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Public Narratives, Storytelling, and Trust: A Case Study in a STEM-Based Writing Program

Jeff Gagnon

Abstract: In recent years, a growing body of scholars have argued that narrative storytelling is an effective and necessary science communication tool for the education of undergraduate STEM students. This research comes at a time when many in the public are becoming distrustful about science, scientists, and scientific communication. However, questions remain about which genre and style of narratives are most effective at building trust among STEM communicators and public audiences? My essay answers this question through a case study of narrative communication in my first-year writing classes. I analyze my attempts to teach STEM students that “public narratives,” a genre of writing created by community organizer Marshall Ganz, represent a necessary intervention for bridging the larger communication gaps that are widening levels of distrust among scientists and science-skeptical publics across the country. As a unique genre of writing, public narratives combine personal storytelling with audience-driven connection and persuasive writing. They are founded on three communicative elements that undergraduate STEM students need significantly more knowledge and training in as they prepare to engage the public in their areas of professional specialization; these areas include storytelling their own experiences with skepticism and distrust, the rejection of condescension, labeling and dismissiveness, and a compassionate approach to listening and understanding audiences that seem skeptical or even opposed to science.

Introduction

The students shifted uncomfortably in their seats. They were packed into a large campus auditorium, listening to a presentation on climate science by renowned professor of atmospheric science and climate science expert, Dr. Veerabhadran Ramanathan. Ramanathan, or “Ram” as he is popularly known on campus, was delivering a special guest lecture to over 500 first-year writing (FYW) students in the program I oversee. I had arranged for them to attend this presentation because they were enrolled in a lower-division writing course focused on teaching academic and public writing through the lens of climate science and climate communication.

Ramanathan’s presentation focused on essential questions. What causes climate change? How do scientists know it is happening? What evidence do they have? What will the consequences be? And how soon will we experience them? Overall, the science was relatively accessible. His metaphors were clear and applicable. However, after more than twenty minutes into the presentation, students began to get restless. The facts were interesting, but something was missing.

Sensing that he was losing their attention, he shifted into storytelling mode. He told students that earlier in his career he was more focused on advancing the science of

the climate crisis for other scientists than on educating students or the public about the problem. He felt little obligation to help the public understand the science. Students relaxed into their seats and nodded. Almost 70% of them were majoring in STEM fields, and they could relate to his point. Over the years, many of them had voiced similar observations in my FYW classes. Communicating any science-related topic to the public was a supposedly unnecessary skill for those pursuing future, and highly specialized, STEM careers. In other words, communication was a “soft skill” best left for the arts and humanities student.

However, Ramanathan surprised the students with what he said next. He revealed that his life’s work took on greater meaning when something monumental happened in his life. The birth of his grandchildren awakened a new and deep urgency to advance his research and communicate that research to the public. He was terrified to realize that if he remained on the sidelines and out of public discourse his grandchildren might live through some of the most serious consequences of the climate crisis during their lifetimes. Leaning forward into the microphone, he explained that his grandchildren are only a few years younger than the students in the audience. He now had their attention.

After sharing this personal connection, he appealed to a shared passion for science in the room. Using pronouns like “we” and “us,” he urged students to use their science interests to learn about the climate crisis and to research solutions. He told them that they will experience serious consequences in their lifetimes, but that there was time for everyone to work together to avoid the worst outcomes. He further clarified that students in all majors should work together to address climate change because solutions are needed in all aspects of society. When he finished this portion of his story, most students (including this author) felt inspired to use our respective skills and talents in pursuit of a larger social effort—we were joined together, as participants, in something greater than ourselves.

Ramanathan concluded his story and presentation by outlining some of the science and communication-related solutions that are most needed to address the climate crisis globally and locally. Importantly, he did not tell students what to do. Instead, he *invited* students to join him in the push for solutions across campus and in their local communities. His message was clear—he was willing to work for change, and he hoped they would join his efforts.¹

When my students reflected on Ramanathan’s presentation in our class discussion the following day, many agreed that Ramanathan’s story about his grandchildren was the most meaningful part of the presentation. I pressed them for reasons. They explained that his story transformed him from a famous academic scientist talking about a complicated subject into a grandfather who wanted to care for his grandkids. In other words, he shifted from being a distant, objective scientist to someone to which they could relate. Surprisingly, instead of undermining his trust or credibility, his personal story invited trust, a sharing of common ground, and a new perspective on the topic. It helped stu-

1. See Ramanathan, “Climate Change Morphing,” where he tells a similar story.

dents to recognize the urgency of the crisis in their own personal and familial terms; it even inspired some of them to take action.

Ramanathan’s story illustrates a unique approach to narrative storytelling that inspires public trust in science and scientists. This approach is essential for climate science specifically, and science, or even STEM, communication more generally, especially at a time when such trust is declining (Kennedy). In Ramanathan’s narrative approach to structure, I observe three specific moves that, when fused together, represent a version of what scholar and activist Marshall Ganz calls a “public narrative.” According to Ganz, a public narrative is a three-part approach to public communication that includes: “a story of self,” “a story of us,” and “a story of now” (see Figure 1).

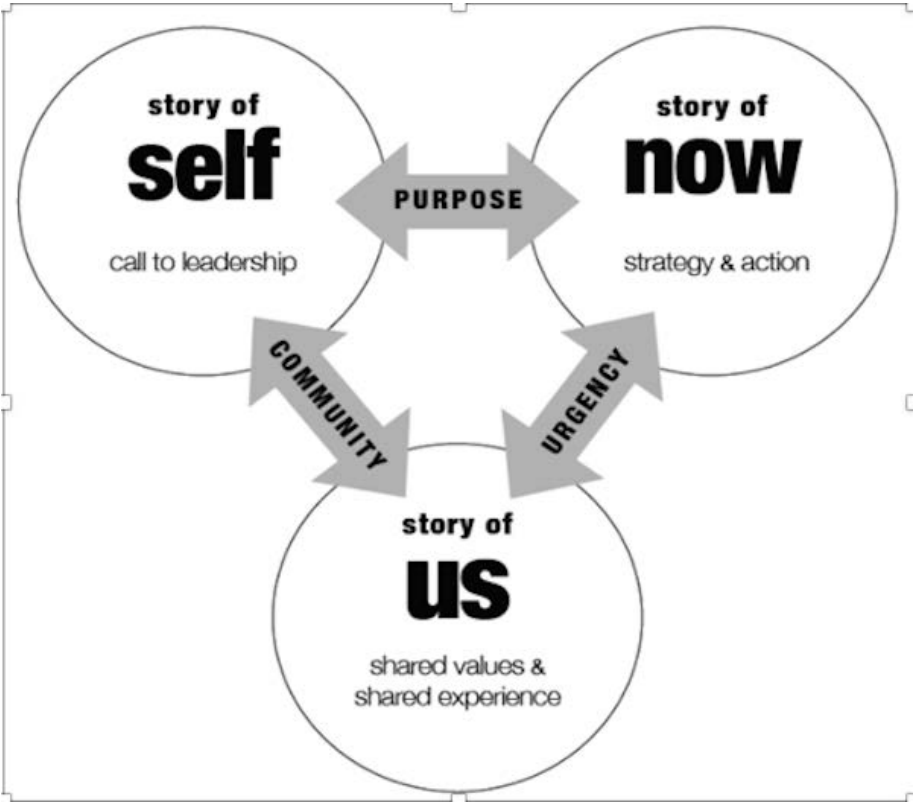


Figure 1: The Public Narrative (Ganz)

Ganz, a long-time labor activist for the United Farm Workers Movement, is both the innovator of the public narrative method and its biggest champion. He argues that public narratives allow individuals and groups to advocate for a social cause by combining the conventions of storytelling with the elements of persuasive and evidence-based writing. In other words, well-written public narratives motivate and inspire readers to

join a cause or movement because the writer has connected their individual story with the shared values and experiences of intended audiences.

With its origins rooted in social and labor movements, the public narrative may at first seem out of place in a special issue devoted to developing science communication and trust among novice scientists and the public. Indeed, the genre itself has no explicit connection to science or science communication. Nor does Ganz himself specifically advocate for its usage in science classes or programs. Nevertheless, I argue that teaching STEM undergraduates how to write public narratives will prepare them to engage compassionately and effectively with non-expert audiences beyond the university. In my composition courses, I have witnessed public narratives transform students' understanding of how to communicate publicly in ways that build, rather than undermine, trusted relationships. They represent an important pedagogical tool in the toolboxes of FYW programs that are seeking to facilitate students' communication with non-expert audiences in all fields, but especially science.

My argument builds on the work of recent scholars in two related fields. First, there are those that argue that narrative storytelling is an effective and necessary science communication tool that should be taught with more regularity to undergraduate STEM students in colleges and universities (Brownell; Dahlstrom; Hayden; Kiernan; Priest). Second, some scholars argue that institutions should devote more intention and resources to integrating arts and humanities training with that of science and engineering (Kiernan; DeLuca). They maintain that writing, rhetoric, and composition scholars should take a more active role in equipping STEM students with the knowledge, skills, and practices to communicate effectively with a non-expert public. My project contributes to and expands on these perspectives by raising important questions that are still unanswered by the research. For example, is it enough to teach undergraduate science and engineering majors how to use narrative storytelling to communicate meaningfully with non-expert audiences? And what kind of storytelling approaches work best at building trust instead of dismantling it?

Marshall Ganz and the Public Narrative

When I first designed my lower-division composition course, I chose a climate change communication theme because I wanted students to think about foundations of writing and rhetoric through the lens of public communication. Approximately 65% of my students are STEM majors. The vast majority tend to be trusting of science and scientists, although they do represent a diverse range of perspectives on whether scientists are trusted communicators. Some students are open-minded about science skepticism, while others demonstrate little patience for people who are skeptical, distrustful, or even opposed to messages delivered by credentialed scientists. In course reflections and surveys, some students find writing to be necessary and essential to their own education and to public understanding of science. In contrast, others tend to assume that writing and communication skills are nonessential skills for STEM majors; these students tend to assume that responsibility for science distrust resides in a public that lacks proper scientific literacy. At times, these latter perspectives manifest into elitism, arrogance, and condescension toward those that do not share their views. This group of students

struggles to relate to skeptical lay people who cannot share their love of science and their deep trust in scientific processes or even scientists themselves. Such mindsets illustrate the “us vs. them” attitude that Adam Hayden refers to in the public debates about science communication.

These contrasting and sometimes polarizing views present enormous challenges and opportunities for a FYW course. In a ten-week quarter, I want to teach students the foundations of strong academic writing and critical thinking. I structure the syllabus around three writing projects that scaffold into a final capstone project. Each project provides opportunities for students to learn and practice science writing and communication to public, non-science audiences by focusing on an issue for which there are high levels of documented public distrust of scientists. They learn the challenges of meaningfully communicating to audiences about complex science-related issues that are impacting the public good. By meaningful, I am referring to research developed by Michele Eodice, Anne Ellen Geller, and Neal Lerner in *The Meaningful Writing Project: Learning, Teaching, and Writing in Higher Education*. According to their findings, students find writing meaningful if they have some agency in choice of topic; if the context or message is relevant to their lives; if they can use it to make personal connections to their life experiences, family or family histories; and if the project has some future connection to their professional development, and/or social relationships and communities.

Science communication experts working at the intersections of science communication and undergraduate education also inspired my course theme and capstone project. In recent years, a growing number of scholars have argued that FYW programs and science communication programs should turn to narrative storytelling to prepare STEM students for communicating with non-science audiences (DeLuca; Kiernan, “Building Socioscientific Trust”). As Julia Kiernan argues, institutions should reject a rigid STEM approach to learning because “A STEAM approach...can prepare students for both outcomes as it has the capacity to complement socioscientific learning in its union of multiple perspectives and disciplines, positioning the comprehension of science topics as necessary and important to all members of society” (“Building Socioscientific Trust” 31). These approaches deliberately reject the notion that public distrust in science is rooted in science illiteracy or insufficient communication of science facts. Therefore, using research in the field of teaching climate science communication, I designed a narrative storytelling project. In my first iteration of the course and the project, students read about the causes, effects, and solutions of the climate crisis. I assign a wide variety of trusted research sources, including chapters from Veerabhadran Ramanathan’s edited textbook, *Bending the Curve: Climate Change Solutions*, a textbook specifically written by University of California researchers for college student audiences. Students analyzed both the content and the writing of these sources. I introduced students to some of the research on science storytelling, and we analyzed the strategies that different storytellers would use to communicate science successfully to non-science audiences. Students then drafted their own climate stories. Some of the most powerful have stayed with me. Some wrote about having to evacuate from California wildfires. Others wrote about growing up with asthma and other health problems because they lived near an oil refinery that polluted the neighborhood with harmful toxins. Still others narrated stories of growing

up in homes where climate science was rejected by family members, and how they felt confused by the paradox of loving science while rejecting climate science.

The strengths of these projects seem to reinforce the research on narrative storytelling in science communication. As Jon Christensen clarifies when it comes to communicating with public audiences, "Numbers numb, stories stick." However, while these early projects were certainly meaningful, both for the students and me, I questioned whether they were sufficient in building the kind of trust that researchers have identified as being a problem for climate skeptics. For example, some students felt drawn to telling stories that condescended to climate skeptics. Some student writers tried to narrate stories that concluded with blame and shame messages toward climate skeptics. And still others wrote narratives that focused on providing more science. These impulses are understandable. Most students trust the science, understand the urgency of the climate crisis, and are frustrated with systemic attempts to dismiss climate science and postpone taking serious actions to mitigate its effects. Nevertheless, these stories reinforce the same "us vs. them" mentality referenced earlier. They also illustrate the mistaken belief that scientific ignorance is always the problem when people doubt climate science. As Susan Fiske writes, "potential divides between scientists and the public are not merely about sheer knowledge in any simple way" (13593). It was at this point that I felt stuck. What was the best way to teach narrative storytelling and the importance of trust-building among writers and non-science audiences?

This is when I discovered Ganz's arguments about the importance of "public narratives." Ganz supports the idea that storytelling is a way to communicate effectively to audiences; however, his creation of the public narrative was designed to do more than just communicate stories. The purpose of the public narrative is to help leaders and organizations tell stories that will recruit support for transformative social movements. To fulfill such a purpose, narratives need to combine the elements of powerful storytelling with the communication of shared values.

According to Ganz, public narratives are structured in three interrelated parts. He classifies them as the story of self, the story of us, and the story of now. This unique three-part structure enables writers to communicate both a problem and a solution to that problem. Each part serves a purpose. The story of self introduces readers to the problem through the lens of the author's personal experiences. Writers communicate their experiences with the problem, the challenges or conflicts they experience, and how they have tried to overcome these challenges. In many ways, the story of self follows the common conventions of powerful narrative storytelling by encouraging writers to develop characters, plot tension, and a resolution. However, if the story of self is recognizable to most students, the story of us is not. The story of us represents a writer's attempt to shift from personal storytelling to direct communication with audiences and readers. Writers are challenged to name the common values and experiences that they share with readers, and to compose an inclusive "we" that invites them into a common struggle. Finally, the story of now offers writers a chance to communicate a solution to the problem. However, in doing so it offers an unexpected twist on the traditional proposal-driven approach to narrative storytelling. Instead of telling readers what *they* should do to solve the problem, the story of now begins with the writer's declaration of what they will do first and why they will do it. What actions need to be taken? What

steps is the writer willing to follow? In beginning with this approach, the story of now transforms into a leadership invitation in which the writer invites the audience to join them in taking some future step.

What distinguishes public narratives from other genres of storytelling is that they are intentionally designed to help writers build trust with readers. They do this by identifying common ground between writer and audience. Public narratives, and the story of us, requires writers to demonstrate that they have listened to and understand the concerns that audiences may have about the climate crisis. Identifying common ground disrupts the typical argument-based approach to academic writing, which many of my students interpret as an either-or position in a debate that must be won. Student writers build trust when they meet the reader where they are, identify with the reader's ideological position, and use that shared common ground to build their story.

In the following sections, I outline and analyze my teaching strategies for assigning public narratives in my writing course focused on climate communication. As mentioned previously, I organize the class in three mini units that lead students toward the completion of their public narratives, which represent their final capstone projects in the class. In the first unit, students learn the foundations of climate science and climate communication. They write analytical reflections on their own experiences with the climate crisis and their personal engagement with climate science. In the second unit, students begin researching public audiences and varying levels of public distrust. They investigate possible public audiences for which they share common ground on these issues, and they compose analytical arguments about the best ways to communicate climate science to those audiences. In the third and final unit, students research the promises and challenges of both structural and individual climate solutions. They use this research, and their first two writing projects, to compose their public narratives.

The Story of Self

As described above, the story of self represents a writer's story of how and why they have been called to act on a certain issue, challenge, or problem. Ganz describes the story of self as "Why you were called to what you have been called to." Writers use personal storytelling elements to introduce readers to the problem that needs to be addressed. This requires the various elements of a good narrative structure, including plot, characterization, and setting. Writers introduce readers to a moment in their lives when they had to meet a challenge, overcome an obstacle, or come to some greater understanding about a topic or issue. As Ganz explains it, "The key focus is on choice points, moments in our lives when our values become real when we have to choose in the face of uncertainty" (2). Writers must become vulnerable as they reveal something about themselves, especially a struggle they have encountered. In these ways, they take on the role of a protagonist who is locked in a struggle to overcome an obstacle.

In preparing students to write climate-science driven stories of self, I begin the unit by asking students to reflect deeply on their prior knowledge of climate science itself. What do they know about the science of climate change? How well do they understand the causes of the climate crisis? The effects? Where did they learn these concepts? How trusting are they of science and scientists? How did they begin to trust the science, and

the scientist, involved in this work? After doing these reflections, students read course materials designed to explain the complexities of climate science for public audiences.

These pre-writing exercises and reading assignments produce startling revelations for some students. Most students have never asked these reflective questions in an academic class. It is common for students who identify as pro-science STEM majors to be humbled by the complexities of this science. Another important recognition is that some students come to realize that age-appropriate lessons on climate science are not universal experiences for all students. Class discussions almost always reveal disparate perspectives among students when it comes to climate science. For example, some students identify as climate activists with strong trust of climate science. Other students voice confusion or even disinterest toward the research. Occasionally, some express distrust and skepticism toward it. Still others communicate how personal experiences with natural disasters have shifted their perspectives, raised their curiosities, and caused them to challenge science skepticism. For example, one student reflected on growing up in a politically conservative community and household. He was raised to be skeptical of climate change science until a series of category four and five hurricanes devastated his city. Surviving this trauma led him to question his own knowledge and to deepen his curiosity about the science behind these hurricanes. Similarly, another student shared that she had grown up questioning the severity and urgency of the climate crisis because her family identified with conservative political values. Based on family conversations, she had assumed that climate damage was a relatively minor problem that would never affect her or her family. That is, until wildfires forced her family to evacuate their home.

Reflecting on prior knowledge is essential because it provides pro-science STEM students with valuable opportunities to recall prior moments of science uncertainty. In these exercises, students face many realizations. Some realize that they do not understand climate science as much as they thought, which allows them to find common ground with those in the public who feel uncertainty about the complexities of the science. Others recall that they did not always trust climate science or scientists as strongly as they do right now. Again, this allows students to have compassion for those who are still feeling skepticism. Beginning with these foundations encourages students to compose meaningful stories of self that set the stage for trust-building with audiences. It allows them to name and frame the problem that their larger, public narrative will address.

However, composing meaningful stories of self presents significant intellectual and cognitive challenges for these STEM students. Many students are reluctant at first to even try blending narrative storytelling with science communication. Their hesitation is rooted in their limited exposure to narrative science writing combined with the assumption trap of binary thinking. Mariya Deykute refers to this binary thinking trap as the false dichotomy between creative thinking and scientific inquiry (21). Creating science-based stories of self generates an experience of cognitive dissonance among some students. They have been educated to believe that science is a process of identifying truth and fact based on an objective and unbiased analysis of data, while narrative storytelling is based on personal and political whims and biases. These oversimplified, contrasting belief systems have been internalized to such a degree that students struggle to see other perspectives: they express concern that science-based narrative storytelling is so biased

that writers cannot be trusted; they have internalized the larger cultural messages that narrative communication is at odds with science and science communication and that science writers should never tell stories; they have been taught to “stick to the facts,” and that if lay public audiences do not accept a particular view, it must be because they lack science literacy. I address these concerns by meeting students where they are; I acknowledge these views and validate their dissonance. I show them evidence that sometimes people who distrust climate science or climate scientists (and other forms of science) are highly educated people whose distrust stems from reasons other than knowledge deficits.

Ultimately, the unit is successful when students draft stories of self that introduce readers to the problem and frame problems of climate distrust in ways that audiences can relate to. Ganz summarizes this point, arguing,

A good public story is drawn from the series of choice points that have structured the ‘plot’ of your life – the challenges you faced, choices you made, and outcomes you experienced....The story you tell of why you sought to lead allows others insight into your values, why you have chosen to act on them in this way, what they can expect from you, and what they can learn from you.

When students begin the process of writing stories driven by their experiences with climate change, or when they compose stories about how they first came to trust climate science, they begin to realize that they are doing the work of questioning the origins of their own belief systems. When did I first learn to trust climate science? How did my worldviews change or evolve throughout my childhood and adolescence? And as they share their drafts with their classmates in peer-driven revision processes, they begin thinking about what they share in common with others. They begin to think seriously about audiences that might find meaning and power in their stories.

The Story of Us

Once writers have composed a powerful story of self, the question becomes, who needs to read this climate story? How can climate stories construct a sense of trust among writer and readers so audiences are moved to some greater understanding or even new perspective on the issue? Or, how might readers be moved to take action? For Ganz the answers to these questions can be found in the most unique element of the public narrative genre: the story of us. Framed by Ganz through the inclusive us/we pronouns, the purpose of the story of us is for writers to identify and speak directly to an intended audience in their public narratives. As readers will recall, the purpose of the public narrative is to recruit intended audiences to join a cause, movement, or action (which is later communicated in the story of now). As Ganz teaches his students:

Your challenge will be to define an ‘us’ upon whom you will call to join you in action motivated by shared values, values you bring alive through storytelling. However you define the “us” whom you hope to move, it must consist of *real people* with whom you can communicate, move or not move, engage or not engage, get to act or not.” (my emphasis)

The story of us evokes a well-known anonymous maxim: “people do not care how much you know until they know how much you care.” From what I have learned in teaching public narratives, this wisdom represents a crucial missing link in strategies for science communication.

Arguably one of the central problems for the public perception of scientists today is they do not care about the public good; scientists facing charges of elitism and condescension can respond through a well told story of us. This element of the public narrative promotes a sense of community among writers and readers. Central questions include, who are “we”? What do we stand for? What actions, principles or values defines us as an “us”? In Ganz’s vision, the essential ingredient in the story of us recipe is the communication of shared values and experiences. It is best understood as an invitation of shared common ground. He explains, “One way we establish an ‘us’—a shared identity—is through telling of shared stories, stories through which we can articulate the values we share, as well as the particularities that make us an ‘us’” (3). Naming shared values promotes common ground among writers and readers. It also heightens the reader’s sense of feeling seen, heard, and understood. In this way, the story of us plays a central role in bridging the gap between writers and audience, and it represents a unique and conflicted aspect of the genre for most students.

To begin this unit, I help students call forth a series of “us’s” in their lives. In other words, we brainstorm the different groups, organizations, communities, and extended networks they belong or have belonged to. We define community broadly, beginning with extended family circles, but we also include youth groups, church groups, neighborhood groups, social, sports or recreational organizations, political groups, school-related groups and organizations, work-related groups, and academic discipline-based communities. Selecting a specific community is essential to telling the story of us. Nevertheless, students sometimes struggle to recall and name the communities to which they belong. Ganz’s advice is instructive: “We are all part of multiple ‘us’s’—families, faiths, cultures, communities, organizations, and nations in which we participate with others. What community, organization, movement, culture, nation, or other constituency do you consider yourself to be part of, connected with? With whom do you share a common past? With whom do you share a common future?”

To be effective, writers need to identify “real people” that they can communicate with, so beginning with possible audiences that students know and understand is a crucial step. Using a series of reflective questions, I ask them to narrow and eventually choose a community that will represent their intended audience or “us” for the project. For students who have rarely, if ever, invoked intended audiences in their academic writing, this aspect of the project is both challenging and exciting. They are excited to discover that writing for “real people” lends a sense of credibility and meaning to their academic writing that they have rarely encountered or been allowed to explore. For example, one student identified her college orchestra as a community that she wanted to communicate with about climate change. She understood those orchestra members to be disengaged on the issue of climate science and unaware of the carbon footprint of the orchestra’s international travel schedule. She felt inspired by the challenge of communicating a meaningful message about climate science to an audience she knew well. Another student identified former members of a youth group who had been raised in

conservative households; these students had been taught to question the accuracy and urgency of climate science. Using writing to connect with these former youth group members invigorated the student writer with a unique sense of meaning and possibility for their academic writing. Yet another student, who identified herself as a Latinx member of a U.S.-Mexico border community, directed her public narrative toward multilingual neighbors in her home community. The opportunity to compose a meaningful message about climate change to her community was exciting because she felt as though this community was often ignored by media members, academics, and others in science communication.

Nevertheless, the potential for confusion and for misunderstanding the importance of choosing a community is high. For example, it is common for some students to select an intended audience “of people on YouTube.” Another student recently brainstormed that they wanted to write to the people of Indonesia, his home country. In my experience, these choices stem from students’ misguided belief that the project will be easier to write if the audience is large and general. Usually, the opposite is true. The larger and more generalized the audience, the more difficult it becomes to construct a meaningful story of us based on shared values and experiences. The more focused an audience, the easier it can be to balance the rhetorical choices necessary for an effective message. Therefore, I schedule one-on-one conferences and incentivize students to attend additional office hour coaching sessions. In these conversations, I guide students to sufficiently narrow their idea of community to a group whose demographics, values, and experiences about the climate crisis they tend to know and understand. In some cases, I also coach them to broaden their attention if their focus has become too narrow. When students have successfully worked through the challenge of community identification, they often come to several important realizations about writing and communication. First, they realize that *they* are the authorities on that community, not me (the instructor). And second, they recognize that to meet readers where they are, they will need to reflect on and listen deeply to the attitudes, beliefs, and knowledges that the chosen community possesses about the climate crisis.

The story of us teaches principles of audience-driven communication designed to build trust among pro-science communicators and non-science audiences. One such principle is the Aristotelian rhetorical value of knowing the audience. Audience-driven communication challenges students to push past tendencies toward binary thinking and superficial labeling of communities that some students bring to the classroom. This is important for student writers that comprehend the data and the scientific consensus around the climate crisis but who struggle to communicate with audiences that are still processing the data and are unsure of how to interpret and draw conclusions about it. This is also valuable for students who are less familiar with the scientific consensus and are inclined to label their communities as either pro-science “believers” or anti-science “deniers.” In class, we discuss the limitations of these positions and the nuances that writers miss when classifying audiences in these simplistic ways. Regarding this latter point, climate communication specialist Chui-Ling Tam points to the missed oppor-

tunities when communicators assume overly simplistic discourses and labeling of positional groups around this issue. She writes:

It's simplistic to divide people into only two opposing camps of climate change: believers or deniers...between those two polarized positions are local populations living with the immediate effects of climate change on the environments they depend upon...The history and experience of individuals and communities may influence how they interpret and prioritize climate change. This diversity of lived experience and worldviews contradicts the divisions between climate change belief and denial. (Tam)

Tam's research encourages climate communicators to think locally when they target certain audiences with climate messages. She challenges readers to contextualize and consider how the lived experiences of individuals and communities might shape their attitudes, belief systems, and experiences with climate messaging. However, while Tam's insights are instructive, they are also difficult for pro-science students to grapple with. I dialogue with students about the emotional frustrations that pro-science students experience when confronting members of their communities that seem stubborn and close-minded. I ask them to reflect deeply on the limits of labeling audiences as "deniers." We review climate scientist Katharine Hayhoe's argument that, "if our goal is to label and dismiss whoever it is that we are speaking with or to, then that word [denier] will do it" (Hayhoe, "There Must Be More Productive Ways"). How does labeling close minds? How does labeling reduce opportunities for bridge building? How does labeling break trust? An essential part of the story of us is teaching students how to listen deeply and actively to the audiences they are addressing in their narratives. We practice these methods in class and use them to inspire more open-minded, curiosity-based approaches to composing stories of us.

I also introduce academic research to help students better understand the climate-science related knowledge, attitudes, and belief systems of their audiences. I assign Anthony Leiserowitz et al.'s long-term, ongoing research study, "Global Warming's Six America's." This study, first developed in 2008 and updated annually, is supported by the Yale Center for Climate Change Communication and is foundational to climate communication research. Its findings disrupt the popular media notion that there are two dominant perspectives on climate change in the United States: those that believe in climate change and those that do not. Instead, the study finds that American audiences exist on a wide spectrum of knowledge, attitudes, and beliefs about the climate crisis. They identify and classify six different groups that view the climate crisis from different perspectives.² I use this study to help students characterize and contextualize how much

2. On one side of the spectrum are the "alarmed" and the "concerned," who represent 33% and 25% of Americans, respectively, on this issue. Both groups tend to trust climate science when it comes to the causes and effects of climate change. However, they question the solutions that would work best to address the crisis. In the middle of the spectrum are the "cautious," representing 17% of Americans. The cautious face great uncertainty with climate science. They are neither sure of the causes and effects of the science, nor are they sure of the consensus of climate scientists on the issue. The

their audience understands the science and trusts the scientists doing this work. Understanding these questions sets the stage for the story of us that each will write.

Stories of us are central to the task of communicating trust among non-science audiences; yet, they are not without their risks, and there are no guarantees. Some audiences do not respond to inclusive writing or shared values, no matter how inclusive the story or how powerful the narrative. Nevertheless, although stories of us are the most challenging of the public narrative genre for most students, the leaps that students take and the courage they display in composing them is often the most inspirational part of the projects for me to read. Many experience what Ganz describes as the power to move others through an inclusive calling to shared values. He writes, “By telling our personal stories of challenges we have faced, choices we have made, and what we learned from the outcomes we can inspire others and share our own wisdom. Because stories allow us to express our values not as abstract principles, but as lived experience, they have the power to move others” (1).

The question is, move them to what?

The Story of Now

By the time they turn to part three, the story of now, students are asking the question, what can *we* do about this problem? The story of now is a call to what Ganz calls “hopeful action.” This aspect of the public narrative communicates the exigency of the problem and the urgency of doing something collectively to address this conflict. In other words, what needs doing “now”? He contrasts his vision of “hopeful action” with what he describes as shallow “exhortation.” He writes, “Leaders who only describe a problem, but fail to inspire us to act together to try to solve the problem, aren’t good leaders...a ‘story of now’ is not simply a call to be for or against something—that’s ‘exhortation’—it is a call to take ‘hopeful’ action.” Ganz elaborates, “A ‘story of now’ is urgent, it requires dropping other things and paying attention, it is rooted in the values you celebrated in your story of self and us, and a contradiction to those values that requires action.” In other words, for Ganz, there is a significant difference between written texts that argue

have a lot of questions and are not sure whom to trust. Next are the “disengaged.” The disengaged are the smallest group in the survey, coming in at 5% of those surveyed. As their name suggests, the disengaged are both uninformed and uninterested in climate science or the issue of climate change. They know very little about the urgency of the crisis, as few are communicating with them about the issue. Finally, on the other side of the spectrum are both the “doubtful” and the “dismissive.” These two groups represent 10% and 9% of Americans, respectively. Both groups have been persuaded that climate scientists cannot be trusted on this issue. The doubtful are pretty sure climate change is either not happening, or it is caused by natural forces (and not greenhouse gas emissions). The dismissive tend to believe that climate scientists cannot be trusted. Furthermore, they are nearly certain that the issue is a hoax. As the study suggests, all groups struggle to fully understand or even trust climate science. As the diversity of perspectives in this study highlights, meaningful conversation that builds trust among writers and audiences is essential on this issue.

for a problem and written proposals that both name a problem and inspire readers to join collectively to address that problem.

Ganz's vision for solution-oriented communication represents an "exercise in leadership." Writers exercise this leadership when they first identify solutions to a problem that *they* are willing to organize, join, or support themselves, instead of proposing that readers take action on their own. In other words, writers *invite* readers to *them* in a more collective effort to address the problem. He uses an instructive example to clarify the uniqueness of his vision:

If you ask me to "change a light bulb," for example, to deal with climate change, do you really think it will happen? Especially if it's among 100 other things I might—or might not—do? But if you ask me to join you in persuading the Kennedy School to change all of its light bulbs by signing a student petition, joining you in a delegation to the dean, and, adding my name to a public list of KSG students who have committed to changing the light bulbs where they live, what do you think the odds are of success?

There are two points worth highlighting in Ganz's advice to writers. First, stories of now should never be reduced to proposals that individual readers must take to solve the problem. The example of the lightbulb clarifies this misconception. Ganz deliberately rejects the individuality of changing a lightbulb because the action is solitary, isolated, and ultimately insufficient for addressing the larger systemic problem of climate change. He contrasts this individualist approach with an example of social organizing. He encourages the writer to initiate a collective effort that is both scalable and multi-faceted. This leads to the second point that in a story of now writers are not sitting idly by and watching from a distance as they tell readers to solve a problem on their own; rather, writers must commit to some new action first, why those actions will address the problem, and why readers should "join" these efforts. Ganz describes the public narrative as a form of leadership that transforms the proposal into an invitation.

When it comes to the climate crisis, the challenges posed by Ganz's story of now are immediately clear to students. What solutions are most needed to address the crisis? What solutions are students committed to taking? To respond to these questions, we read solution-oriented course materials highlighting scientific solutions (Ramanathan and Cole). However, it is common for students to still feel overwhelmed by the size and scope of the problem. Therefore, we focus on the importance of local solutions and scalability (Hayhoe, "Connecting Global Change"); we also read about the power of social movements (Han). Students also research local movements already committed to doing the work that they (and others) may be willing to join.

Two additional challenges regularly present themselves with this part of the unit. One involves the challenge of teaching students how to understand the complexity of solutions in a ten-week quarter so they can identify something they are willing to do and then invite others to join them. As a compromise, I encourage students to focus on stories of now that propose new understandings or ways of thinking. Students often struggle to integrate solutions with stories of self and us. Trust building solutions are those that match the story of self, us, and now and that consider the audience's prior knowledge, attitudes, and beliefs about the crisis. Thus, I conference with students to

provide valuable feedback about how to unify the three elements of their projects. We also do a round of peer-review workshops so that students can discuss their ideas and drafts with similarly situated audiences. In other words, peer discussions become a necessary opportunity to learn whether their stories are unified and whether their strategies for building trust are effective.

Conclusion

In my contribution to this special issue, I have argued that narrative storytelling is an effective science communication tool that should be taught with more regularity in colleges and universities, including FYW programs. Public narratives represent a necessary intervention for bridging the larger communication gaps that are widening levels of distrust among scientists and science-skeptical publics across the country. They are built on three elements that undergraduate STEM students need significantly more knowledge and training in as they prepare to engage the public in their areas of professional specialization; these areas include storytelling their own experiences with skepticism and distrust, the rejection of condescension, labeling and dismissiveness, and a compassionate approach to listening and understanding audiences that seem skeptical or even opposed to science. In the coming decades, as science-related crises become even more urgent, educators have a vital role to play in preparing STEM students to communicate meaningfully across differences. Public narratives represent an important part of that bridge, for they help students to take risks with their writing, stand on common ground with others, and motivate others to act on the challenges we face together.

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