global future with our everyday activities, personal health, and finances. As such, the “story” of climate change and its contribution to SLR is presumed. The challenge when designing this story map, then, was: How to embed and structure the video recorded stories in relationship to the SLR viewer within the Esri template? Having chosen the Story Map Journal template, how would we structure the user experience within it?

The main challenge in working towards some sort of intertextuality between the grand narrative of climate change—as depicted in the interactive SLR map itself—and the stories of residents is the division of the screen for the user. On the left side of the interface, the user can scroll down and sequentially view the videos of residents, starting with Norfolk, Virginia and ending in Cocoa Beach, Florida. The videos were not sequenced in any specific order other than to have those from Virginia first and Florida second. This reflects the actual order in which the interviews were conducted, and more than anything else reflect our travel from Virginia south to Florida.

On the interface’s right side, the user can explore NOAA’s Sea Level Rise Viewer, embedded as it is within the tool, and prefaced for the specific region (either Hampton Roads, VA, or the Space Coast in Florida). Users can also click a button to reveal a yellow circle on a static map to help them locate the precise location in which the respective video was filmed. Users can also toggle between the static image and the interaction SLR map in order to draw a closer connection between the participants being filmed and their actual vulnerability based on the latest climate and oceanographic projections.

While the goal of this arrangement from a design standpoint was to draw a link between each resident’s lived story and the location-specific data in the interactive SLR viewer, we also acknowledge that the division of the screen is potentially a disruptive user experience. First, users are invited to watch the video while simultaneously or afterwards exploring the interaction SLR map, which is only granted about half a screen of digital real estate. Second, while NOAA’s Sea Level Rise Viewer affords free exploration of flooding projections, the overall sequencing of our website has resulted in an experience of linear scrolling through the videos. We are left with this question: Does our attempt to merge stories with data produce a disjointed user experience that requires too much technical effort to allow for the stories to have emotional impact? In our initial envisioning of the project, we wanted users to be able to play the individual videos as they explored an area, but our technical backgrounds and the template of choice restricted this method of juxtaposition. Thus, we have questions about the integration of stories and map and whether or not they are tightly connected enough to be effective, or if they perhaps distract from one another.

Despite these concerns, we believe that adding personalization to SLR risk maps and interactive viewers adds value. The diversity of types of stories, from individuals with diverse backgrounds and careers, opens up more opportunities for user engagement by providing more diversity of worldviews about the same issue. As Akerlof et al. (2016) discuss, “cultural worldviews which contribute to politically polarized beliefs about climate [are] predictive of perceptions of sea level rise risk” (p. 314). If an SLR tool can include voices from cultural worldviews of eight people in two locations, (see Table 1), the data might be seen in a different frame. The stories of the participants with relatable concerns frame the data, as opposed to the data being itself the frame. The tool also gains credibility when the data reflect the stories of individuals (e.g., one participant’s account of wading through water up to her waist is reflected in the 3-foot SLR projections in her neighborhood).

Our decision to film our project participants outside (save one, who was filmed during inclement weather) was intentional. We wanted the participants’ stories to take place in an area of relevance to their story. For some, this meant actually being filmed along the causeway which, if inundated, would affect industry and recreation. For others, this meant standing in between the space separating their home from the encroaching body of water. The visual co-locating of story and body in situ helps, from a design perspective, with appeals to place. Previous research has shown that levels of engagement and risk perception are tied to one’s sense of place (Scannell & Gifford, 2013) though personal concern does not necessarily lead to willingness to act at a community level (Akerlof et al., 2015), and also that risk messages are more effective when localized (van der Linden et al., 2015). Therefore, aligning the visual of the SLR map with the potential for evocation of emotion from familiarity of place might be an effective rhetorical technique to make more concrete connections between the grand narrative of climate change and the stories of vulnerable residents.

Curating Stories of Residents
Before pressing record on our camera, we simply instructed participants to tell us a story about flooding or SLR in their community. We did not want to overdetermine the nature or type of story that the project participants presented, but rather wanted them to discuss what first came to their minds when they were prompted as such. Were these stories of their own personal experience? Stories about their community? A family member? Stories based on science, or based on historical experience? The participants shared a variety of different types of stories; we present a brief overview of each story in Table 1.

We edited the videos for length, noise interruptions, moments where we conversed with the participants, and content. The participants all had varying degrees of confidence and comfort in front of a camera, so some brought notes, some wanted prompting, and others could have talked for hours. From a user experience standpoint, we wanted each story to be about three minutes long. This necessitated making difficult editorial decisions about what to cut. The three main reasons for cutting the clips were time considerations, relevance of story, and tone. This was a balance between our editorial hand and the real, felt perspectives of the participants. For example, in one video the participant was very outspoken and critical about their city’s handling of stormwater and lack of attention to critical infrastructure. This of course is understandable emotion that an affected resident would have; however, the tone of this critique, we think, would add an overtly-political (in the partisan sense) layer to the tool, and our intention
was not to do this.

We also had to make decisions about scientific accuracy as they pertained to the goals of our project (see Covi & Kain, 2016). For example, some participants focused on storm-driven flooding rather than SLR. The two phenomena are scientifically distinct. From a science communication standpoint, the issue of conceptual accuracy is an ethical question, as well as a rhetorical one (Dahlstrom & Ho, 2012). While our participants described real events that had occurred in the world (or which might occur in the future), some of their stories were not accurate representations of the phenomenon being communicated (i.e., SLR). However, temporary stormwater flooding does give those who experience it emotional and experiential context for future SLR-associated long-term inundation. Our decision was to include these narratives as exemplars of the types of situations that might arise from SLR-associated inundation, because the goal of our project was to give context to the data rather than help users attain a precisely accurate mental model of SLR.

These conflicts between usability, editorializing, honoring participant perspectives, and scientific accuracy raise the issues of design and rhetorical ethics. In her work on narrative inquiry, Jones (2016) discusses the political nature of design, particularly design that might be used to give agency to project participants by foregrounding their voices. She argues that designers’ choices can either “perpetuate systemic and structural oppression or enhance the agency of users” (p. 489). Our project did not have explicit social justice aims, though we believe that by adding coastal residents’ narratives about flooding to scientific data, we afforded project participants opportunities for agency. Our video-editing decisions, however, may have limited the agency that participants had to tell their stories. Moreover, it is important to acknowledge that while our project had a goal of representing ethnic and gender diversity in participants, ethnic diversity was limited. The participants you see on the tool are everyone who directly responded to our recruitment efforts, so this is in part an issue of snowball sampling and in part likely related to available time and willingness to be video-recorded. More steps will be taken to meet the goal of ethnic diversity in future development of this project.

Table 1. Overview of participants and their interpretations of “story”

<table>
<thead>
<tr>
<th>Participant</th>
<th>Location</th>
<th>Interpretation of “Story”/Key Moments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grace</td>
<td>Historic Ghent, Norfolk, VA</td>
<td>Tells a story of how she was unaware that the neighborhood flooded as much as it did, and now has taken it upon herself to purchase a bullhorn and notify other new residents that a specific part of the street floods and that they should move their cars. This is a story about neighborly connection and helpfulness.</td>
</tr>
<tr>
<td>Jill</td>
<td>Fox Hill neighborhood, Hampton, VA</td>
<td>Tells a story of a three-day Nor’easter that affected her small neighborhood, where she has been living for a short period of time since retiring from the Air Force. She asks, “How are you going to live with water?”, and notes that leaving the “hidden gem” of Hampton would involve grief and financial burdens.</td>
</tr>
<tr>
<td>Heidi</td>
<td>Virginia Beach, VA</td>
<td>Tells a story of moving in with her mother after she sold her house in a highly-vulnerable part of the city after Hurricane Matthew. She recounts a time in which she had to wade out of her house and through the neighborhood with water up to her waist, and found a neighbor with a boat to ride with. She stated that she “could not live like that,” and, concerned for her mother, she relocated.</td>
</tr>
<tr>
<td>Rich</td>
<td>Larchmont neighborhood, Norfolk, VA</td>
<td>Tells a story of how a family gets to know the city very quickly through flooding. A military service-member with three-year orders to Norfolk, the story is told from the perspective of a temporary but concerned resident.</td>
</tr>
<tr>
<td>Laurilee</td>
<td>Causeway, Titusville, FL</td>
<td>Filmed in two locations, she tells stories of how a popular boat ramp was destroyed twice, by Hurricanes Matthew and Irma, and how it not being rebuilt causes confusion and anxiety amongst residents. She tells another story about how critical the causeway is for recreation, wildlife, and connecting barrier island communities to the mainland.</td>
</tr>
<tr>
<td>Randy</td>
<td>City Hall, Satellite Beach, FL</td>
<td>Tells science-based stories about inundation projections using the canal outside City Hall as an example. He showed how high the water would reach at different levels of flooding and gave an explanation of how SLR could combine with high tides to exacerbate flooding.</td>
</tr>
<tr>
<td>Leslie</td>
<td>Public library, Palm Bay, FL</td>
<td>Tells multiple stories about storms that caused community flooding, and how each storm came with an example of an individual in need of assistance. Her story was about neighbors coming together to respond to the threat.</td>
</tr>
<tr>
<td>Joanie</td>
<td>City Hall, Cocoa Beach, FL</td>
<td>Tells the story of how a small, coastal city has come to revise a 2001 stormwater master plan to deal with coastal flooding, and how the city has dealt uniquely with inundation through various urban stormwater management techniques.</td>
</tr>
</tbody>
</table>
The Action Page
In addition to the editorial decisions we made with respect to video editing, we also made choices regarding the wording of text, inclusion of specific photos, and developing a concluding segment with SLR preparation information and our contact information. On the final page of the tool, we provided viewers with a list of steps they could take to prepare for SLR in order to leave them with a concluding message that suggests pathways for action or self-education that may empower them. This decision was prompted in part by the linear Story Maps template structure, which seemed to us to require some sort of concluding information or message or have a built-in presumption of praxis. When audiences are exposed to messages about the certainty of global climate change, they may feel fatalistic or powerless to respond, unless they are provided information about concrete actions they can take to prepare (Milfont, 2012). Therefore, we chose to include this type of information at the end of the project in order to suggest further pathways for action that users might take, which also falls in line with the spirit of productive usability forwarded by Simmons and Zoetewey (2012).

CONCLUSION
This project demonstrates one way to combine personal stories and georeferenced scientific data in interactive risk maps using an accessible story mapping application. It evolved out of our research and reflects an ethical stance about the humaneness of maps as they merge with larger data sets. During this project, we found the need to make significant rhetorical choices at four conceptual levels: selecting a Story Maps template, developing a story structure, editing individual narratives, and concluding with an overarching message. We recommend that others interested in developing similar projects take into account the rhetorical implications of technical and editorial decisions at each of these levels.

In the introduction to this article, we asked: Why haven’t we made leaps in computer modeling and simulation and user agency in exploring and generating data led to subsequent national change in environmental engagement? In many local communities, SLR mitigation, adaptation, and response projects are being done; however, national policies in the U.S. and many states have lagged. We believe work on engaging communities must continue, as bottom-up models of risk communication might in the end prove more effective than top-down. But these projects should, in our estimation, center on the people in the affected community.

Our goal with this project was to put together a tool that would help give local, personal, context to scientific data. It is possible, though, that this may not be the most effective approach to motivate personal or collective action. Future work might focus on the points for consideration raised in our Discussion, namely bringing a greater diversity of perspectives to the project and explicitly centering the voices of residents in a participatory mapping approach rather than editorially framing the stories. For example, a deep mapping project that centers on a community’s concept of SLR and their concerns for the future might serve as a resident-driven representation of place and an effective focal point for community engagement. Conversely, developing a more focused editorial message might help motivate action. Our immediate future plans for this project are to conduct a UX study with local audiences to explore the effects of layering and locating personalized stories onto SLR maps. This will help us provide design suggestions for others interested in developing similar projects with different rhetorical goals.

ACKNOWLEDGEMENTS
Funding for this project was provided by a SIGDOC Career Advancement research grant. We would like to thank UCF’s Center for Humanities and Digital Research and ODU’s Media Park Lab for equipment use. We would particularly like to thank our project participants for sharing their stories: Jill Davis, Heidi Jeffries, Leslie Maloney, Rich Nazario, Randy Parkinson, Joanie Regan, Grace Tazewell, and Laurilee Thompson.

REFERENCES


APPENDIX A
Overview of template options presented by Esri’s Story Map application, with our considerations for application to interactive risk mapping for the SLR Stories project.

<table>
<thead>
<tr>
<th>Esri Category</th>
<th>Esri Name</th>
<th>Esri Description</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Sequence of Place-enabled Photos or Videos</td>
<td>Story Map TourSM</td>
<td>“Present a set of photos or videos along with captions, linked to an interactive map. It’s ideal for walking tours or any sequence of places you’d like your readers to follow. Choose between three different layout options, including a new Side Panel layout that makes your beautiful photos fill most of the display.”</td>
<td>This template would have allowed us to center the interactive risk map and add clickable points on the map that would allow “pop-up” images or text boxes to convey personal narratives. From a technical standpoint, however, we did not have the coding experience to integrate videos instead of static images.</td>
</tr>
<tr>
<td>A Rich Multimedia Narrative</td>
<td>Story Map JournalSM</td>
<td>“Create an in-depth narrative organized into sections. As readers scroll through the sections in your Map Journal, they see the content associated with each section, such as a map, 3D scene, image, video, etc. Narrative text and images can be displayed in a side panel, or in a floating panel that appears on top of your ‘main stage’ content.”</td>
<td>This template divides the screen into two columns, one of which could contain an interactive map, and the other which could contain text, images, or videos. While this creates a separation between map and personal story, the scrolling navigation allowed a smooth transition between stories. Additionally, the “journal” metaphor of having image follow along with text was in line with our goals.</td>
</tr>
<tr>
<td></td>
<td>Story Map CascadeSM</td>
<td>“Create a visually and editorially engaging full-screen scrolling experience for your audience blending narrative text, maps, 3D scenes, images, videos, etc. Sections containing text and inline media can be interspersed with ‘immersive’ sections that fill the display, including map animations and transition effects.”</td>
<td>This more technical version of the rich multimedia category went beyond what we needed, as we did not require animations or transition effects in our maps. Additionally, this template created a completely linear story that would have dissuaded users from free-form exploration.</td>
</tr>
<tr>
<td>A Series of Maps and Other Content</td>
<td>Story Map SeriesSM</td>
<td>“Present a series of maps that your readers can easily browse and switch between using tabs, numbered bullets, or our expandable ‘side accordion’ control. There’s an optional description panel for presenting narrative text and other content associated with each map. In addition to maps, you can present images, videos and other embedded web content, such as other web apps and even other Story Maps!”</td>
<td>This template has potential for other risk map purposes, specifically with regard to sea level rise, but we were using one map only: NOAA’s Digital Coast imagery. Toggling between maps would have disrupted, in our view, the user’s sense of place.</td>
</tr>
<tr>
<td>A Curated Set of Places</td>
<td>Story Map ShortlistSM</td>
<td>“Present a large number of places organized into tabs based on themes, for example, food, hotels, and attractions. As your readers navigate around the map, the tabs update to show them just the places in their current map extent.”</td>
<td>This template would not have worked well with the embedded interactive map (again, based in part on our coding expertise). Additionally, we were not interested in focusing on the individual places so much as the stories themselves.</td>
</tr>
<tr>
<td>Two Maps</td>
<td>Story Map Swipe and SpyglassSM</td>
<td>“Let your readers compare two maps by simply swiping back and forth, or by peering through one map to see another with our ‘Spyglass’ tool. You can present two different maps, or enable readers to compare different layers in the same map. A Swipe Series option lets you present multiple map locations that your readers can choose between using tabs.”</td>
<td>While this template has potential for risk maps (the swipe approach is already used by organizations like Climate Central and NOAA), it only shows before-and-after states of being. It would not allow free exploration of a risk map with multiple choices.</td>
</tr>
<tr>
<td>Just One Map</td>
<td>Story Map BasicSM</td>
<td>“Present a map via a very simple user interface. Apart from the title bar and an optional legend, the map fills the screen. Use this app to let your map speak for itself.”</td>
<td>We literally did not want the map to “speak for itself”; we wanted the people represented on risk maps to speak for themselves. However, this template might have been helpful if we had the coding skills to manually add videos directly to the map.</td>
</tr>
</tbody>
</table>

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Social Media in Professional, Technical, and Scientific Communication Programs: A Heuristic to Guide Future Use

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ABSTRACT
This article reports on the results of a research study supported by a CPTSC research grant that analyzed programmatic use of social media in professional, technical, and scientific communication programs (TPCs). This mixed-methods study included a survey of TPC program administrators (n = 29), an inventory of TPCs’ social media account use (n = 70), and an inventory of TPCs’ course offerings that included social media (n = 27). Results showed that programmatic use of social media requires strategic consideration, particularly in order to generate two-way communication, a goal of many of the TPCs studied. To that end, our article generates questions and guiding suggestions (drawn from our three-part study) to guide administrators who wish to include social media in their TPC.

CCS Concepts
CCS → Social and professional topics → Professional topics → Computing education → Model curricula

Keywords
social media, technical communication, program development, programmatic analysis

INTRODUCTION
Based on original research supported by a Council for Programs in Technical and Scientific Communication (CPTSC) research grant, this article addresses current, emerging, and future directions for programmatic social media use. Historically, professional and technical communication scholarship has attended to social media use, but as this article explores, less research has focused on how social media research can inform administrative decisions related to technical, professional, and/or scientific communication programs. Similarly, social media use at the programmatic level is a fruitful area of exploration, including program administrators’ decisions to utilize social media for student recruitment and retention as well as to embed social media use into curricula. Our article draws on both quantitative and qualitative data gathered in 2015 and 2016 to describe how the analyzed programs use social media for programmatic purposes. Also, our article articulates potential questions and guiding suggestions that can serve as a heuristic for programmatic engagement with social media.

Broadly, interest in social media by writing scholars has burgeoned in the past decade as social networking technologies have become more popular among students and faculty alike. In writing studies, technological tools like Facebook, Twitter, Reddit, and Pinterest (among others) spurred early conversations about the potential role of such technologies in the classroom and academia (Maranto & Barton, 2010; Vie, 2007, 2008). As these tools became more commonplace, scholars shifted to specific analyses of particular tools like Facebook or Twitter alongside multiplatform analyses. Many of these studies addressed pedagogical uses of social media in first-year writing courses (Balzhiser, 2011; Patrick, 2013; Shepherd, 2015) and beyond first year composition (FYC) (Faris, 2017). While some research took the form of case studies of undergraduate students across a variety of social media (Buck, 2012), others explored social media as a composing tool by specific user groups: second-language students (DePew, 2011), border and transnational students (Monty, 2015), graduate students (Coad, 2017), or members of fandoms (Potts, 2015; Wolff, 2015), among others. Finally, rather than take a pedagogical approach, some research analyzed specific social media composing features such
as Twitter hashtags (Dadas, 2017; Jones, 2014; Lang, 2019), for example.

Beyond this broad interest by writing studies scholars, technical and professional communication scholars have also attended to the increasing use of social media personally, pedagogically, and professionally by faculty and students. Lam, Hannah, and Friess (2016), drawing on research from Daer and Potts (2014), illustrated that over fifty articles published between 2009–2014 in technical communication focused on social-media-related topics (e.g., relationship building between clients and products; the use of social media tools by technical communicators for research, teaching, and research). A 2014 special issue of Technical Communication Quarterly concentrated on social media, examining social media—as the guest editor noted—as both/and in terms of their use and their relation to our constructions of ourselves as global citizens, communicators, and teachers (Kimme Hea, 2014, p. 2). Similarly, two connected special issues of Communication Design Quarterly in 2016 explored social media from a communication design perspective by asking the question, “What should communication designers consider when using social media to share information?” (St.Amant, 2016). Other technical communication scholars have approached social media through various lenses, such as their potential pedagogical use (Dyrud, 2011; Verzosa Hurley & Kimme Hea, 2014; Vie, 2017), their use as a communication tool during times of crisis or disaster (Bowdon, 2014; Pflugfelder, 2019; Potts, 2013) or in international communication about climate change (Dong, 2019), and their roles in workplace communication and as a facilitator of distributed work (Ferro & Zachry, 2014; deWinter, Kocurek, & Vie, 2016; Lam & Hannah, 2016; Pigg, 2014). Further, social media research dovetails with initiatives in technical and professional communication, such as internationalizing programs and research agendas (St.Amant, Sapienza, & Sides, 2011; Shin, Pang, & Kim, 2015; Wang & Gu, 2015) and exploring user experience and interface design (Sano-Franchini, 2018), among others.

Where the field has not yet intervened as readily, and where this article contributes to the literature, is within the arena of programmatic research and curricular design. That is, despite a solid focus on programmatic research in both writing studies broadly and technical and professional communication specifically, few scholars have conducted programmatic research within technical and professional communication that is devoted to social media. Such a consideration is timely as recent books and articles have approached social media through various lenses, such as their potential pedagogical use (Dyrud, 2011; Verzosa Hurley & Kimme Hea, 2014; Vie, 2017), their use as a communication tool during times of crisis or disaster (Bowdon, 2014; Pflugfelder, 2019; Potts, 2013) or in international communication about climate change (Dong, 2019), and their roles in workplace communication and as a facilitator of distributed work (Ferro & Zachry, 2014; deWinter, Kocurek, & Vie, 2016; Lam & Hannah, 2016; Pigg, 2014). Further, social media research dovetails with initiatives in technical and professional communication, such as internationalizing programs and research agendas (St.Amant, Sapienza, & Sides, 2011; Shin, Pang, & Kim, 2015; Wang & Gu, 2015) and exploring user experience and interface design (Sano-Franchini, 2018), among others.

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METHODS

This study intended to determine whether and how technical, professional, and scientific communication or writing programs (hereafter TPCs) across the United States were utilizing social media and toward what end. This study was a three-part study, and our three phases of data collection included:

1. a survey aimed at program administrators to capture administrative perspectives on social media use at a programmatic level (n = 29);
2. an inventory of which TPCs had social media accounts (either active or lapsed) (n = 70); and
3. an inventory of which TPCs had courses involving social media, with data gathered from course catalogs as well as participants’ responses to a survey question asking about existing courses (n = 27).

A cross-institutional team of researchers was involved with this project. This team consisted of two tenured technical communication scholars in conjunction with advanced PhD students in the digital humanities and a master’s student in rhetoric and humanities. The research team included the two grant co-PIs (Vie, at University of Central Florida, and deWinter, at Worcester Polytechnic Institute), two doctoral candidates (Roth Miller and Dieterle, both at University of Central Florida), and one master’s student (Angelica Giannone at Worcester Polytechnic Institute).

Research Questions

Our research questions, as articulated in the grant application approved by the CPTSC, were as follows:

1. What is the current status of programmatic and curricular use of social media in technical and scientific communication in the U.S.?
2. What are potential “best practices” for using social media to attract and retain technical communication students?
3. What are potential “best practices” for using social media in teaching technical and scientific communication?

4. What challenges do faculty and programs face related to programmatic and curricular uses of social media?

Our data allowed us to begin exploring answers to these questions. We understood, too, that the second and third research questions had very different aims—using social media for programmatic purposes can be quite distinct from using social media for pedagogical purposes in one’s own individual classroom. However, previous technical communication scholars have explored programmatic research through discussions of curricula (Allen & Benninghoff, 2004; Harner & Rich, 2005; Melonçon, 2012; Melonçon & Henschel, 2013). Similarly, Watts’ (2019) study of an online student orientation embedded within her course helped her make claims about “student satisfaction, student perceptions of online learning, and students’ program retention,” all elements she found valuable as an online TPC program director (p. 254). Thus, we found value in addressing our second and third research questions in connection with each other, and our manuscript reports on findings in both areas.

Data Collection
Active data collection was completed in fall 2015 and spring 2016. The survey was composed in Qualtrics and disseminated in fall 2015 and spring 2016 via email to TPC program administrators as listed on program websites. Next, our research team examined social media posts, websites, and course catalogs between January and April 2016 to inventory social media account use and program-level course offerings. Overall, we evaluated each TPC (n = 112) individually and

- noted whether undergraduate, graduate, or both undergraduate and graduate programs were offered by the TPC;
- offered the survey link via email and asked for the TPC director’s participation;
- identified social media platforms utilized by the TPCs;
- investigated activity or inactivity on Facebook and Twitter, requiring at least 10 posts in January and February 2016 to be considered active;
- coded all posts during spring semester 2016 for all active TPC accounts on Facebook and Twitter;
- categorized posts as accolades, program recruitment, events, or other; and
- searched course listings and catalogues on the TPCs’ websites for social media curricula.

Compiling the List of TPCs
To gather these three forms of data, we first determined the list of TPCs that our research team would explore. We relied on several previous studies of TPCs that generated similar lists to guide our own compilation, such as Harner and Rich’s (2005) study of undergraduate curricula in TPCs, Melonçon and Henschel’s (2013) previous study of TPC degree programs, and both Nugent’s (2009) and Melonçon’s (2012) studies of TPC certificate programs as models. Using their discussions of list creation as guides, our research team composed and cross-checked an initial list. However, as Nugent (2009) noted, “no complete and authoritative list of programs in technical communication can be said to exist, making it difficult to initiate systematic research of technical communication programs” (p. 79). Further, he stated, most programmatic research in TPCs draws from program directories compiled by organizations in the field “and in doing so, make[s] assumptions ... about the completeness and representativeness of those directories ... Each study also makes assumptions about ‘what counts’ as a program for the purposes of their research” (p. 79). Despite these challenges, however, we worked within the parameters of organization-sponsored program directories and remained intentionally broad in our understanding of what counted as a TPC in an attempt to cast as wide a net as possible for our research purposes. This is similar to Melonçon’s (2012) approach in her study of TPC certificate programs, where she articulated criteria for a degree “in the general sense” as being a program that “includes a wide range of courses that would be recognized as courses appropriate for a TPC degree, e.g., courses in technical writing, courses that integrate technologies used in the profession, and courses focused on genres (that is, reports, instructions) common in the workplace” (p. 209).

Because this project was funded by a CPTSC grant, we started with their programmatic database and compiled a spreadsheet of programs listed with CPTSC in 2016. From there, our team augmented the listing with information gleaned from ATTW memberships, much like Allen and Benninghoff’s (2004) study of TPC curricula. Throughout, we consulted with each other to ensure that we were in agreement regarding a program’s inclusion (see also Melonçon, 2012, p. 209).

This resulted in a list of 112 programs that included undergraduate and/or graduate degrees in technical, professional, and/or scientific communication or writing in the United States. Though Melonçon and Henschel’s (2013) study resulted in a larger list of 185 undergraduate TPC programs, their study methodology looked at “majors, concentrations, emphases, tracks, and specialization[s]” (p. 45), while our study only focused on majors, minors, and certificate programs. While this may have limited our numbers somewhat, our team agreed that our list of 112 TPCs would provide us with enough breadth to begin to answer our research questions. Our number (n = 112) was more in line with previous studies of TPCs. These include Nugent’s (2009) study of 139 TPCs in the U.S. and listed in “the combined major program directories” (p. 83), Harner and Rich’s (2005) 133 programs as listed on the STC database, and Allen and Benninghoff’s (2004) 73 TPCs drawn from the ATTW website and ATTW-L listserv. Ultimately, our intention was not to provide an exhaustive list of best practices, but to explore potential best practices as well as challenges. As well, the qualitative portion of this mixed-methods study was never meant to be generalizable, but instead to generate potential best practices and spur further research into TPC social media use. Thus, we approached list creation with an eye toward breadth and within the guideposts of previous TPC studies.

The next sections offer greater detail about each phase of the project and the methods involved.

Phase One: Survey of University Perspectives on Social Media Use
The first layer of participant data was collected through a national survey housed in Qualtrics. This survey was approved by the IRBs at University of Central Florida and Worcester Polytechnic Institute. A pilot version was sent in February 2015 to five TPC directors known to the co-PIs, who agreed to test the survey and
ensure the branching pathways worked correctly as well as to give feedback on the questions themselves. After they provided feedback, the results were discarded; pilot participants were made aware that they should save their actual answers for the revised version of the study. Those pilot participants were invited to take the lightly modified final version of the survey. Because the survey was anonymous (participants were invited, but not required, to provide their contact information in the survey), we were unable to track whether the five pilot participants also completed the final survey. The final survey was disseminated in September 2015 and open until February 2016. A total of 30 potential participants began the survey and 29 consented to participate out of a possible 112 participants, or 26.7% of our sample pool.

We sent via email a personalized invitation and link to the Qualtrics survey to the 112 chairs or directors of identified TPCs from our spreadsheet. We also sent two individual follow-up emails asking for survey participation. There were a possible 44 questions with branching pathways depending on the participant’s responses, and the average responder answered 32 of those possible questions based on yes/no branches. At the survey’s end, participants were asked if they would participate in possible follow-up research projects related to social media. The full survey is included in Appendix 1.

Survey questions thematically addressed the following five areas:

- Programmatic use of social media to recruit, attract, and/or retain students;
- Support to bring social media speakers and experts to campus;
- Incorporation of social media into the curriculum, individual courses, or instruction, including programmatic learning goals specific to social media;
- Faculty research in social media;
- Alumni employment in social-media-related fields and best practices for programmatic social media use.

Each of the five thematic areas was assigned a color for visual coding (i.e., programmatic use of social media = red; speaker support = yellow; social media in curriculum = green; faculty research = blue; alumni employment/best practices = purple). These colors were used in an initial coding pass by the research team that was facilitated by the use of ATLAS.ti qualitative data analysis software. That is, the research team first analyzed the survey responses by color-coding the participants’ answers according to whether their answers corresponded to one or more of the above five areas. This color coding allowed the research team to quickly assess inter-rater reliability in a visually striking manner.

The researchers then, drawing on grounded theory methodology (Charmaz, 2006; Urquhart, 2012), coded for in-vivo trends that arose from the five main categories. These in-vivo codes revolved around accolades, recruitment, opportunities, and information. The research team carried these codes forward and continued to refine them in the second and third phases of the study.

The first phase of the study (i.e., the survey) also helped inform the second phase of the study (i.e., an inventory of social media use) because participants were explicitly asked in the survey whether and how their programs incorporated social media into curriculum, individual courses, and/or instruction. Those participants who answered yes (that their programs incorporated social media) were asked for specific course titles and course numbers where possible, and were encouraged to provide URLs if available. The research team was therefore able to follow up on these URLs and course materials if available online.

**Phase Two: Inventory of Social Media Use**

The second study phase involved an inventory of social media use by the 112 TPCs studied; we began our research in January 2016 and completed it in June 2016. The research team created a database for data collection and tracked whether or not programs were using social media and if so, which tools. We also tracked how the programs used social media (i.e., to announce events, to share accolades, or to recruit students) and how frequently the programs engaged with their social media accounts. We found that 70 TPCs had social media accounts (sometimes multiple accounts) for programmatic use out of 112 TPCs in our list, or 62.5%.

We went directly to each program website to determine which programs were using social media programatically. If particular platforms (e.g., Facebook, Twitter, LinkedIn) were listed, we clicked links from the pages. Most often, programs included links to their Twitter and Facebook accounts; however, some programs did offer links to LinkedIn, YouTube, blogs, Instagram, Flickr, and Pinterest. We developed numeric codes (one through eight) with each numeral associated with a particular social media tool: Twitter = 1, Facebook = 2, LinkedIn = 3, YouTube = 4, blogs = 5, Instagram = 6, Flickr = 7, and Pinterest = 8. Using numerals allowed us to quickly scan which social media outlets were predominantly used and we ascertained that Facebook and Twitter were preferred. Therefore, we chose to focus our deep analysis efforts on Facebook and Twitter. We did not go directly to LinkedIn, YouTube, Instagram, Flickr, or Pinterest to check for use beyond what was indicated on program websites because of the more limited use of these technologies; that is, the data sample would have been too small given the low number of TPCs using these technological tools (see Table 1).

**Table 1: Programmatic Use of Social Media (n = 70 programs)**

<table>
<thead>
<tr>
<th>Coding number</th>
<th>Social media technology</th>
<th>Number of programs (n = 112) using</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Twitter</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Facebook</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>LinkedIn</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>YouTube</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Blogs</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Instagram</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Flickr</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Pinterest</td>
<td>1</td>
</tr>
</tbody>
</table>
with a social media presence at the programmatic level).

We also noted that of the 70 programs that were using social media, many used more than one social media technology for programmatic use (e.g., one program might use both Twitter, Facebook, and YouTube for programmatic purposes). Thirty programs of the 70 (42.8%) used more than one social media tool, and the greatest number used by one program at a time was five (i.e., one program used Twitter, Facebook, YouTube, Instagram, and blogs for program promotion). However, most programs (57.1%) focused on only one social media tool at a time.

We excluded university-wide social media efforts not specific to TPCs. We did, however, differentiate between general departmental social media use and TPC-specific social media use; in other words, our research team tracked whether the main department (e.g., English, writing and rhetoric, etc.) had social media accounts of some kind as well as whether the associated TPC (e.g., technical communication, scientific communication, professional writing) had social media accounts. In only four cases were there both departmental and TPC-specific social media accounts that overlapped.

Because Twitter and Facebook dominated use, we also went directly to those sites to search for program-related pages. In some cases, we would find related student organizations or projects, related departments, and outdated pages. In this sense, our search sometimes led us to complex “rabbit holes” that required subjective decisions. Decisions to include related accounts such as student organizations associated with a TPC or related department social media accounts were based on the degree to which they were specifically relevant to TPCs. We excluded generalized university, college, school, and department pages from our analysis unless posts directly and frequently mentioned technical or professional communication.

Next, we needed to determine which accounts were worthy of deep analysis and we agreed to only further pursue active accounts. We wanted to spend more time deeply analyzing active accounts and coding their activities in order to categorize the ways TPCs were using social media, and we wanted to label inactive accounts as such so that we could quantify how many TPCs had opened accounts, used them for a while, and then became inactive. To determine active or inactive status, we analyzed the time period during which the last 10 posts on Twitter and Facebook occurred. We determined which accounts were active by perusing recent posts. To consider an account active, we required at least 10 posts during January and February 2016. Any accounts below this threshold were considered inactive. Based on these limiters, 27 of the 70 programs with programmatic social media accounts (38.5%) were considered active. See Table 2 for a breakdown of active versus inactive social media accounts by TPCs.

Analyzing TPCs’ social media accounts—for active versus inactive status and for more fine-grained detail about how active social media accounts were being used—proved challenging for our research team for several reasons. First, when visiting the individual program pages, we found many programs displayed minimal information regarding social media. Often TPC program pages did not have links to social media pages; however, by searching further, we frequently found related department, college, and university social media links. In these early investigations, we found social media use usually leveraged efforts of the university-wide communications office. For example, many universities would offer links to social media pages in Web site footers. Links would appear on each page as the footer was consistently displayed. However, when the links were clicked from the TPC’s page, a generic university-wide social media page would often be displayed. Second, we also found that often TPCs were contained within the larger umbrella of a department (most often English departments), some of whom had their own departmental social media pages. Programs were sometimes also organized within other departments, such as writing and rhetoric or communication. This resulted in social media accounts serving a wide range of degree programs and areas of study within a department rather than more exclusively the TPC housed within that department.

Table 2: Active Versus Inactive Social Media Accounts by Social Media Platform

<table>
<thead>
<tr>
<th>Social Media Platform</th>
<th># of Programs with Active Presence</th>
<th># of Programs with Non-Active Presence</th>
<th>Total # of Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twitter</td>
<td>19</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>Facebook</td>
<td>18</td>
<td>14</td>
<td>32</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>YouTube</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Blogs</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Instagram</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Flickr</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pinterest</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

TPCs

Third, we experienced difficulty in the granularity of the search. In many cases, we needed to make a subjective call to draw boundaries between a larger department-supporting social media account and an account specifically supporting an embedded TPC. For example, the University of Central Florida (UCF) programs illustrated this well. UCF offers a technical communication master’s degree within the Department of English and a professional writing graduate certificate through the Department of Writing and Rhetoric. UCF also offers a scientific and technical communication area of specialization within the Texts and Technology doctoral program. The technical communication master’s program didn’t have active social media accounts, but the Texts and Technology (T&T) doctoral program did for both the overall program and the T&T student organization. Finally, the Department of Writing and Rhetoric did have active social media accounts, but not specifically for the professional writing graduate certificate; instead, the account promoted all activity (including that of this TPC) within the department. For this study’s purposes, we decided not to look for TPC-related social media activity beyond the boundaries of a departmental social media account, meaning university-wide social media use wasn’t considered true programmatic use. We did, however, consider TPC-related social media use to include activity around student organizations, related projects such as a journal in the field, and related departmental use as long as the content related to TPCs in some way.

For active accounts, we investigated the nature of their posts and categorized them as accolades, program recruitment, events, and
“other.” Accolades involved posts that congratulated faculty or students on recent achievements such as conference presentations, publications, awards, and so on. Events posts were targeted to current students and faculty and announced upcoming and ongoing events of interest. A fine line existed between events and accolades. Ultimately, we coded a post as an event if it was advertising a future activity with the purpose of increasing attendance. Alternatively, a post was coded as an accolade if it concerned a past activity and the nature of the post was to highlight the work of a person, group, or project. Program recruitment posts included notices to prospective students (e.g., “We are accepting applications for the PhD program in XYZ at ABC University”). Posts included in the “other” category included original posts or repostings of news articles, memes, discussions of the weather, interesting information originally posted by another entity, etc. We tracked the number and type of posts on active Facebook and Twitter accounts for TPCs and recorded the link to their Facebook accounts (if applicable) and their Twitter handles (if applicable) in our database.

Phase Three: Inventory of Social Media Courses
The third phase of the study involved an inventory of TPCs’ curricula for courses that involved social media. Beginning with our full list of 112 TPCs, we further codified that list by breaking it down by offerings: undergraduate only, graduate only, or offering both undergraduate and graduate programs. We then returned to that individual TPC’s survey results concerning social media curricular development and followed any provided URLs or looked at any course syllabi shared online. After this, we visited each university’s program website to analyze their inclusion of social media at a curricular level from an outsider’s perspective. Additionally, our team searched course listings and catalogues for evidence of social media education and noted courses featuring social media curricula.

Subjective decisions were necessary during this phase’s coding process. For example, a course titled “writing and publishing in online environments” might not immediately strike the research team as a course related to social media, but some courses with this or a related title mentioned social media in the description and were thus coded as social media courses. When readily available, we read course descriptions and used our best judgment. Courses with the term social media in the title always counted. Courses with terms such as new media often counted based on descriptions and platforms mentioned. Ultimately, this method was employed to determine whether social media education was visibly occurring in the curriculum. Of the 112 programs possible, only 27 programs appeared to have courses with social media offerings.

We were unable to find course catalogs for some of the programs and syllabi were generally unavailable online. A number of factors might account for this. The first is that the absence is an accurate representation of some programs; for these programs, social media was not included in their curriculum. The second is that catalog copy is often written vaguely to allow faculty to approach courses individually, and course titles are sometimes written in such a way as to be as capacious as possible for all the faculty approaches to teaching that course. The third is that some courses included social media as a medium for communication (in the same way that websites and papers are), and as such were treated as a medium rather than a topic for instruction. And finally, online materials might have been out of date.

RESULTS AND DISCUSSION

Our survey results indicated positive adoption of social media. However, phase two and three analyses of web and social media material highlights the uneven use of or education about social media in TPCs. This section attends to our survey results, our analysis of social media in programmatic use (attracting students, building programmatic communities, and the like), and the presence of social media in TPC curricula.

Survey Results
As noted earlier, 30 participants began the survey out of a possible 112, all of whom were TPC administrators. One participant did not consent to complete the remainder of the study, and thus 29 participants continued through the remaining possible branching paths available in the survey. Table 3 shows one set of yes/no/not sure questions offered to participants and their responses; participants were always offered a follow-up qualitative free response space right after a yes/no/not sure question in order to give them space to elaborate on their response.

Table 3: Yes/No/Not Sure Questions Offered to Participants

<table>
<thead>
<tr>
<th>Categorical Questions: Does your program include ...</th>
<th>Yes</th>
<th>No</th>
<th>Not Sure</th>
<th>n =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmatic use of social media to recruit, attract, and/or retain students</td>
<td>19</td>
<td>7</td>
<td>3</td>
<td>29</td>
</tr>
<tr>
<td>Programmatic student learning goals about social media</td>
<td>19</td>
<td>2</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Programmatic incorporation of social media into curriculum, courses, and/or instruction</td>
<td>18</td>
<td>3</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>Faculty research about social media</td>
<td>15</td>
<td>4</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Program sponsorship for guest speakers who focus on social media</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>24</td>
</tr>
</tbody>
</table>

When examining these numbers within the context of the second and third phases of the study (i.e., the inventory of TPC social media account use and the TPC course catalog inventory, respectively), our research team noted some dissonance. That is, the numbers in Table 2 are generally positive—many TPC administrators noted that their programs incorporated social media into the curriculum, or embedded student learning goals about social media into the program, for example. However, the catalog and social media/website analysis doesn’t bear this out across the many programs examined. Thus, we posit that those who chose to participate in the survey may have done so because they were already interested in or excited about social media use in a TPC and therefore would possibly have more elements to positively describe about their program as related to social media. It might also be the case that websites have not been updated to reflect recent additions of social media curricula, or that social media content is included in courses with names that do not reflect social media topics and thus are not easy for external audiences to ascertain the inclusion of social media. Finally, this also points to a definitional problem: like the issue of what counts as a TPC, defining what counts as social media has been similarly fraught for researchers (see, for example, Stewart, 2016).
We also studied TPCs that had an online presence, but the TPC administrator had not completed the survey. There could be a variety of reasons why a TPC administrator may not have responded. Some of those TPCs may have had a program administrator who was less enthusiastic about social media and therefore not as interested in participating in the survey. We also note the possibility of survey fatigue (or even email fatigue) as program administrators frequently receive a large number of emails daily, with some of those including survey or other research requests. However, our response rate of 26.7% is in line with typical response rates for online surveys at around 30% (Nulty, 2008), and thus we believe that our study’s response rate provides enough data to present a useful snapshot of TPC administrators’ use of social media.

**Programmatic Use of Social Media to Recruit, Attract, and/or Retain Students**

Table 4 showcases the responses from participants regarding their use of social media at a programmatic level to recruit, attract, or retain students. Programs that used social media to recruit, attract, and/or retain students self-reported using the following platforms: Facebook (18 out of 19 possible “yes, we use social media” responses), Twitter (8 of 19), Google+ (1 of 19), YouTube (5 of 19), blogs (4 of 19), and other (3 of 19, which included podcasts and Tumblr). No respondent reported using Reddit, Instagram, Foursquare, Pinterest, or wikis.

<table>
<thead>
<tr>
<th>Categorical Questions: Does your program include ...</th>
<th>Yes</th>
<th>No</th>
<th>Not Sure</th>
<th>n =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmatic use of social media to recruit, attract, and/or retain students</td>
<td>19</td>
<td>7</td>
<td>3</td>
<td>29</td>
</tr>
</tbody>
</table>

**Media to Recruit, Attract, and/or Retain Students**

In this section, our data revealed several challenges to using social media for these aims. They include considerations of labor (both faculty and student), challenges of one-way versus two-way communication, and concerns regarding lack of recognition for social media efforts as service and/or administrative work.

When asked how programs use these tools to attract, recruit, and/or retain students, the qualitative data showed that content generation overwhelmingly depended on student (8 of 19) and faculty (5 of 19) labor, with only one program employing a department webmaster whose job description included social media content. In fact, one respondent wrote, “Getting students to post is the holy grail.” The research team noted that most of what the TPC directors discussed in their follow-up responses about how programs generated content was what we determined as information sharing/pushing (11 of 19). For instance, directors described content such as “departmental happenings,” “successes of current students and alums,” “job openings,” and “news of interest.” Even though we asked in the question whether the departments engaged in “socially mediated discussion,” the directors only talked about posting but not about discussion/two-way communication. We reflect that this could be a generative avenue for follow-up discussion.

The labor of content generation is an issue that TPC administrators acknowledged in their responses, and our respondents further delineated multiple issues that affect content creation for programmatic social media use. These include considering who is generating the content (e.g., students only, faculty members only, students and faculty, directors only), whether and how those content generators are compensated for their work, and how those laws might impact content creation. Respondents suggested, for example, the potential role of social media for student professionalization, with students generating content as a form of “(micro) crowdsourcing,” while others saw the need for a professional or dedicated role to generate content. Concerning what content should be shared, respondents saw the ability of social media to push information in a timely fashion and highlight the work of the department. Several respondents discussed the problems faced in developing best practices or strategies, such as the need for legal considerations and/or policies, as well as the pressures of time and uncompensated labor. These concerns arose again in both reasons why programs didn’t use social media, as some noted that their programs were too small and did not have adequate resources. Many responses suggested a desire and willingness to do this (i.e., one respondent said, “We’d like to do more, but don’t have staff or time to do these”), and also noted a need for a strategic plan (i.e., a different respondent said, “You need a coherent content plan and schedule. You must execute on what we actually teach”), with one person pointing out the need to use Facebook ads.

One respondent noted that it’s difficult to engage with social media on top of teaching, research, and service, indicating that social media use for this or any other purpose does not currently fit under these three categories. Programmatically, this appears to be an opportunity to scaffold social media engagement as recognized service, and to also consider recognizing such service at the multiple levels where it can appear for a faculty member in the university—for instance, the inclusion of social media in one’s teaching that supports a TPC is different than the labor of content creation as a TPC program director, although the same faculty member might participate in both activities. A TPC program director might have a research agenda that includes scholarship on social media, a teaching schedule where he or she incorporates social media assignments into pedagogy, and programmatic activities that support social media for his or her program such as creating content, responding to comments, or writing blogs. This is just one example of how the labor of social media for programmatic use can be distributed in different ways across the life of an individual TPC administrator.

**Social Media Course Offerings**

This phase of our research was one of the more challenging for two reasons. First, the research team lacked access to the actual course syllabi being taught in the TPCs. As a result, we were frequently unable to determine whether social media content was being taught in a given course, or whether social media was being incorporated as a communication tool in a course. Second, catalog listings for courses are typically generic, in order to apply to many different instructors’ approaches to the same course within one institution.

Thus, the undergraduate or graduate course catalog listings for a TPC might be intentionally broad to allow for faculty variance in teaching courses.

We had to rely heavily on the TPC administrators’ self-reported data as to whether social media was being taught in certain courses. In our survey, we asked “Does your program include programmatic incorporation of social media into curriculum, courses, and/or instruction?” Given that the TPC administrators who responded to this question in our study (n = 23) overwhelmingly said yes (18/23, or 78.2%), our research team expected to see more references to social media in the materials that we evaluated (i.e., course
catalogs). However, of the 112 TPCs possible, our research team found only 27 explicit references to social media being taught in the curriculum in some way (24.1%) in their course catalogs. While this aligns with the number of TPC administrators who responded to this question in our survey, it seemed to us that the strong response of “yes” to that survey question would imply that, even among the additional 89 programs whose administrator did not respond to the survey, there would be higher numbers of courses identified in the course catalogs that included social media in some way. Because course catalogs only include course titles, a short description, and credit hours, there is limited information that can be gleaned from them, likely impacting our team’s ability to discern whether or not social media was incorporated into these courses.

Unlike Melonçon and Henschel’s (2013) study of undergraduate TPC programs in the U.S. that also relied on coding course catalogs, our study looked for information that was often more difficult to ascertain. That is, Melonçon and Henschel coded the course catalogs they gathered by dividing them into required and elective courses, then assigning them into general categories (e.g., capstone, editing, usability, linguistics, etc.) in order to assess what TPC programs nationwide were asking students to take as part of a TPC degree program. Instead, our research team was looking for evidence of one specific element of a course—in other words, was social media used as content and/or tool in this course? On hindsight, we realize that a necessary part of our study was missing if we wanted to more deeply understand whether or not (and how) social media was being taught in TPC courses: we needed to gather syllabi when possible and talk directly with instructors when possible. As Melonçon and Henschel noted, “Additional research should focus on analyzing syllabi and talking with instructors to gain a better understanding of what happens in the classroom” (p. 60). We agree, and while we asked for course numbers and course catalog URLs from our participants, we did not ask for syllabi and did not follow up with individual faculty teaching social media in TPCs. These would be fruitful areas for future research.

However, the qualitative responses from the TPC administrators offered some valuable detail when considering how these respondents saw social media being infused into the curricula of their TPC. One respondent reflected on their own use of Wikipedia, LinkedIn, Twitter, and YouTube in the TPC classes they taught, and shared that another faculty member in the program “taught an entire course about the business uses of social media as part of a study-abroad program in London. The class evaluated the social media presences of Harrods, the Maritime Museum in Greenwich, a brewery, etc., and made site visits.” Another shared the description of a class called “Designing Social Media Infrastructure” thusly:

This course prepares technical communicators to assess and develop governance/oversight procedures, policies, employee training, monitoring and measurement protocols, risk and compliance guidelines, and audit processes for social media. Students select a company and conduct a semester-long case study where they develop critical infrastructure documents for social media.

Still other respondents shared titles of courses in the curriculum of their TPC, such as Multimodal Composition, Digital Rhetoric, Content Strategy, Writing in the Public Interest, Writing and Digital Media, Developing Online Content, Rhetoric of Web Publishing, and International Technical Communication, among others. It is clear that, for these 23 respondents, social media infused the TPC curriculum of their program in many different ways. And when asked, “Why do you think that it is important to teach social media in classes or curricula?” respondents reinforced its importance in the workplace as well as its prevalence in everyday communication and in technical communication specifically. As one participant stated, “Social media is an important element of writing and communication that must be addressed as seriously as standard academic discourse. It’s most likely that students will write more in social media platforms than in other modes throughout their personal and professional roles.”

Questions and Concerns to Guide Future TPC Social Media Use

In addition to the descriptive research that we conducted about current observable practices, we surveyed programmatic administrators about current and best practices for social media in TPCs. Twenty-two people responded to our best practices question, and we coded these responses using the following categories that arose in vivo from the data:

- Student work & professionalization;
- Faculty and/or professional social media role;
- Information sharing;
- Ongoing problems; and
- I don’t know.

This final category of “I don’t know” was often accompanied with text explaining that the responding TPC director didn’t research social media and/or didn’t use it personally. In a separate follow-up question, we asked why the program doesn’t use social media to recruit, attract, or retain students, and of the six who responded, five programs reported being small and therefore lacking the resources, interest, or time to actively run or maintain a presence. Ultimately, the size of the programs matter, which makes sense considering the time commitment needed to manage a social media presence effectively. However, there is an opportunity even here to teach social media in coursework, thus preparing students for the platforms and communication challenges that they will likely face. TPC administrators can play a role in making arguments about the necessity for such courses or assignments as beneficial from a programmatic perspective.

Eight of our 22 respondents spoke strongly about student labor and professionalization as a TCP strategy. According to their self-reporting about student activities in service to the program, respondents discussed students posting to Facebook groups, running sites, or collaborating with faculty to manage a broader project. Students self-reporting about student activities in service to the program, respondents discussed students posting to Facebook groups, running sites, or collaborating with faculty to manage a broader project. Students.

In discussing the benefits of student engagement, one respondent wrote that “it is useful for students in the program to do much of the social media posting and management because it gives an inside view of the program and its benefits to [other] students.” In this way, student labor becomes a means of professionalization into the core competencies and skills that might be expected in the workplace after graduation (Brumberger & Lauer, 2015; Frith, 2014). However, with students cycling in and out of TPC programs as they matriculate and then graduate, some TPC administrators may be wary of involving students at high levels in programmatic social media use; the ongoing training required may be burdensome.

And while some respondents note the benefit of “crowdsourcing”
social media tasks through student labor, another respondent noted specifically the need for oversight of student work on these sites. Specifically, allowing students to post to programmatic social media sites indicates programmatic approval of all posts, which may not always be true. As one respondent wrote in response to best practices as a cautionary statement: “Take legal considerations seriously. The idea of having a student run an account could backfire. Create procedures and policies for social media usage.” Thus, calls for students to run and manage these sites in the future should only be done with clear documentation and training, and also include an oversight mechanism that ensures social media usage is done in service of the program. Many institutions have, or are in the process of developing, brand guidelines and social media guidelines, and the TPC programs will need to consider how best to introduce students to these guides.

While many respondents discussed student labor, four other respondents discussed the need for a dedicated faculty or administrative role, or a professional plan, for social media engagement. In addition, 13 respondents discussed faculty and staff postings to social media platforms, either on personal accounts or via programmatic accounts. In many ways, the responses concerning faculty or professional roles in social media management are closely linked to the challenges identified in implementing social media: namely, time and money. As one respondent wrote: “These are time-consuming. Yes, PR and recruitment have become our jobs—on top of teaching, scholarship, and service, but it’s hard to find time to make these work as they should.” In addition to this trickle-down professional role, another respondent noted that “administrators tend to see it as a … panacea that requires no actual understanding of how it works or of the infrastructure and resources to make it effective,” and that “if universities would invest the resources for meaningful data mining, targeting, and so on, we might be able to make good use of it.” Such comments point to frustrations within social media use. Best practices indicate that social media managers need time, training, and resources to be used effectively for the purposes identified. In terms of time, social media managers need time to develop an understanding of their local institutional context, including understanding the institutional social media guidelines (if any), the key stakeholders and players involved in social media use throughout the institution, and the audience’s needs and desires as related to social media. At one institution, Instagram may be key in reaching out to students; at another, faculty may be active in private Facebook groups for a program. Without an awareness of such local contexts, social media managers may waste valuable time setting up TPC-focused social media accounts that lay dormant because their potential audiences were active elsewhere.

Despite frustrations with time, time can also be used as a guiding principle for TPC-related social media use. For example, three respondents pointed to the benefit of creating a master calendar and posting schedule to maintain active social media accounts. In such a calendar, social media managers or coordinators pre-schedule set content during the year using available tools. In some cases, these schedules were very simple, from posting opportunities for students every other Friday to a three-day-a-week posting schedule. In some cases, this responsibility is placed on the department webmaster or designated staff person; however, in most cases, these posts and engagement fall to faculty in the program. To distribute the labor of maintaining accounts, several institutions described rotating the posting responsibilities. Finally, technologies abound that can assist with scheduling social media posts, setting up automated responses to program pages and accounts, and even trawling other social media accounts to suggest content that a TPC social media account might want to share.

The final identified best practice from the field is social media for information sharing (i.e., one-way communication), which is discussed in 19 of the 22 responses. Programs identified Facebook, Twitter, YouTube, and blogs as the primary ways to share information about the program, update course descriptions, announce events, and post about student activities. One respondent discussed keeping in touch with alumni. For the most part, responses indicated that social media was mostly used for announcements and news items—pushing information out to networks. However, along with pushing out information on a one-time basis, TPC administrators responsible for social media account content may also consider curating “evergreen” content (i.e., information that can be considered timeless, useful year after year) that can be reposted on a consistent basis; they may also want to curate a network of accounts of interest whose content can be reblogged, shared, retweeted, and so on to demonstrate engagement with the network and create an active presence for audience members.

Absent in responses concerning best practices was social engagement via social media (i.e., two-way communication). In other words, many programs discussed posting news and events to social media, but they did not discuss active tagging of individuals in the network, liking or retweeting others’ items, or running synchronous or asynchronous online community sessions organized around a hashtag. In some ways, social media serve as extensions to an organization’s website presence, which, taken in conjunction with comments about time and resources, makes sense. Active social media engagement—the type of activities that a community manager might foster—consumes time, resources, and social labor. Faculty may be willing to do this for their personal careers and personal networks because the labor is of deep personal interest to them. However, the labor dedicated to a program may not have the same social and emotional rewards needed to justify and motivate people to engage in such work, particularly when the day-to-day work of a TPC administrator includes so much already. Programs that can tap into a point person or people in the department/program whose research, teaching, and/or service interests align with social media specifically or digital communication broadly will likely be more successful in structuring their social media presence over the long term. However, those programs should also consider what happens if that point person leaves.

Limitations and Future Research Directions

One limitation of our study involves the content of our list of TPCs that we studied (n = 112). As noted earlier, and in previous TPC research as well, determining an exhaustive list of TPC programs for research purposes is difficult for many reasons. Our research team created a list of 112 programs for our study based on methods and guidelines explored in previous TPC scholarship. However, we realize that our choices of programs to include or exclude created a listing that is not monolithic. That is, our listing includes large doctoral-granting institutions alongside regional comprehensive institutions alongside tech schools, and so on. As such, future research could explore nuances in TPCs’ programmatic use of social media by applying limiters such as sorting programs according to a listing like that of the Carnegie Classification of Institutions of Higher Education. We recognize, too, that TPCs constantly evolve and grow, and our data are a snapshot of an earlier time. While
accurate in 2015-16, changes have of course occurred since, and future research can build upon the baseline we present here.

A second limitation involves the nuances between our second and third research questions. That is, our second research question asked, “What are potential ‘best practices’ for using social media to attract and retain technical communication students?” and our third research question asked, “What are potential ‘best practices’ for using social media in teaching technical and scientific communication?” We described in this article that we see many connections between programmatic use of social media to attract and retain students and programmatic use of social media embedded within pedagogy (i.e., use of social media in a course that is taught within a TPC). However, we acknowledge that pedagogy involves both the individual (i.e., the faculty teaching the course) and the collective (i.e., the course is embedded within and supports a larger program). Future research can continue to deeply explore both of these areas and examine ways that individual curricular choices about social media in TPC classes can affect the larger program-level outcomes and goals for the TPCs in which they are embedded.

A third limitation involves our coding methods as well as the self-reported nature of the data we gathered from the survey. First, more social media posts than we anticipated were coded “other.” Posts in the “other” category included scholarship, internship, and job opportunities as well as various random posts such as quotes or shared information. Breaking down the “other” category and understanding the nature and purposes of these less-common types of posts may be an area for future research. Second, we were unprepared for the lack of information about curriculum from our survey results, from online sources, and from course catalogs. We expected to more easily be able to find information about TPC courses online, and would design our study differently in order to find this data more easily next time, perhaps using a structure drawn from Melonçon and Henschel’s (2013) study of undergraduate curriculum that relied heavily on course catalogs. Finally, we acknowledge that the first phase of the study gathered data from those TPC administrators who self-selected to respond. While our aim in this study is not to generalize (and thus our heuristic of questions and concerns is not meant to be a monolith), we would like to see a broader study with more TPC administrators responding to allow for even greater depth and nuance to the self-reported data.

Some of our respondents illustrated valuable avenues for future research. In terms of seeing social media as an opportunity for development, survey responses indicated that programs saw social media as a potential tool for engaging students, faculty, alumni, and the community, yet TPC administrators were unsure how to accomplish this goal (see Vie, 2017, for further articulation from TPC faculty about the tension between an interest in social media pedagogically and a need for specific training to feel comfortable moving forward with this interest). This may be an area for future research or a potential recommendation for how to communicate with and involve varied vested parties in technical and professional communication programs and in associated professional fields.

Similarly, many of the survey responses as well as content posts appeared to try to reach multiple audiences at once. They often attempted to bridge student, university, and professional interests in technical and professional communication education. As a result, we recognize that as social media has become increasingly central to professional business strategies. We see a greater need for savvy technical and professional writers who can simultaneously act as community managers (see Bingham & Conner, 2015; Carnegie & Crane, 2018; Hackos, 2015; Shalamova, Rice-Bailey, & Wikoff, 2018).

Finally, our survey was not able to draw out much discussion of student retention as a result of social media use by TPCs, and this was difficult to discern from phase two or phase three of the study (e.g., there was little way to capture results that discussed retention from studying TPC posts or catalogs). Because retention is often so important to program administrators, this would be an important area for future research. More research with TPC alumni that asks whether social media played any role in their retention as students could be key.

**A Heuristic for TPC Social Media Use**

Based on our research team’s findings, we share here a set of possible guiding questions for TPC administrators who wish to consider, or further develop, the incorporation of social media into their program’s design (Table 5).

**Table 5: A Heuristic for TPC Social Media Use**

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Consider professional development around SM and accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audience Analysis</td>
<td>Encourage individual faculty teaching SM in the TPC to include alternative assignments when possible</td>
</tr>
<tr>
<td>Connections to the Broader Field</td>
<td>Consider which social media (SM) will reach this/these audience(s)</td>
</tr>
<tr>
<td>Curricular Development</td>
<td>Think about ways to encourage participation from community members but be aware of the increased labor of two-way communication</td>
</tr>
<tr>
<td>Work to stay aware of SM research in TPC journals, books, and conferences</td>
<td></td>
</tr>
<tr>
<td>Continue to stay abreast of industry needs and partnerships in TPC, particularly relating to SM</td>
<td></td>
</tr>
<tr>
<td>Hold programmatic conversations about the goals of incorporating SM in curricula and the program as a whole</td>
<td></td>
</tr>
</tbody>
</table>

Our second research question asked, “What is the effect of social media on the technical and professional writing education? To what end?” We described in this article that we see many “best practices” for using social media in teaching technical and scientific communication. However, we recognize that as social media has become increasingly central to professional business strategies, we see a greater need for savvy technical and professional writers who can simultaneously act as community managers (see Bingham & Conner, 2015; Carnegie & Crane, 2018; Hackos, 2015; Shalamova, Rice-Bailey, & Wikoff, 2018).

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<table>
<thead>
<tr>
<th>Longevity and Labor</th>
<th>Have we considered why as a program we want to include SM in (1) individual courses (2) the program as a whole?</th>
<th>Consider how SM assignments and tools can meet learning goals or outcomes for individual courses and program goals or outcomes for the TPC as a whole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Build recognition and reward for programmatic use of SM into the TPC and/or broader aspects of the university (i.e., promotion, tenure) where possible</td>
<td>Consider internships, course credit, work-study, and other means of rewarding student labor in SM for the TPC</td>
</tr>
<tr>
<td></td>
<td>Ensure that multiple individuals are aware of the SM logins and passwords in case the point person leaves</td>
<td>Back up SM accounts where possible; consider alternative SM in case primary choice falls</td>
</tr>
<tr>
<td></td>
<td>Create a detailed content calendar and regularly check for communication with audience members</td>
<td>Create a detailed content calendar and regularly check for communication with audience members</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marketing and Branding</th>
<th>Is the TPC administrator aware of university brand guidelines (if applicable)? Social media guidelines (if applicable)?</th>
<th>Regularly examine and share brand guidelines and SM guidelines, as applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Does the program’s use of SM align with these guidelines?</td>
<td>Highlight elements for the SM team to be aware of and engage in what-if questions to spur discussion (e.g., is our Twitter avatar on brand? What do we do when our audience complains on Facebook? What happens if a student organization in our program creates an Instagram without our knowledge?)</td>
</tr>
<tr>
<td></td>
<td>How are, or will, members of the SM taught to align with these guidelines?</td>
<td>Highlight elements for the SM team to be aware of and engage in what-if questions to spur discussion (e.g., is our Twitter avatar on brand? What do we do when our audience complains on Facebook? What happens if a student organization in our program creates an Instagram without our knowledge?)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training</th>
<th>Does the TPC administrator need training in SM use to more effectively include SM at the programmatic level?</th>
<th>Consider workshops, brown bag lunches, seminars, reading groups, and other forms of professional development for members of the TPC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do TPC faculty need training in SM to more effectively include SM at the curricular level?</td>
<td>Draw on in-house expertise when possible to share locally contextual best</td>
</tr>
</tbody>
</table>

**CONCLUSION**

Social media can build communities, yet the effective use of social media is a specialized skill that requires a significant commitment to long-term engagement with that community. At the level of programmatic adoption, either for programmatic use or curricular inclusion, social media use requires strategic consideration, especially for growing two-way participation over unidirectional information sharing. Our data indicate that an opportunity exists to expand social media curricula in TCPs to meet the increasing demands that these new platforms place on professional and technical communicators. Further, programs can use social media successfully as expansions of their current web activities to push up-to-date information about courses, news items, announcements, and job opportunities for students. Such activities, our research indicates, do not require significant time or resource investment. However, they do require a designated point person or people who can think big-picture about the TPC’s strategy and select the appropriate platforms, ways of engagement, and content that align strategically. TPC administrators or faculty are ideally situated to take such a rhetorical approach to social media use and able to develop networks (both local and field-specific) over time. Should programs choose to engage with the capabilities of social media, our research indicates that they will want to coordinate with marketing or other units on campus to access analytics on the different platforms and/or designate a social media coordinator to engage actively with the social networks through tagging individuals, liking posts or retweeting them, and hosting live sessions via these platforms.

And those TCPs that are not yet prepared to incorporate social media as part of their overall strategy for student retention, recruitment, or engagement may choose in the meantime to bring experts to their institution to speak to faculty and administrators about the power of social media at a programmatic level. Once TCP programs are ready to take the leap, they might participate in workshops that help faculty and administrators understand the local institutional context, develop a potential social media strategy, and reward for curricular level?

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Polytechnic Institute as they worked with the co-PIs to carry out the work of this grant project. We appreciate the anonymous reviewers of this article for their helpful and thorough feedback, and we also thank all of the respondents to our study for their careful and thoughtful discussions of programmatic work relying on social media at their institutions.

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**APPENDIX**

**Q1** You are being asked to take part in a research study. Whether you take part is up to you. The purpose is to survey technical, professional, and scientific communication programs about social media. We are interested in learning about social media for student recruitment, engagement, and learning outcomes.

The study is led by Dr. Stephanie Vie (Institution 1) and Dr. Jennifer deWinter (Institution 2). The survey should take approximately 15 minutes of your time. At the end, you will be invited to share your contact information to enter a drawing for a $50 gift card from Amazon.

You must be 18 years of age or older to take part in this study. Are you at least 18 years of age or older?

- Yes
- No

**Q2** Do you teach in or are you an administrator (e.g., a program director, co-director, coordinator, assistant, or similar) of a technical, professional, or scientific communication/writing program?

- Yes
- No

**Q3** Do you consent to participate in this study?

- Yes
- No

**Q27** For the purposes of this study, we use “student” to refer to any student enrolled in a professional, technical, and/or scientific communication or writing program (such as a certificate program, undergraduate degree, or graduate program (MA/MS/PhD)).

We use “program” to refer to any professional, technical, and/or scientific communication or writing certificate, undergraduate degree, or graduate program (MA/MS/PhD).

We use “social media” to refer to web technologies such as Facebook, Twitter, Google+, Reddit, YouTube, Instagram, Foursquare, Pinterest, blogs, wikis, etc. For the purposes of this study, we do not consider email or static webpages (such as a department or program website) to be social media.

In this survey, we will ask about three main areas related to your program’s potential use of social media: (1) to recruit, attract, and/or retain students; (2) to teach enrolled students; (3) to connect social media with your program’s learning outcomes or related elements.

**Q4** Does your program use social media to recruit, attract, and/or retain students?

- Yes
- No
- Not sure

**Q32** You mentioned that you are not sure if your program uses social media to recruit, attract, and/or retain students. Can you explain further?

**Q5** What do you see as some potential “best practices” for using social media to recruit, attract, and/or retain students by programs? How might programs best use these tools for these purposes?

**Q18** Has your program brought, or do you plan to bring in, guest speakers who focus on social media to your campus?

- Yes
- No
- Not sure

**Q32** You mentioned that you are not sure if your program has brought, or plans to bring in, guest speakers who focus on social media to your campus. Can you explain further?

**Q19** You mentioned that your program has not brought, or does not plan to bring in, guest speakers who focus on social media to your campus. What are the reasons why not?

You may make multiple selections.

- Faculty in the program are not interested in social media.
- Students in the program are not interested in social media.
- We do not know any social media experts who can be guest speakers.
- We do not have the time.
- We have not thought about it.
- Other ______________________________________

**Q33** You mentioned that your program has brought, or does plan to bring in, guest speakers who focus on social media to your campus. What do you hope this speaking engagement will do in terms of recruitment, attraction, and/or engagement for students enrolled in your program? For faculty members?

**Q7** You mentioned that you do not use social media to recruit, attract, and/or retain students in your program. Can you please explain further?

**Q29** You mentioned that your program uses social media to recruit, attract, and/or retain students. Which social media technologies does your program use for these purposes?

You may make multiple selections.

- Facebook
- Twitter
- Google+ (Google Plus)
- Reddit
Q40 How do you use the above social media to attract, recruit, and/or retain students? For example, do you post, have students run the sites for you, engage in socially mediated discussions, and so forth?

Q6 Are there any other ways that your program uses social media to recruit, attract, and/or retain students that the previous questions did not capture? Or do you have further thoughts about social media’s use for recruiting, attracting, and/or retaining students in programs?

Q34 This next section will focus on curriculum and instruction in your program as related to social media.

Q12 Does your program incorporate social media into curriculum, individual courses, and/or instruction?
- Yes
- No
- Not sure

Q35 You mentioned that you are not sure if your program incorporates social media into curriculum and instruction. Can you explain further?

Q15 You mentioned that your program does not incorporate social media into curriculum and instruction. Can you explain further?

Q13 You mentioned that your program incorporates social media into curriculum and instruction. Can you provide course titles (and course numbers) for those courses if possible? Alternatively, you can point us to a course catalog or URL.

Q14 Does your program have courses that specifically focus on social media as a topic, theme, or form of instruction?
- Yes
- No
- Not sure

Q41 Why do you think that it is important to teach social media in classes or curricula?

Q8 What do you see as some potential “best practices” for using social media in teaching professional, technical, and/or scientific communication or writing? Or, what are some of the ways your program has used social media successfully for curriculum and instruction?

Q9 What challenges do you believe programs face related to uses of social media for curriculum and instruction?

Q20 Do any of the faculty in your program research or write about social media?
- Yes
- No
- Not sure

Q37 You mentioned that you are not sure if any of the faculty in your program research or write about social media. Can you explain further?

Q38 You mentioned that some faculty in your program research or write about social media. Would you be willing to share their names for potential follow-up research? If so, please write their first and last names below.

Q39 Does your program have overall student learning outcomes or goals?
- Yes
- No
- Not Sure

Q40 You mentioned that you are not sure if your program has overall student learning outcomes or goals. Can you explain further?

Q41 You mentioned that you are not sure if your program’s overall student learning outcomes or goals address or incorporate social media in any way. Can you explain further?

Q17 Can you please explain in what ways do your student learning outcomes address social media?

Q16 Do your program’s student learning outcomes or goals address or incorporate social media in any way?
- Yes
- No
- Not Sure

Q43 Now we would like to ask you about former students’ use of social media in their professional lives (their jobs).

Do any of your former students who have graduated (alumni from your programs) use social media in their professional lives (their jobs)?
- Yes
- No
- Not Sure

Q44 If you answered yes, please describe what they do, if known (their jobs), and what they do with social media in their jobs.

Q29 Thank you for participating in our research study. We thank you for your time. May we contact you for a brief follow-up interview?
- Yes
- No

Q30 Please provide your name and email address below so we may enter you into the drawing for a $50 Amazon gift card. If you indicated your willingness to have us contact you for a brief interview, we will use this same contact information.

Q31 Thank you for your participation in this survey. Your responses will be valuable to us as we research the role of social media in program development. If you have questions or need assistance,
please contact [name] at [email].

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Book Review

*Design, Ecology, Politics: Towards the Ecocene*

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*Design, Ecology, Politics: Towards the Ecocene* is a must-read for any communication design educator or practitioner concerned with the deleterious effects of the Anthropocene (or its critical counterpart the Capitalocene), which names the current geological era marked by human dominance over environmental processes. In this book, Dr. Joanna Boehnert deftly incorporates ecological thinking into design pedagogy to articulate a path forward for a new era of human-environment relations built on cooperation rather than exploitation. Existential threats abound in a modern era built on endless consumption and production cycles driven by market logic. For too long, designers have tacitly participated in the destructive tendencies of the neoliberal political project by convincing themselves and others that their work is neutral. This book is a wake-up call that highlights the role that design has played in constructing the precarious conditions of the modern world and, more importantly, the role designers could play in charting a way out of the mess humanity has made.

In part one (“Design”), Boehnert establishes the exigence for her project by tracing the complicity of designers and the design industry in manufacturing consumer desire while anesthetizing populations to the ecocidal consequences of unending production. She argues that “one of the primary roles for design in this context is to create an illusion of wholesomeness and to whitewash/greenwash/datawash destructive industrial processes” (p. 31). Hope, however, is not lost. The flipside of design as a tool to drive consumption is that it can be repurposed to expose, illustrate, and reverse devastating ecoist ideology. Design activists can use their skills to “help build awareness, inform and build solutions – and also protect activists and other people” (p. 37). The key to doing so lies in the development of ecological literacies for designers and that work begins with the educators and educational institutions that foster design pedagogy.

Part two (“Ecology”) serves as a primer on ecological theory from systems thinking to ecofeminist critique to eco-psychology. The bulk of the book is dedicated to bridging design and eco-conscious politics through ecological thinking. In this section, Boehnert critiques sustainability discourses as a form of greenwashing as well as the epistemological error committed in the subordination of ecology to economy. The former disempowers and disarms environmental movements while the latter misidentifies the conditions our existence depends upon. Both participate in hubristic ideology that fosters an “illusionary autonomy resulting in pathological behavior” (p. 71) in the form of mass ecological destruction. Market forces benefit from the ethos of individualism promoted by designers who are employed by corporations as advertisers, crisis communicators, and public relations strategists to obscure ecological perception of the destruction wrought by capitalism.

Boehnert concludes with part three (“Politics”) which functions as a series of case studies where designers have participated in neoliberalism under the guise of environmental concern. In doing so, corporations have leveraged design principles to mask their contributions to ecological harms such as air pollution, desertification, and climate change. They do this by posing as environmentally conscious global citizens while displacing accountability through rhetorics of individual responsibility and technological optimism. Ecological modernism and technofixes are proposed by elites as safe alternatives to more radical action. These proposals are intended to stave off redesigns of status quo social relations and “With carefully crafted images, design buttresses the ‘master’s house’ that depends on the dismissal of the environmental and social impacts of technological innovations” (p. 162). However, by instilling ecological literacy into design pedagogy,
designers have the opportunity to help others become conscious of the exploitation that growth-based economies necessitate and become wearier of corporate sponsored technocratic solutions.

The strength of Boehnert’s analysis lies in her politicization of communication design. By applying concurrent design, ecology, and political lenses to the contemporary crises of capitalism, Boehnert dispenses with the veil of neutrality that keeps designers in service to their employers at the expense of their society. She makes a compelling case for training future communication designers to incorporate ecology into their identities in order to envision more sustainable futures that aren’t rooted in cycles of consumption and production. The sheer scale of the existential challenges we face requires a fundamental reorientation of how we relate to each other, how we relate to other species, and how we relate to the ecological systems that make life on this planet possible. We cannot continue to abide by a perverse market logic that values economic production more than the ecological health it is contingent upon. Designers can and should intervene into the political processes that mediate social-ecological relations to address and abate the harms of neoliberalism.

Educators will find this book to be a thought-provoking resource to reimagine their communication design curriculums. Practitioners will be challenged to rethink their own complicity in enabling environmental destruction. Boehnert’s work is inspiring yet grounded in ample examples of macro and micro design projects that contest the supposedly benign nature of design. If we are to transition to a new era of the Ecocene, it is critical that designers embrace systems thinking and start working toward regenerative and distributed design economies decoupled from the desire for growth. Boehnert argues that “design is poised to facilitate social change – once designers move beyond their comfort zones and disciplinary boundaries to meet the complexity of environmental and social challenges” (p. 182). She demonstrates that the ethical considerations about who designers work for, what they work for, and how they work are essential to building sustainable futures. Corporate tactics that shroud ecological devastation through symbolic violence and trickery can be remedied by design activists committed to the public commons and focused on social, political, and ecological justice.

Although Boehnert’s multidisciplinary integration of design, ecological, social, and political theory successfully models the complexity of the global problems she attempts to address, a reader may be left with a desire for more concrete suggestions for enacting design activism. This is an excellent book for theorizing new pedagogies, but it could use more practical design strategies and suggestions for eco-literate designers to incorporate into their ongoing efforts and for educators to incorporate into their curriculums. There may be too much focus on teasing out the intricacies of ecological theory in particular at the expense of offering more pragmatic opportunities for designers to engage in the political realm. The last section hints at these opportunities but does so in a way that critiques status quo efforts by design practitioners more than it articulates coherent design solutions. Those readers that desire more definitive instructions on how to reorient communication design work toward the Ecocene and how to visualize solutions to contemporary problems may be left wanting more, but perhaps that is the subject of a future treatise or perhaps that cognitive labor must be left up to the reader to do. Either way, there is no denying the powerful call to action that Boehnert makes for designers and those that teach design to incorporate and inculcate ecological ethics in their respective practices.

As planetary boundaries are increasingly trampled over at an alarming rate, our habitat is on the precipice of irreversible deterioration and our species faces the imminent possibility of self-annihilation. Everyone, not just communication designers, has a stake in the search for sustainable futures. However, designers are uniquely positioned to facilitate change that cannot come soon enough. Design, Ecology, Politics: Towards the Ecocene is a robust and sobering interrogation of the design industry and its role in aiding and abetting the ecocidal market logic of the status quo. However, it is also a hopeful manifesto that points to the possibilities of design to imagine and enact better outcomes through ecological thinking, ethics, and literacy.

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Book Review

Bodies in Flux: Scientific Methods for Negotiating Medical Uncertainty

Christa Teston


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At the time of this writing, the New York Times reports that more than 10,000 people have died from the coronavirus worldwide. Healthcare systems across the globe are struggling to keep up with the number of cases being confirmed each day. Over 50 studies on the virus were published in January 2020 as scientists worked to better understand it and potentially develop a vaccine (McFall-Johnsen, 2020) but there has not yet been a vaccine developed. While this is not the only global health crisis happening in early 2020, it is likely the one to which many readers have paid closest attention. We cannot know now the impact the spread of the coronavirus will have on the globe and yet individuals and organizations are currently working to transform uncertainty about the virus into evidence that governments and the public can use to make actionable decisions. While the book under review here does not deal with the coronavirus specifically, it does engage with issues of key importance related to the coronavirus: those of medical certainty and those of medical uncertainty.

When the future seems more uncertain than ever Christa Teston’s Bodies in Flux: Scientific Methods for Negotiating Medical Uncertainty (2017) offers readers insight into what she describes as the “backstage biomedical methods and materials” (p. 41) that shape the construction of evidence in health and medical contexts. Teston sheds light on the ways these evidences are less certain than many might like to believe, emerging from complex inter- and intra-actions between human, nonhuman, and extrahuman actors. Importantly, Teston provides readers with strategies with which to navigate the increasingly complex networks of relations within which academics and practitioners in communication design and technical communication—particularly those interested in or involved with health and medical contexts and issues—may find themselves, and urges us to use those strategies to better understand these networks of relations.

Teston organizes Bodies in Flux into six chapters. In her introductory chapter, she clearly outlines her research questions for readers: “...how are evidential worlds assembled from bodies in perpetual flux? From where does medicine’s evidential weight hail? What protocols and procedures elevate everyday biological activities to positions of argumentative authority?” (Teston, 2017, p. 1). She firmly grounds her analysis in rhetorical theory, stating early in Chapter 1 that one goal of the chapters that follow is to “trace how modern medicine does rhetorical work” (Teston, 2017, p. 2). For readers unfamiliar with rhetorical theory, Teston provides nuanced and detailed explanations and analysis of the rhetorical concepts with which she engages, explores, and theorizes her case studies. For practitioners and academic readers alike, Teston’s case studies—which make up the bulk of the book’s chapters—will likely be of particular interest. Those readers with an interest in or background with rhetorical theory will likely also be interested in the rhetorical constructs Teston uses to explore each of these case studies.

In Chapter 2, “Evidencing Visuals,” Teston explores “the obscure work” (2017, p. 23) of how pathologists, visuals such as pictures and stains, instruments, and disciplined bodies work together to materially evidence whether and to what degree a patient has cancer. In so doing, Teston describes engaging with such a series of relationships as “dwelling with a rapidly changing assemblage of not-quite-human objects” (2017, p. 56). This requires, according to Teston, a new definition of the rhetorical construct of kairos and she describes dwelling kairotically as “a rhetorical skill required for attuning to spatial and temporal contingencies of constantly changing phenomena” (2017, p. 57). One of Teston’s strengths throughout Bodies in Flux is her skill in describing her case studies in such detail that she is also asking readers to reorient themselves
to contexts which we may have previously understood to be more straightforward than we originally realized. Once we recognize that complexity, Teston provides us with the rhetorical tools to better navigate those situations. “Dwelling kairotically” in the face of cancer care is one such example of this.

The case study at the heart of Chapter 3, “Assessing Evidence,” will likely be of particular interest to CDQ readers. In this chapter, Teston focuses on the Food and Drug Administration’s (FDA) Avastin hearing, which took place in 2011. The hearings were the result of a drug company challenging the FDA’s decision to withdraw approval for a drug (Avastin) which had previously been granted accelerated approval. Like Chapter 2, Teston’s focus here is on cancer care; Avastin had been approved for the treatment of end-stage breast cancer. Teston analyzes transcripts from the two-day hearings, as well as previous FDA deliberations and clinical trial data (including inferential statistical analysis), to explore the material-discursive conditions that lead to the hearing. Teston describes her work in this chapter as opening “the black box of how inferential statistical analysis attunes deliberators to value some degrees of disease experiences or evidence over others” (2017, p. 88). Opening such “black boxes” of biomedicine is a project which will require the perspectives and expertise of individuals from diverse backgrounds; and indeed, is one to which CDQ readers may be particularly attuned.

Chapters 4 and 5 continue to explore the ways decisions and choice in a network of relations result in certain evidence “counting,” this time with a focus on methodological practices rather than sites. In Chapter 4, Teston focuses on Cochrane Systematic Reviews (CSRs) which, she argues, are not mere summaries of previously published data but “hard-fought arguments” (2017, p. 95). Chapter 5 is potentially Teston’s most explicitly political chapter. She contextualizes this chapter by explaining that “nearly two-thirds of women who request testing for genetic mutations correlated with an increase in breast and ovarian cancer do not receive genetic counseling (Armstrong et al. 2015)” (Teston, 2017, p. 135). More people than ever are exploring their genetics either through professional medical means or through tools like “23andMe.” Teston’s exploration of evidence in this chapter is particularly important. Here, she focuses on the “ideological, economic, and algorithmic machines that make genetic information meaningful” (Teston, 2017, p. 135-136), again focusing on the complex network of relations among human, nonhuman, and extrahuman actors that shapes what many believe to be evidence free of ideology. Noting how consumers’ evidences become a part of future databases, the ways that biomedicine continues to too often prioritize corporate interests, and the need for constant critical attention to this particular area of biomedicine, she concludes: “Before purchasing and simultaneously selling information about themselves, patients-turned-consumers-turned-reference—material-turned-patients might do well to understand (if not inquire about) the nature of a particular laboratory’s methods for genetic sequencing” (Teston, 2017, p. 166).

In her final chapter, Teston shifts her focus more broadly to healthcare and issues several calls to action for readers. Echoing the conclusion of Chapter 4, Teston calls for “more cross-disciplinary collaborations among rhetoricians, technical communicators, and medical professionals” (2017, p. 170)—a call that may seem particularly compelling for CDQ readers. As both practitioners and academics in the fields of communication design/technical communication, CDQ readers have an opportunity to take up such a call, challenging though it may be. That might be as simple as reaching out to a contact in your organization or institution to explore collaboration, or something more complicated, such as reaching out to those authors who publish work in CDQ to create cross-institutional or cross-organizational teams. Teston makes clear that biomedicine is more complex than it appears, and it is truly only through these kinds of cross-disciplinary collaborations that we can better make those complexities clear.

Teston sums up three key takeaways for the book as a whole: “(1) evidences result from rhetorical attunement; (2) methods matter; and (3) biomedical practice (not just health) is relational” (Teston, 2017, p. 171). After explicating each of these, she offers a final suggestion for what it might look like to “dwell with disease” now. Here Teston shifts again to rhetorical theory and calls for a phronetic medical practice. First explaining to readers some of the ways the Greek concept of phronesis has been explored by classical rhetorical theorists (“practical wisdom”) and her own interpretation (“profoundly attuned to phenomena”), Teston situates phronesis within the context of medical care, arguing for a type of care that might be “sensitive and beholden to our transcorporeal condition. Matter, movement, and time intersect in precarious ways. Practicing care as phronesis is the act of attuning to such precarity” (2017, p. 179). It is a bold claim and, were it to be taken up by the medical professionals whose work Teston explores and analyzes in Bodies in Flux, would transform health and medicine. Drawing on incredibly thorough work throughout the case studies she explores in the previous chapters, this call for transformation of medical evidence is a strong culmination to the book, and Teston offers two helpful vignettes for what this might look like in practice, one focusing on a woman getting re-fitted for a wheelchair and one focusing on the immunology of cancer care.

Throughout the book Teston makes it clear that part of what is happening when medical professionals and scientists attempt to navigate medical uncertainty is something that is not at all unfamiliar to communication design and technical communication practitioners and scholars: the need to make something clear enough for the audience to make a choice. Teston’s focus on the “backstage” labor that shapes supposedly certain medical evidences will likely be helpful for communication design and technical communication researchers and teachers to use in classrooms and as opportunities for considering new research sites. Indeed, each of Chapters 2-5 could stand alone easily as an excerpt from the book focusing on an individual case study. Practitioners will likely find Teston’s suggestions for “dwelling” with uncertainty useful, and though they are often grounded in rhetorical theory, Teston clearly explains such rhetorical concepts so that even those without a background in rhetoric will have a basic understanding of not only the concepts themselves but also what it might look like to put them into practice. What is clear from Teston’s book is that there are a number of opportunities for intervention at all levels of both practice and the academy, and it will likely be easy for readers of all backgrounds to identify a site or method in our own contexts which could use some attention to the “backstage” labor that shapes its results. Overall, Bodies in Flux is a rigorous, thoughtful inquiry into a world many would prefer was clearer and more certain than it truly is. Today, though, it is likely better that we see how uncertain such contexts truly are and begin to cultivate the attunement Teston calls for in order to better prepare for an uncertain future.

REFERENCES


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